BRADY

May 16, 2011

Ms. Brenda Reese
Lead Remedial Project Manager
Desert Integrated Product Team
NAFVAC Southwest
1220 Pacific Highway
San Diego, CA 92132

SUBJECT: TRANSMITTAL OF DRAFT EXTENDED SITE ASSESSMENT REPORT OF FORMER UNDERGROUND STORAGE TANK SITE 229, NAVAL WEAPONS STATION SEAL BEACH, CALIFORNIA
DOCUMENT NUMBER: RBAE-4302-0120-0087
CONTRACT NUMBER: N68711-03-D-4302

Dear Ms. Reese,

Richard Brady & Associates is pleased to submit one copy of the Draft Extended Site Assessment Report of Former Underground Storage Tank Site 229, Naval Weapons Station Seal Beach, California. This work was performed under the contract cited above. Please contact me at 619-571-4176 if you have any questions or comments.

Sincerely,

Timothy Shields
Program Manager
Richard Brady & Associates

CC. Ms. Pei-Fen Tamashiro, NWS Seal Beach (1 bound, 1 electronic)
Mr. John Broderick, RWQCB (1 electronic)
Mr. Stephen Niou, DTSC (1 electronic)
Ms. Patricia Henshaw, Orange County HCA (1 bound, 1 electronic)
Ms. Li Li, Orange County Water District (1 bound, 1 electronic)
Mr. Mark Persico, City of Seal Beach (1 bound, 1 electronic)
Ms. Diane Silva, Administrative Records (1 bound, 1 unbound, 2 electronic)

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DEPARTMENT OF THE NAVY
NAVAL WEAPONS STATION SEAL BEACH
800 SEAL BEACH BOULEVARD
SEAL BEACH, CA 90740-5000

IN REPLY REFER TO:
5090
Ser 45W/0055
16 May 2011

California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3348

Attention: John Broderick

Ladies and Gentlemen:

The enclosed is forwarded for your review. Please forward your written comments by July 15, 2011.

If you have any questions, please contact me at (562) 626-7897.

Sincerely,

PEI-FEN TAMASHIRO
Installation Restoration Coordinator
By direction of the
Commanding Officer

Enclosure: 1. Draft Extended Site Assessment Report of Former Underground Storage Tank Site 229, Naval Weapons Station Seal Beach, dated May 16, 2011

Copy to:
Naval Facilities Engineering Command
Southwest
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1220 Pacific Highway
San Diego, CA 92132-5190

DEPARTMENT OF THE NAVY
NAVAL WEAPONS STATION SEAL BEACH
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SEAL BEACH, CA 90740-5000

IN REPLY REFER TO:
5090
Ser 45W/0056
16 May 2011

California Environmental Protection Agency
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress CA 90630

Attention: Stephen Niou

Ladies and Gentlemen:

The enclosed is forwarded for your information only.

If you have any questions, please contact me at (562) 626-7897.

Sincerely,

PEI-FEN TAMASHIRO
Installation Restoration Coordinator
By direction of the
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IN REPLY REFER TO:
5090
Ser 45W/0057
16 May 2011

County of Orange Health Care Agency
Environmental Health
1241 E. Dyer Road, Suite 120
Santa Ana CA 92705-5611

Attention: Patricia Henshaw

Ladies and Gentlemen:

The enclosed is forwarded for your review. Please forward your written comments by July 15, 2011.

If you have any questions, please contact me at (562) 626-7897.

Sincerely,

PEI-FEN TAMASHIRO
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SEAL BEACH, CA 90740-5000

IN REPLY REFER TO:
5090
Ser 45W/0058
16 May 2011

Mr. Mark Persico
211 8th Street
Seal Beach, CA 90740

Dear Mr. Persico:

The enclosed is forwarded for your review. Please forward your written comments by July 15, 2011.

If you have any questions, please contact me at (562) 626-7897.

Sincerely,

PEI-FEN TAMASHIRO
Installation Restoration Coordinator
By direction of the
Commanding Officer

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IN REPLY REFER TO:
5090
Ser 45W/0060
16 May 2011

Orange County Water District
P.O. Box 8300
Fountain Valley CA 92728-8300

Attention: Li Li

Ladies and Gentlemen:

The enclosed is forwarded for your review. Please forward your written comments by July 15, 2011.

If you have any questions, please contact me at (562) 626-7897.

Sincerely,

PEI-FEN TAMASHIRO
Installation Restoration Coordinator
By direction of the
Commanding Officer

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NAVAL WEAPONS STATION SEAL BEACH
800 SEAL BEACH BOULEVARD
SEAL BEACH, CA 90740-5000

IN REPLY REFER TO:
5090
Ser 45W/0059
16 May 2011

Dear Restoration Advisory Board Member:

The *Draft Extended Site Assessment Report of Former Underground Storage Tank Site 229, Naval Weapons Station Seal Beach, dated May 16, 2011*, is available on-line in the "Reading Room" section of the Naval Weapons Station Seal Beach Installation Restoration Program website https://www.cnic.navy.mil/SealBeach/OperationsAndManagement/EnvironmentalSupport/EnvironmentalCleanup/index.htm for your review. Please forward your written comments by July 15, 2011.

If you have any questions, please contact me at (562) 626-7897.

Sincerely,

PEI-FEN TAMASHIRO
Installation Restoration Coordinator
By direction of the
Commanding Officer

Copy to:
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Attention: Brenda Reese
1220 Pacific Highway
San Diego, CA 92132-5190

DEPARTMENT OF THE NAVY – NAVFAC SOUTHWEST
Naval Facilities Engineering Command
1220 Pacific Highway, San Diego, California 92132-5190

DRAFT

EXTENDED SITE ASSESSMENT REPORT OF FORMER UNDERGROUND STORAGE TANK SITE 229, NAVAL WEAPONS STATION SEAL BEACH, CALIFORNIA

Contract Number: N68711-03-D-4302
NAVFAC SW CTO 0120

DCN: RBAE-4302-0120-0087

May 16, 2011

Prepared by:

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San Diego, California 92123-4349

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DEPARTMENT OF THE NAVY – NAVFAC SOUTHWEST
Naval Facilities Engineering Command
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DRAFT

EXTENDED SITE ASSESSMENT REPORT OF FORMER UNDERGROUND STORAGE TANK SITE 229, NAVAL WEAPONS STATION SEAL BEACH, CALIFORNIA

Contract Number: N68711-03-D-4302
NAVFAC SW CTO 0120

DCN: RBAE-4302-0120-0087

May 16, 2011

Prepared by:

Fred Essig, P.G. 8407 Date 5/16/11
Richard Brady & Associates
Senior Geologist

Approved by:

Timothy Shields, P.G. 8727 Date 5/16/2011
Richard Brady & Associates
Project Manager

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EXECUTIVE SUMMARY

A release of diesel fuel related to the former operations of the two 10,000-gallon underground storage tanks (USTs) occurred within a limited area of UST Site 229. The USTs were removed from the site in 1991.

A portion of the coastal wetlands of Seal Beach National Wildlife Refuge (SBNWR), which is an estuary of Anaheim Bay, is located approximately 400 feet east of the site. Installation Restoration Program (IR) Site 14, a separate UST release site with no further action (NFA) status, is located between UST Site 229 and the SBNWR.

This Extended Site Assessment investigation of former UST Site 229 consisted of collecting Site Characterization and Analysis Penetromenter System (SCAPS) laser induced fluorescence and cone penetrometer test screening data at 22 locations, collecting and analyzing 7 soil samples, installing 6 temporary well screens, installing and developing 4 groundwater monitoring wells, and performing 4 groundwater sampling and analysis events covering the 4 newly installed wells and 2 existing wells.

The results of the investigation show that mobile fuel product does not appear to exist at the site.

Soil is impacted with residual diesel fuel and related polycyclic aromatic hydrocarbons (PAHs) in the vicinity of the former tank, with a maximum concentration of total petroleum hydrocarbons quantified as diesel in this area of 2,800 mg/kg. The thickness of the residual diesel near former UST Site 229 is greatest within the limits of the former UST excavation. Adjacent to the former excavation, thickness of soil impacted with residual diesel is less than one foot, and appears to continue to thin and pinch out within approximately 50 feet. Petroleum impacts detected in the south and eastern SCAPS locations away from the former UST Site 229 location appear to be related to IR Site 14, based upon groundwater flow direction and available soil and groundwater data from UST Site 229 and IR Site 14.

Dissolved-phase fuel appears to have migrated away from the source area in the down-gradient direction in the shallow groundwater, towards the east and southeast. Dissolved PAH concentrations are below project action limits for all sampling events, except for two detections of naphthalene. Dissolved diesel concentrations appear to be stable. Dissolved oxygen and oxidation/reduction potential data from groundwater sampling suggesting that remediation by natural attenuation is occurring.

The nature and extent of the diesel release at former UST Site 229 hast ben adequately defined by the SAP decision rules. The plume appears to be stable. No complete pathways to human receptors have been identified. Additionally, an ecological risk screening evaluation has concluded that any dissolved phase diesel constituents migrating towards ecological receptors will be diluted and attenuated to below relevant ecological screening levels prior to reaching ecological receptors. Therefore, it is recommended that former UST Site 229 be granted a status of NFA.

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Appendix B Boring Permit and Well Logs

Appendix C Field Documentation

Appendix D IDW Manifests and Lab Data

Appendix E Well Survey Report

Appendix F Groundwater Sample Data Validation Narratives

Appendix G Data Quality Review

Appendix H Ecological Risk Screening Evaluation

ACRONYMS/ ABBREVIATIONS

bgs	below ground surface
BRADY	Richard Brady & Associates
BTEX	benzene, toluene, ethylbenzene and xylenes
CDWR	California Department of Water Resources
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chain of custody
COPC	chemicals of potential concern
CPT	cone penetrometer test
CSM	conceptual site model
DCA	dichloroethane
DO	dissolved oxygen
DoN	United States Department of the Navy
DOT	Department of Transporation
DQO	Data Quality Objective
DTSC	California Department of Toxic Substances Control
ESA	Extended Site Assessment
ft/ft	foot per foot
FWENC	Foster Wheeler Environmental Corporation
GCE	Gutierrez Canales Engineering
GPS	global positioning system
IDW	investigative derived waste
IR	Installation Restoration Program
IITM	Interim Internal Technical Memorandum
JEG	Jacobs Engineering Group

LIF	laser induced fluorescence
MARRS	MARRS Services, Inc.
mg/kg	milligrams per kilogram
µg/kg	micrograms per kilogram
mg/L	milligrams per liter
MTBE	methyl tertiary butyl ether
NAD83	North American Datum 1983
NAVD88	North American Vertical Datum 1988
NAVFAC SW	Naval Facilities Engineering Command Southwest
NAVWPNSTA	Naval Weapons Station
NFA	no further action
NTU	nephelometric turbidity units
OCHCA	Orange County Health Care Agency
ORP	oxidation/reduction potential
PAHs	polycyclic aromatic hydrocarbons
PAL	project action limit
PCE	tetrachloroethylene
POC	point of contact
ppm	parts per million
PVC	polyvinyl chloride
PWD	Public Works Department
RAB	Restoration Advisory Board
RES	Riedel Environmental Services, Inc
RWQCB	California Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SBNWR	Seal Beach National Wildlife Refuge

SC	specific conductance
SCAPS	Site Characterization and Analysis Penetrometer System
SHAW	Shaw Environmental and Infrastructure, Inc.
TCE	trichloroethylene
TPH-diesel	total petroleum hydrocarbons as diesel
US EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	underground storage tank
VOC	volatile organic compound

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1.0 INTRODUCTION

This Extended Site Assessment (ESA) report has been prepared by Richard Brady & Associates (BRADY) for former Underground Storage Tank (UST) Site 229, Naval Weapons Station (NAVWPNSTA) Seal Beach, California (Figure 1-1). The ESA included a Site Characterization and Analysis Penetrometer System (SCAPS) investigation, and installing and sampling groundwater monitoring wells. This ESA was performed under subcontract to Shaw Environmental and Infrastructure, Inc. (SHAW), for Naval Facilities Engineering Command Southwest (NAVFAC SW) under contract number N68711-03-D-4302, Task Orders 120 and 181. This investigation was conducted in accordance with the approved Final Work Plan and Sampling and Analysis Plan (SAP) (BRADY, 2009a) and Final SAP Addendum 01 (BRADY, 2009b) for this project.

1.1 Investigation Objective

The objective of this ESA was to provide an up-to-date delineation of the extent of petroleum contamination related to diesel fuel released from two former 10,000-gallon USTs at the site, and to make recommendations for either future work or no further action (NFA). Sampling was performed to adequately evaluate the nature and extent of soil and groundwater contamination related to UST Site 229. Sample results were compared to screening levels to determine if site conditions pose a risk to human health or the environment. The screening levels were described in the SAP as "project action limits" (PALs).

1.2 Scope of Work

Prior to this investigation, the existing data set left uncertainty regarding the thickness and spatial distribution of petroleum hydrocarbons in soil and groundwater. The Navy identified the SCAPS Cone Penetrometer Test (CPT) / Laser Induced Fluorescence (LIF) direct-push technology, combined with fixed-base laboratory testing of soil and groundwater samples, as being appropriate to provide additional data.

To meet the investigation objective, BRADY performed the following tasks:

- Pushed the SCAPS CPT/LIF probe at 22 locations to a maximum depth of 30 feet below ground surface (bgs) to provide rapid screening data about the site geology and distribution of petroleum hydrocarbons. The SCAPS screening data provided the basis for locating soil samples and groundwater monitoring wells.
- Installed temporary well screens at six of the SCAPS locations to provide a preliminary evaluation regarding the presence or absence of mobile fuel (*i.e.*, free product) and to evaluate approximate depth to water table to support the design of permanent monitoring wells.
- Collected seven soil samples from six SCAPS locations and analyzed the samples for total petroleum hydrocarbons diesel range (TPH-diesel), naphthalene, polycyclic

aromatic hydrocarbons (PAHs), and benzene, toluene, ethyl benzene, and xylenes (BTEX).

- Installed and developed four permanent groundwater monitoring wells based on SCAPS data, soil sample data, and previous groundwater gradient information from the vicinity of UST Site 229.
- Collected groundwater samples during four monitoring events from the four newly installed monitoring wells (SB229-MW01, -MW02, -MW03 and MW04) and two existing monitoring wells (BSW-14-4 and BSW-14-6). Groundwater samples were analyzed for TPH diesel by United States Environmental Protection Agency (US EPA) Method 8015 Modified and PAHs including naphthalene by US EPA Method 8270C-SIM.

1.3 Regulatory Agency and Public Partnering

The Navy conducts site investigations at NAVWPNSTA Seal Beach in the Installation Restoration (IR) Program in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act. For petroleum sites such as UST Site 229, the California Regional Water Quality Control Board – Santa Ana Region (RWQCB) is the lead regulatory agency.

Several activities involved the regulatory agency partners and the public in planning and executing the investigation. A summary of partnering activities related to this project is provided below:

September 9, 2008, Planning Meeting with RWQCB. The project team developed preliminary technical strategy and schedule for the project. The strategy for the site and screening criteria was discussed.

January 20, 2009, Restoration Advisory Board (RAB) Meeting. The project team presented the planned Extended Site Assessment of Former Underground Storage Tank 229 to the RAB and the community.

April 3, 2009, RWQCB Agency Representative Site Visit. The RWQCB agency representative (Patricia Hannon) visited the site and observed SCAPS operations.

July 14, 2009, Well Installation Pre-Mobilization Meeting. The RWQCB and Navy agreed upon the provisions outlined in the SCAPS investigation Interim Internal Technical Memorandum IITM (BRADY, 2009c), including the proposed new monitoring well locations, the addition of existing wells BSW-14-4 and BSW-14-6 to the groundwater monitoring program, and the exclusion of BTEX by US EPA 8260B from the groundwater analytical protocol. Additional details regarding this meeting were presented in the Final SAP Addendum (BRADY, 2009b).

January 12, 2010, Project Managers Meeting. The Navy and the RWQCB agreed to change the groundwater monitoring schedule from quarterly to semi-annually. The next groundwater monitoring well sampling event was scheduled for May 2010.

July 13, 2010, Project Managers Meeting. The Navy reported the award of the task order for additional groundwater sampling, scheduled for July 2010 (originally scheduled for May 2010). The RWQCB expressed preference that the final groundwater sampling event, originally scheduled for November 2010, be scheduled to occur in the rainy season after substantial rainfall has occurred.

October 12, 2010, RAB Meeting. The Navy presented the results of the investigation to date to the RWQCB, the RAB, and the community. The presentation included the results of three groundwater sampling events. The data showed that the site appeared to be a good candidate for NFA.

1.4 Report Organization

This ESA Report is organized as follows:

- Section 1 presents the objectives, scope, and organization of the report
- Section 2 describes the background and environmental setting
- Section 3 summarizes investigation rationale
- Section 4 summarizes the field activities
- Section 5 presents the investigation results
- Section 6 presents the finding of the revised CSM.
- Section 7 presents the summary and conclusions
- Section 8 presents the references.

Appendices that contain supporting data and details are as follows:

- Appendix A – Final Internal Interim Technical Memorandum, SCAPS Investigation
- Appendix B – Boring Permit and Well Logs
- Appendix C – Field Documentation
- Appendix D – IDW Manifests and Lab Data
- Appendix E – Well Survey Report
- Appendix F – Groundwater Sample Data Validation Narratives
- Appendix G – Data Quality Review
- Appendix H – Ecological Risk Screening Evaluation.

Figures and tables are included in separate tabs at the end of the document.

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2.0 BACKGROUND

2.1 Facility Location and Description

NAVWPNSTA Seal Beach is located in the northwest corner of Orange County, California, in the City of Seal Beach; which is approximately 20 miles south of Los Angeles (Figure 1-1). Nearby communities include the Cites of Huntington Beach, Westminster, Los Alamitos, and Garden Grove. Comprised of 5,256 acres, NAVWPNSTA Seal Beach is a Navy weapons and munitions loading, storage, and maintenance facility. NAVWPNSTA Seal Beach consists of 230 buildings and 128 ammunition magazines providing over 500,000 square feet of ammunition storage space. NAVWPNSTA Seal Beach has been operated by the Navy and its contractors since its inception in 1944.

2.2 Site Description and History

UST Site 229 is located southwest of the intersection of Industrial Road and Kitts Highway adjacent to the eastern edge of former Building 229 (Figures 2-1 and 2-2). UST Site 229 includes a backfilled tank pit which formerly contained two 10,000-gallon steel USTs. The backfilled pit covers an area of approximately 200 square feet. Currently the site is a vacant unpaved (dirt) lot, with minor sparse vegetation consisting of grass and weeds.

A portion of the coastal wetlands of Seal Beach National Wildlife Refuge (SBNWR), which is an estuary of Anaheim Bay, is located approximately 400 feet east of the site (Figure 2-1). IR Site 14, a separate UST release site with NFA status, is located between UST Site 229 and the SBNWR.

The Site 229 USTs were reportedly used to store diesel fuel for a boiler that provided heat for former Building 229. The building was the office of the NAVWPNSTA Seal Beach Comptroller/Controller and was used for accounting functions. Building 229 was demolished in the 1990s and no surface expression of the building remains.

The USTs were removed from the site in 1991 by Riedel Environmental Services, Inc. (RES) (RES, 1991). As part of UST removal activities, RES collected four soil samples from the UST excavation for TPH-d and BTEX analysis by US EPA Methods 8015 and 8020, respectively. A summary of the soil sample analytical results is presented in Table 2-1.

Upon completion of the excavation, UST removal, and sampling activities, RES backfilled the excavation with fill material. The concrete anchor pad for the two USTs was left in place at a depth of approximately 11 feet bgs. Based on the TPH-d and BTEX concentrations reported in soil samples from the UST excavation, RES recommended further investigation (RES, 1991).

2.2.1 Adjacent IR Site 14

IR Site 14 is located to the east of former UST Site 229 (Figure 2-2), and is the former location of three steel USTs which were used to store leaded gasoline and diesel fuel for a refueling service station used by base vehicles (Foster Wheeler Environmental Corporation [FWENC], 2000). Use of the USTs was discontinued in 1984 after the gasoline tank was found to have leaked.

In 1984, the United States Department of the Navy (DoN) commissioned the United States Geological Survey (USGS) to perform a study of the extent of the gasoline contamination. The study included drilling 33 shallow test holes and installation of groundwater monitoring wells in several of the test holes. Both soil and groundwater samples were collected and analyzed as part of the study.

Results of the USGS study at IR Site 14 (USGS, 1991) concluded that approximately 5,800 gallons (with an uncertainty of 2,000 gallons) of gasoline were present in the subsurface soil at concentrations below residual saturation. The USGS report stressed that the estimated quantity of gasoline was a minimum estimate of the total quantity of gasoline contained in the subsurface, since it did not include the gasoline-saturated soil in the vicinity of the former leaking tank. The USGS study concluded that gasoline had spread almost radially through the subsurface soil to a distance of 150 to 300 feet from the source (USGS, 1991). The gasoline-contaminated soil was estimated to encompass an area of 160,000 square feet, with an approximate thickness of 1 to 2 feet near the water table.

2.3 Previous Site Investigations

This section summarizes site investigations conducted after the UST 229 removal.

In 1992, Jacobs Engineering Group (JEG) conducted a UST Study Site Assessment at UST Site 229 (JEG, 1993). This UST Site Assessment consisted of a geophysical survey, a screening study consisting of the collection of five soil gas samples, the advancement of seven soil borings, and the conversion of three of seven soil borings to groundwater monitoring wells. Soil boring, soil sampling points, and groundwater monitoring well locations are depicted on Figure 2-3.

Eleven soil samples were analyzed for TPH-extractable as diesel by US EPA Method 8015 and BTEX by US EPA Method 8020. Five soil gas samples were analyzed for TPH by an unspecified method. Three groundwater samples were analyzed for TPH-extractable as diesel by US EPA Method 8015 and BTEX by US EPA Method 8020 (JEG, 1993).

Hydrocarbon concentrations were below reporting limits in all five soil gas samples. However, residual petroleum product was visible on temporary soil gas probes V-1 and V-4 upon removal of the probes (which were installed above the water table) indicating product had migrated away from the UST location (Figure 2-3).

Benzene and toluene were below reporting limits in all 11 soil samples analyzed during the JEG assessment. Ethylbenezene and total xylenes were reported at MW1 in the soil sample from 11 feet bgs at concentrations of 230 and 170 micrograms per kilogram (µg/kg), respectively. TPH-extractable as diesel was reported in 5 of the 11 soil samples analyzed with concentrations ranging from 53 milligrams per kilogram (mg/kg) at MW3 in the sample from 5.5 feet bgs, to 2,600 mg/kg at MW4 in the sample from 11 feet bgs. TPH-extractable as diesel was also reported in soil samples collected from 8.5 feet bgs in soil borings SB6 and SB7.

Soil borings MW1, MW4, and MW5 (Figure 2-3) were advanced to a depth of 28 feet bgs and were converted to groundwater monitoring wells, which were generally screened from 5 to 28 feet bgs. Groundwater was encountered at approximately 8.5 feet bgs in each of the three monitoring wells. The three monitoring wells were developed and sampled. TPH-extractable as diesel and BTEX were below reporting limits in groundwater samples analyzed from these three wells (JEG, 1993).

JEG concluded that free product potentially exists on the groundwater above the in-place UST anchor pad. In addition, JEG concluded that dissolved hydrocarbons in groundwater appeared to be confined within approximately 10 feet north of the former excavation. Also, soil was impacted with hydrocarbons above groundwater in the former excavation, and approximately 25 feet northwest of the excavation beyond soil boring SB6 and monitoring well MW4 (Figure 2-3). JEG recommended that hydrocarbon impacted soil be removed and remediated, and that any free product be removed during excavation activities (JEG, 1993). At the conclusion of the JEG site assessment, all three groundwater monitoring wells were destroyed.

No other additional work was conducted after 1993 due to an experimental bioremediation study conducted by Stanford University (Reinhard, et. al., 2000) at IR Site 14. The investigators of the study at IR Site 14 requested that no intrusive work be conducted at UST Site 229 during the bioremediation study.

On May 31, 2007, the RWQCB issued *"Information Request for Underground Storage Tank Site 229, US Naval Weapons Station Seal Beach, GeoTracker ID: T0605901373"* requesting any additional information pertaining to studies or remedial activities performed at UST Site 229. The letter also requested the above referenced information and a Work Plan for the site by July 31, 2007; however, based on funding prioritization, the investigation was delayed (RWQCB, 2007).

In August 2008, NAVFAC SW authorized BRADY through Shaw to complete a Site Characterization of NAVWPNSTA Seal Beach UST Site 229 using SCAPS. This ESA Report documents site characterization performed between March 2009 and December 2010.

2.3.1 Adjacent IR Site 14

Various other assessment activities were conducted at adjacent IR Site 14. A phased groundwater investigation was conducted at IR Site 14 between 2001 and 2002, which included the installation and development of four new groundwater monitoring wells, BSW-14-6 through BSW-14-9, and quarterly groundwater sampling of nine monitoring wells (BSW-14-1 through -9). Four quarters of groundwater samples were analyzed for VOCs, and TPH as gasoline and diesel. Conclusions presented in the 2002 Annual Groundwater Monitoring Report indicated that the petroleum hydrocarbon plume appeared to be stable and not migrating off-site. Concentrations of BTEX, MTBE, and TPH as gasoline and diesel appeared to have decreased or remained stable since 2001 (FWENC 2001b, 2002a, 2002b, 2002c and 2002d; as cited in MARRS, 2007).

An ecological risk screening was conducted by MARRS Services, Inc. and Geosyntec Consultants (MAARS, 2005). The ecological risk assessment was conducted because IR Site 14 is located directly adjacent to the SBNWR. An additional groundwater investigation of IR Site 14 was completed by MARRS Services, Inc. in 2007. The groundwater flow direction during the three monitoring events was to the southeast with gradients of 0.0022, 0.0013, and 0.0022 foot per foot (ft/ft), respectively (MARRS, 2007). Isoconcentration contours for benzene and MTBE in groundwater, and the locations of UST Site 229, IR Site 14, and the SBNWR are depicted on Figure 2-4. The report made a recommendation for NFA, which was granted.

2.4 Land Use

Since NAVWPNSTA Seal Beach was first commissioned in 1944, the facility has been used for weapons and munitions loading, storage, and maintenance. Prior to 1962 it was known as the Naval Ammunition and Net Depot and was used to service anti-submarine nets used to protect fleet bases and anchorages around the world. NAVWPNSTA Seal Beach has evolved into the Navy's primary West Coast ordinance storage, loading and maintenance facility. All current facility operations are industrial, and the Navy's proposed future use for the entire facility will remain industrial, with controlled access restricted to authorized badged personnel. In the Kickoff Meeting for this project, held at NAVWPNSTA Seal Beach on August 22, 2008, the team discussed that the currently vacant and unpaved site is not planned for redevelopment.

2.5 Topography and Climate

UST Site 229 is situated on the gently sloping southeast margin of Landing Hill, which is a mesa that extends 1.8 miles inland from the beach and reaches a maximum elevation of 70 feet above sea level (MARRS, 2007). The site and immediate area is flat, with elevations ranging from approximately 11 to 13 feet above mean sea level, based on well survey data.

The Seal Beach area is characterized by a Mediterranean climate, with warm to hot, dry summers and cool, wet winters. Based on Long Beach climate data, temperatures range from an average

yearly high of 75 degrees Fahrenheit (F) to an average low of 55 F, with an average annual rainfall of 12.94 inches (NWS, 2010).

2.6 Geology

Former UST Site 229 is located approximately 0.1 to 0.2 mile southwest of the mapped surface location of the Newport-Inglewood Fault zone (USGS and CGS, 2006).

The following regional geologic information is summarized in the "Final Groundwater Monitoring Report" for adjacent IR Site 14 (MARRS, 2007):

"As reported in California Department of Water Resources (CDWR) Bulletin No. 63-2 entitled Sea-Water Intrusion: Bolsa-Sunset Area, Orange County, Landing Hill is formed by anticlinal uplift along the Newport-Inglewood Fault (CDWR, 1968)."

"The SBNWR is situated in the Sunset Gap, which is an erosional plain that is partially backfilled by recent lagoonal, tidal marsh, and alluvial floodplain deposits. It is reported that in the Sunset Gap area, the lagoonal-alluvial sediments overlie Pleistocene sediments and reach a maximum thickness of 35 to 40 feet. The underlying Pleistocene sediments of the Lakewood and San Pedro Formations comprise thick water-bearing formations in the area. The Lakewood Formation is interpreted to reach a thickness of 400 feet in the inland portion of the Sunset Gap. The underlying San Pedro Formation has a reported thickness of 550 to 650 feet in the Landing Hill area (CDWR, 1968)."

The site-specific geologic findings of this investigation are discussed in Section 5.

2.7 Hydrogeology

NAVWPNSTA Seal Beach is located within the East Coastal Plain Hydrologic Subarea of the Lower Santa Ana River Hydrologic Area, which has designated existing or potential municipal, agricultural, and industrial beneficial uses for groundwater (RWQCB, 2008). The base overlies groundwater of the Santa Ana Pressure Subbasin, and is within the Orange County Groundwater Management Zone (RWQCB, 2008). The Orange County basin contains several aquifers, two of which, the Lynwood and Silverado aquifers, merge across most of NAVWPNSTA Seal Beach (MARRS, 2007).

Tidal influence from the adjacent SBNWR is controlled by engineered channels and engineered flow controls that restrict flow from Anaheim Bay. The tidal influence within the salt marsh environment is muted by the engineered controls which restrict flow in and out of the tidal flats. The effect of these engineered controls can be observed in the delayed and reduced tidal fluctuations observed within the salt marsh east of the site (MARRS and GSC, 2005).

Previous studies have investigated tidal influences on groundwater flow in the vicinity of former UST Site 229. The USGS's tidal influence study (USGS, 1991) and the more recent tidal influence study within the Final 2002 Annual Groundwater Monitoring Report for IR Site 14

(FWENC, 2003 as cited in MARRS and GSC, 2005) both indicate that tidal influences on groundwater are limited in the area of IR Site 14. As evidenced by the specific conductance (SC) data of shallow groundwater in the Site 14 area provided in the USGS Report (USGS, 1991), there is an abrupt change in SC levels between the marsh data and the Site 14 monitoring points. This contrast between the saltwater (high SC levels) within the marsh and the relatively water (low SC levels) observed in the upgradient wells at Site 14 suggest a narrow "groundwater mixing zone". The impact of the tidal mixing zone is discussed in further detail in Section 6.3.1 of this report. FWENC [2003 as cited in MARRS and GSC, 2005] reports that tidal influence associated with the nearby wetlands does not have a significant influence on the groundwater flow direction.

Groundwater elevations measured during this investigation are discussed in Section 5. Groundwater is relatively shallow at former UST Site 229, ranging from approximately 7 to 9 feet bgs. The groundwater gradient is relatively flat, with an average magnitude of approximately 0.001 ft/ft.

3.0 INVESTIGATION RATIONALE

The investigation rationale was based upon historical data from previous investigations and the need to further delineate fuel contamination in soil and shallow groundwater at former UST Site 229. Data design and collection followed the 7-step Data Quality Objective (DQO) process as detailed by the US EPA (US EPA, 2006). The process is used to determine the type, quantity, and quality of the data necessary to support decision-making regarding current site conditions and future site management decisions. DQOs for this investigation are presented in Worksheet #11 of the SAP (BRADY, 2009a). Deviations from the SAP are described in Section 4.4.

3.1 Sampling Rationale

This investigation was designed to use SCAPS to screen the extent of petroleum hydrocarbon contamination and to provide a basis for soil and groundwater sampling. Seven initial SCAPS locations were preselected, and the remaining were chosen using a dynamic work strategy decision rule protocol described in Step 4 of the DQOs in the SAP (BRADY, 2009a). The SCAPS locations as performed are shown on Figure 2-2.

Soil samples were collected and analyzed to:

- Evaluate SCAPS LIF effectiveness
- Confirm the boundary of petroleum-contaminated soil
- Compare to the PALs defined in Worksheet #15 of the SAP
- Provide data to estimate the mass of petroleum hydrocarbons left in place.

Six locations were identified for soil sampling based on the SCAPS data, and a total of seven soil samples were collected for fixed-based laboratory analysis. To evaluate the SCAPS LIF effectiveness, one soil sample was collected from the depth interval of the highest site-wide fluorescence. A second soil sample was collected from a depth interval of background fluorescence directly above the sample with the highest fluorescence. A third soil sample was collected from an area where background fluorescence was measured through the entire push interval, at a depth corresponding to the highest fuel fluorescence at an adjacent push location. The remaining samples and sample locations were established based on decision rules established to define the lateral boundary of the study.

3.2 Rationale for Selecting SCAPS Technology

SCAPS was selected for this investigation because of its real-time high-density soil classification and petroleum contamination screening capability. This assessment strategy allowed for rapid and optimized sample depth selection and enhanced vertical accuracy provided by computerized sample depth control.

3.3 Rationale for Groundwater Monitoring Well Locations and Design

The SCAPS LIF and soil sample analytical data were used to identify four permanent monitoring well locations and to support well construction screen interval design. Given the soil conditions and the SAP requirements, the wells were placed and constructed as follows:

- One upgradient well (SB229-MW04) was positioned in the vicinity of SB229-08 to measure groundwater quality outside of the UST Site 229 tank pit area
- One source well (SB229-MW01) was positioned in the former tank pit location near SB229-01
- Two additional wells (SB229-MW02 and -MW03) were positioned to evaluate plume extent and to provide enhanced information regarding groundwater flow.

In addition, two existing wells (BSW-14-4 and BSW-14-6) from IR Site 14 were added to the groundwater monitoring program. A SAP Addendum (BRADY, 2009b) was prepared to address these two wells. This addition of the wells was a result of the interim SCAPS data and a meeting on July 14, 2009 between the Navy and the RWQCB representative, documented in Worksheet #9 of the SAP Addendum. These wells were added to help characterize the nature and extent of petroleum hydrocarbon impacts to groundwater. Additional details regarding monitoring well rationale are presented in the IITM (Appendix A).

3.4 Rationale for Selecting Analytical Methods

Based on the site history, previous sample analytical data, and chemicals associated with fuels, the following analyses were performed on the soil and/or groundwater samples:

- TPH–d by US EPA Method 8015 Modified (soil and groundwater samples)
- BTEX by US EPA Method 8260B (soil samples)
- PAHs (including naphthalene) by US EPA Method 8270C-SIM (soil and groundwater samples).

Based on the interim data from the SCAPS investigation, and the July 14, 2009, meeting between the Navy and the RWQCB representative, BTEX compounds were removed from the groundwater analytical protocol due to the relative lack of BTEX reported in site soil samples near former UST 229, compared to samples near IR Site 14.

4.0 FIELD ACTIVITIES

The field investigation for the ESA at former UST Site 229 was performed across a period of approximately 17 months, as follows:

- March 31 through April 4, and April 6 and 7, 2009 - SCAPS LIF investigation
- April 29 and 30, 2009 - soil sampling
- July 21, 23, and 30, and August 3 – groundwater monitoring well installation and development
- August 6 and 7, 2009 – groundwater monitoring well sampling event #1
- November 12 and 13, 2009 – groundwater monitoring well sampling event #2
- July 19 and 20, 2010 – groundwater monitoring well sampling event #3
- December 8 and 9, 2010 – groundwater monitoring well sampling event #4.

4.1 Permitting and Notification

A courtesy Drilling Permit Application was submitted to the Orange County Health Care Agency (OCHCA), Environmental Health Department for the SCAPS borings and monitoring wells. At the request of OCHCA, boring logs and well installation logs were submitted to OCHCA (Appendix B).

In addition, digging permits were obtained from the NAVWPNSTA Seal Beach Public Works Department (PWD) prior to any intrusive work at the site.

4.2 Utilities

Underground utility clearance was completed for each subsurface investigation location (SCAPS borings and permanent monitoring wells). The locations consisted of 7 locations in the immediate vicinity of the former UST excavation, and an additional 22 potential step-out locations located on a grid pattern with 50-foot spacing. Not all of the 22 potential additional locations were needed.

Proposed SCAPS locations and the utility lines in the area of interest were marked using color-coded surveyor paint. Underground Location Services and Pacific Coast Locators (underground utility marking services) respectively cleared the SCAPS and monitoring well locations using geophysical methods and existing base utility maps provided under the PWD Digging Permits. Underground Service Alert was notified prior to the start of all subsurface work.

Additionally, each intrusive location was hand augered to approximately 5 feet bgs by field personnel prior to using powered drilling equipment. SCAPS and monitoring well locations were placed at least 3 feet away from any marked or otherwise suspected underground utility.

4.3 Investigation Methods

This section describes the SCAPS investigation and monitoring well installation, development, and sampling methods used at the site. The findings of the investigation are described in Section 5.

4.3.1 SCAPS Investigation

A total of 22 SCAPS pushes were completed at former UST Site 229 at the locations shown on Figure 2-2. The first 7 locations in the immediate vicinity of the former UST location were predetermined; the remaining 15 step-out locations were identified using the dynamic work strategy in the SAP. The SCAPS work was conducted in two deployments between March 31, 2009 and April 7, 2009.

The SCAPS investigation used a combined CPT/LIF probe. Lithologic data was collected using the CPT component, which provided continuous, real-time profiling of soil parameters (CPT tip resistance and sleeve friction) that are used to infer the subsurface lithology. Screening data for fuel was collected using the LIF component. LIF provides measurements of fuel fluorescence with a vertical resolution of approximately 2 inches. Additional details about the CPT and LIF technology are provided in the IITM in Appendix A.

4.3.2 Temporary Well Screens

Temporary well screens were installed at six of the SCAPS CPT/LIF locations (SB229-01, -02, -03, -09, -10, -16) to check for the presence of fuel hydrocarbon free product. In addition, the well screens provided information on depth to water that was useful in designing the permanent monitoring wells. The temporary well screens were constructed of flush-threaded machine slotted ¾ inch polyvinyl chloride (PVC) pipe with pre-packed 0.010 inch slotted filter elements. Well screen intervals were from approximately 5 to 10 feet bgs. The temporary well screens were not surged or pumped to develop the wells. The temporary well screens were left in the ground for 5 to 7 days, after which they were removed and borehole backfilled in accordance with the procedures described in Section 4.3.4. A summary of the temporary well screen data is presented in Table 4-1.

4.3.3 Soil Sampling

Seven soil samples were collected on April 28 and 29, 2009, using 6-inch-long stainless steel tubes and a direct-push drive sampling tool. The samples were analyzed for BTEX, naphthalene, PAHs, and TPH-d by EMAX Laboratories Inc. in Torrance, California. The laboratory analyses were scheduled in accordance with the Final SAP (BRADY, 2009a). Additional details are provided in the IITM (Appendix A).

4.3.4 Destruction and Grouting of SCAPS Holes

The SCAPS probe is equipped with an internal grout injection tube which runs the length of the probe umbilical. The grout pumped through the tube consisting of water, Portland cement,

bentonite and Sikament (a non-toxic friction reducing additive). After the completion of each penetrometer push, the probe was withdrawn approximately 1 inch to allow grout pump pressure to eject the sacrificial probe tip. The grout mixture was then pumped down the tubing to the total push depth. As the rods were extracted, the grout mixture filled the hole under positive pressure from bottom to top to seal penetrometer holes in accordance with California state regulations. SCAPS soil sampling holes were grouted in the same manner using a dedicated grouting probe. Temporary monitoring well casings were removed after water level and free product monitoring was completed and was grouted with a grouting probe using the tremie method.

4.3.5 Monitoring Well Installation

Four 2-inch-diameter permanent groundwater monitoring wells (SB229-MW04, -MW02, -MW03, and -MW04) were installed on July 21, 2009. The wells were installed with a conventional rotary drill rig equipped with 8 inch outside diameter hollow stem augers to depths ranging from approximately 14.5 to 16 feet bgs. The rational for permanent monitoring well installation locations is described in Section 3.3.

Each monitoring well was constructed of manufacturer-cleaned and wrapped, flush-threaded, 2-inch-diameter, Schedule 40 PVC casing, with a 10 foot length of 0.010 inch slotted casing. The well annulus was backfilled with #2-16 filter pack sand, and hydrated bentonite chips. Each of the permanent wells was completed at ground surface with a 12-inch-diameter flush-mounted secured well box set in a 2 by 2 foot concrete well pad and a locking well cap placed on the well casing. During drilling, soil cuttings were logged by a State of California Registered Geologist at designated intervals and at identifiable lithologic changes. Monitoring well logs and construction details are presented in the Well Construction Report in Appendix B.

On July 30, 2009, SB229-MW04 was relocated a few feet away from its original location in order to increase the separation between the well and an overhead utility line. The relocated well was installed using the drilling methods used previously. The original well SB229-MW04 installed on July 21, 2009, was properly destroyed by drilling out all well materials and sealing the borehole with 50 gallons of cement/bentonite grout, which exceeded the calculated borehole volume by 9 gallons.

Well locations were surveyed on August 6, 2009, as described below in Section 4.3.9.

4.3.5.1 *Monitoring Well Development*

Immediately following well installation and water level stabilization, all four monitoring wells were developed. A surge block was attached to the drill rig, placed inside of the well casing and slowly raised and lowered within the screened interval to promote hydraulic communication between the geologic formation and the well. Partial development with the surge block took place immediately following placement of the filter pack, but prior to placement any sealing material. After the concrete surface seal had hardened, each well was purged with a submersible pump and/or disposable bailer, and turbidity was measured with a HF Scientific, Inc. Micro TPI

portable turbidity meter. If water was added to the borehole during drilling, then the volume of water added to the borehole was removed. Then, each well was purged until three borehole volumes were removed. Well development records are available in Appendix C. All down-hole purge equipment was decontaminated between wells in accordance with the SAP.

4.3.5.2 *Monitoring Well Sampling*

Groundwater monitoring was conducted during four events (August and November 2009, and July and December 2010). Groundwater samples were collected from the four newly installed monitoring wells (SB229-MW01 through -MW04), and two existing monitoring wells (BSW-14-4 and BSW-14-6).

Depth to groundwater was measured in each monitoring well using a Solinst water level indicator marked in 0.01 foot increments relative to a fixed point located at the top of each well casing. These measurements were recorded in the field logbook. The water level indicator was decontaminated between wells in accordance with the SAP.

Low-flow/low-stress groundwater sampling was performed in accordance with the SAP. Groundwater wells were purged and sampled using a QED low-flow bladder pump. Water-quality indicator parameters (e.g., pH, temperature, conductivity, DO, and ORP) were measured using an YSI multi-parameter meter with flow-through cell attached directly to the pump discharge tubing during purging. Turbidity was measured using a HF Scientific, Inc. Micro TPI portable turbidity meter. Measurements were recorded on the Low-Flow Well Purging Field Water Quality Measurements forms (Appendix C) at approximately 3 to 5 minute intervals. Stabilization was achieved after all indicator parameters stabilized within the predetermined range for each parameter of interest for three successive readings. Stabilized water quality indicator parameters are presented in Table 4-2. After drawdown and chemical indicator parameters stabilized, groundwater samples were collected from the discharge tube of the bladder pump into the appropriate laboratory sampling containers.

Groundwater samples were analyzed by EMAX Laboratories, Inc. for TPH-diesel by US EPA Method 8015 Modified and PAHs (including naphthalene) by US EPA Method 8270C-SIM.

4.3.6 Sample Handling and Custody

Samples were packaged to allow the samples to be delivered to EMAX Laboratories Inc. in Torrance, California undisturbed and in good condition. The packaging procedures used were designed to meet US EPA and Department of Transportation (DOT) regulations. Immediately after sample collection, sample labels were filled out and affixed to each sample container. Each sample was placed in a re-sealable plastic bag to keep the sample container and label dry, as well as prevent any spills from coming into contact with other samples. Sufficient packing material was used to prevent sample containers from making contact during shipment. Enough wet ice was added to maintain sample temperatures of 4o±2°C. Field samples and ice were collectively double-bagged in plastic bags and taped shut to avoid water leakage, then placed in the ice chests

that served as shipping containers. The ice chest drain plug (if present) was taped shut both inside and outside to further ensure that there was no water leakage.

The Chain-of-Custody (COC) forms were completed and signed by BRADY field personnel and relinquished to the EMAX courier on-site during pickup of the ice chests. The BRADY field personnel retained a copy of the signed COC. Because the samples were relinquished on-site to the EMAX courier, custody seals were not used on the ice chests.

Samples accumulated before transfer to the laboratory were stored in an ice-filled chest and properly protected from breakage. Samples were not held on site for more than 24 hours.

All samples were recorded on COC forms using the sample identification numbers described in the Final SAP (BRADY, 2009a). COCs were completed using waterproof ink and in a manner to ensure entries were legible. Any errors made by the individual completing the COC were crossed out with a single line, initialed, and dated. The COC serves as the legal documentation of the sample custody since it records the transfer of the samples from field personnel to the laboratory to ensure that no tampering occurs.

Upon receipt, the laboratory representative signed the COC form and recorded the temperature of the temperature blank on the COC form and on the Sample Receipt form.

4.3.7 Decontamination Procedures

For each SCAPS push, the push-rod assembly and probe were decontaminated as they were withdrawn from the subsurface by a manifold system with high-pressure water jets, located beneath the floor of the SCAPS truck. The manifold decontamination water was then recovered and contained in a storage drum at the rear of the truck.

Non-disposable sampling equipment was decontaminated to prevent the introduction of extraneous material into samples and to prevent cross-contamination between samples. Decontamination of small non-disposable sample equipment was conducted in accordance with the SAP.

4.3.8 Investigative Derived Waste

Wastes generated during the fieldwork included purged groundwater, decontamination water, personal protective equipment, and soil cuttings. The wastes were containerized on site and stored temporarily in labeled, DOT approved, 55-gallon drums inside a secondary containment area setup in the parking lot adjacent to Building 230. All investigative derived waste (IDW) waste was transported off site by a certified waste disposal contractor. Analytical results and manifests for IDW are located in Appendix D.

4.3.9 Land Survey

SCAPS direct push locations were surveyed by the SCAPS field crew using a portable Trimble Global Positioning System (GPS) receiver capable of sub-meter horizontal accuracy. GPS survey data are summarized in Table 4-3.

On August 6, 2009, six groundwater monitoring wells (four newly installed wells and two existing wells) were surveyed by Gutierrez Canales Engineering (GCE). Survey control was established using US State Plane, North American Datum 1983 (NAD83) and North American Vertical Datum 1988 (NAVD88) from National Geodetic Survey data sheets. Survey information was collected using Trimble GPS equipment to provide field data accurate to within 0.01 foot. The survey report is available in Appendix E.

4.4 Deviations from the Work Plan and Sampling and Analysis Plan

Fieldwork was conducted in general accordance with the Final Work Plan and SAP (BRADY, 2009a), and SAP Addendum 01 (BRADY, 2009b). As stated in SAP Addendum 01, based on the interim data from the SCAPS investigation and a meeting on July 14, 2009 between Navy and RWQCB representatives, BTEX compounds were removed from the groundwater analytical protocol due to the relative lack of BTEX reported in site soil samples near former UST 229, compared to samples near IR Site 14.

During the January 12, 2010, Project Managers Meeting, the Navy and the RWQCB agreed to change the groundwater monitoring schedule from quarterly to semi-annually. During the July 13, 2010, Project Managers Meeting, the RWQCB expressed preference that the fourth groundwater sampling event, originally scheduled for November 2010, be scheduled to occur in the rainy season after substantial rainfall had occurred. The Navy agreed to conduct the fourth event in December 2010.

5.0 INVESTIGATION RESULTS

This section describes the results of the investigation. The validated laboratory analytical reports for data collected during this investigation are provided in Appendix A (soil) and Appendix F (groundwater). A data quality review was conducted to evaluate the data collected during this investigation and determine whether the data meet met the quality objectives outlined in the SAP and SAP Addendum 01. The data quality review is presented in Appendix G.

This section also includes a brief summary of the SCAPS results. The SCAPS results were previously presented in the IITM (BRADY, 2009c) with recommendations for the groundwater monitoring well locations. Additional details about the SCAPS technology was also presented in the IITM. The final IITTM is included in this report as Appendix A.

5.1 SCAPS CPT Soil Classification Data

Twenty-two SCAPS CPT/LIF pushes were completed at UST Site 229 at locations depicted on Figure 2-2. Lithologic data was collected using a CPT probe. Completed SCAP CPT/LIF logs are provided in Appendix A. The column on the left labeled "Qc" is the measured CPT cone (tip) resistance, the next column "Qs" is the measured CPT sleeve friction resistance, and the central column "Soil Class" is the numerical classification of Roberson and Campanella's 1988 soil behavior classification system (Figure 5-1).

The upper most 5 feet of strata was not classified using CPT technology because the soil was disturbed by hand augering for underground utility clearance. However, field personnel encountered approximately 6 inches of loosely consolidated sand and gravels and approximately 3 feet of very hard packed dark brown sandy silt.

CPT data was collected from 5 feet bgs to the extent of the CPT push depth. A layer of silty sand was encountered from approximately 5 to 10 feet bgs. As the investigation moved west toward an estuary of Anaheim Bay, the silty sand layer became overlain by a layer of clay, and the layer became thinner and eventually pinched out. The silty sand and clay are underlain by a layer of interbedded clays ranging from approximately 6 to 16 feet bgs. The interbedded clays are underlain by sandy silt that extended to the total depth investigated at each location. Soils with an LIF response typical of petroleum hydrocarbons tended to be classified as finer grained material such as silty sand and interbedded clays.

5.2 SCAPS LIF Data

The SCAPS LIF/CPT data profiles are provided in Appendix A. The two columns on the right side of the SCAPS LIF/CPT data profiles present the LIF data. The column labeled "Wavelength @ Peak" plots the wavelength of the highest fluorescent intensity. The column labeled "Peak Intensity" plots the maximum fluorescence intensity for each reporting point. The SCAPS LIF intensity profiles are also shown on Figure 5-2.

Of the 22 SCAPS LIF pushes, 10 had LIF wavelength and intensity responses typical of fuel fluorescence, 4 had responses that represent potential or weak fuel fluorescence and 8 had no fluorescence response representative of fuel (Figure 5-2 and Appendix A). In the vicinity of the tank excavation of UST Site 229, fuel fluorescence response generally was weak or there was no response. At locations further away from UST Site 229, towards IR Site 14, the LIF response is typical of fuel fluorescence. Fuel fluorescence response was detected in intervals of varying thickness between approximately 6 to 13 feet below ground surface.

The SCAPS location identification numbers were assigned in sequential order as they were performed. The initial seven locations in the immediate vicinity of the former UST tank were predetermined, the remaining locations were determined under a dynamic work strategy. The first location, SB229-01, performed within the former UST excavation, had the highest fluorescence intensity and thickest interval of the seven initial locations, as shown below.

Push Location	Maximum Fluorescence Intensity	Fluorescence Interval (feet bgs).	Fuel Fluorescence Interval Thickness (feet)
SB229-01	139,660	9.1 – 13.8	4.7
SB229-02	11,346	10.9 – 11.7	0.8
SB229-03	39,890	8.8 – 9.6	0.8
SB229-04	3,863	None	-
SB229-05	3,992	None	-
SB229-06	12,222	8.4 – 8.9	0.5
SB229-07	7,705	8.2 – 8.5	0.3

Locations SB229-02 through SB229-07 were all performed around the former UST excavation, and showed either no fuel fluorescence, or very low intensities of fuel fluorescence in thin intervals.

The remaining 15 SCAPS step-out locations were determined based on the dynamic work strategy in the SAP. Since very low intensity fuel fluorescence was found in bounding locations SB229-02, SB229-06, and SB229-07, step-out SCAPS pushes were performed on the pre-designated 50 foot grid.

The results from SB229-02 required two step-out locations, SB229-09 and SB229-10. These two step-out locations had significantly higher fluorescence intensities than were found at any of the location in the vicinity of former UST 229. As shown below, the fluorescence intensities exceeded the maximum range of the detector, and were “clipped”.

Push Location	Maximum Fluorescence Intensity	Fluorescence Interval (feet bgs).	Fuel Fluorescence Interval Thickness (feet)
SB229-01	139,660	9.1 – 13.8	4.7
SB229-02	11,346	10.9 – 11.7	0.8
SB229-09	246,712 (clipped)	8.2 – 10.1	1.9
SB229-10	248,426 (clipped)	8.5 – 11.0	2.5

The SCAPS LIF data can be used to infer a pattern of residual fuel impact described as follows:

- Within the limits of the former UST 229 excavation, there is a thick interval of residual fuel impact that yields moderate fluorescence intensity.
- Surrounding the limits of the Former UST 229 excavation, there are some thin intervals of residual fuel that yield very low fluorescence intensity. These fluorescence intervals are discontinuous and appear to pinch out within approximately 50 feet of the former UST 229 excavation.
- At two locations approximately 50 feet down-gradient and 50 feet cross-gradient from the former UST, there is a thickened interval of residual fuel that yields extremely high fluorescence intensity.

As per the dynamic work strategy in the SAP, additional step-out locations were performed from locations SB229-09 and SB229-10. In general, additional these step-out locations away from UST Site 229 showed increasing thicknesses of residual fuel that yielded extremely high fluorescence intensity, in a down- and cross-gradient direction towards IR Site 14 to the southeast.

5.3 Soil Sample Analytical Results

A total of seven soil samples were collected and analyzed for potential petroleum hydrocarbon impacts at six SCAPS CPT/LIF sampling locations: SB229-01, -02, -08, 10, -19 and -21. The analytical results, shown in Table 5-1, are presented graphically in the Soil Sample Logs in Appendix A. Soil sample analytical results are summarized on Figures 5-2 and the validated laboratory analytical report is included in Appendix A.

Soil samples were collected adjacent to the SCAPS CPT/LIF push holes. Two soil samples were collected from location SB229-01 in the former UST tank pit, one above the water table at 5 to 6.5 feet bgs, and the second below the water table at 11 to 12.5 feet bgs. The soil sample from 5 to 6.5 feet bgs was collected from a depth interval of background fluorescence intensity that did not show a wavelength typical of fuel. The sample showed no visual evidence or other indications of hydrocarbon impacts. Analytical results were below the reporting limits for all constituents, consistent with LIF data. The soil sample from 11 to 12.5 feet bgs targeted an elevated fluorescence intensity response that showed a wavelength typical of fuel. The sample showed visual evidence of green/gray staining and had a weathered fuel odor. The concentration of TPH-diesel was 1,800 mg/kg, consistent with LIF data. Concentrations of benzene and ethylbenzene were below 7 µg/kg, naphthalene was 17 µg/kg, and concentrations of four other PAH compounds ranged from 15.0 µg/kg to 59 µg/kg.

One soil sample was collected from location SB229-02, situated just down gradient of the former tank pit, below the water table at 10.5 to 12 feet bgs. The sample targeted an interval of slightly elevated fluorescence intensity response that showed a wavelength typical of fuel. The sample showed visual evidence of green/gray staining and a diesel fuel odor. The concentration of TPH-

diesel was 2,800 mg/kg, consistent with LIF data. The concentration of benzene was 7 µg/kg, ethylbenzene was 38 µg/kg, xylenes were estimated at 2.7 J µg/kg, naphthalene was 21 µg/kg, and pyrene was 58 µg/kg.

One soil sample was collected from location SB229-08, north and up-gradient of the former fuel tank pit, below the water table at 11 to 12.5 feet bgs corresponding to the depth interval sampled at location SB229-01. The sample was collected from a depth interval of background fluorescence intensity that did not show a wavelength typical of fuel contamination. This sample showed no visual evidence of staining or fuel odor, and analytical results were below reporting limits for all constituents, consistent with the LIF data.

One soil sample was collected from location SB229-10, approximately 60 feet south of the former fuel tank pit, below the water table at 9.0 to 10.5 feet bgs. The sample targeted an interval of elevated fluorescence intensity response that showed a wavelength typical of fuel contamination. Since the original LIF location had been backfilled with ground (Section 4.3.4), the soil sample was collected at a separate location within approximately 3 feet of the LIF location. Eighteen inches of soil was recovered in the direct push sampling device. Inspection of the sample showed more heterogeneous distribution of fuel than was inferred by the LIF data. The sample showed sand and silt with visual evidence of staining and diesel fuel odor consistent with the LIF data from 9.0 to 10 feet bgs, with a decline in odors and stains from 10 to 10.5 feet bgs in sand underlying the silt. The decline in stains and odors was not expected based on the LIF data. The end of the sample tube representing 10.5 feet bgs was marked for laboratory analysis. The sample was selected to confirm the apparent lack of fuel contamination below the narrow confining silty layer. Laboratory analytical results of the bottom of the 10 to 10.5 feet bgs sample tube report a very low estimated detection of diesel range petroleum hydrocarbons (10.0 J mg/kg), suggesting heterogeneous distribution of fuel impact consistent with the visual and olfactory observations. All other constituents were below reporting limits. The LIF response suggesting the presence of fuel at this location is likely representative of the shallower stained soil and a heterogeneous distribution pattern related in part to variations in soil grain size.

One soil sample was collected from location SB229-19, approximately 130 feet southeast and farther down gradient of the former tank pit, at the water table at 8.5 to 10 feet bgs. The sample targeted an elevated fluorescence intensity response that showed a wavelength typical of fuel contamination. The sample showed visual evidence of gray staining and a diesel fuel odor. The concentration of TPH-diesel was 1,800 mg/kg, consistent with LIF data. The concentration of benzene was estimated at 5.9 J µg/kg, ethylbenzene was estimated 190 J µg/kg, xylenes were estimated at 320 J µg/kg, toluene was estimated at 5.0 J µg/kg, naphthalene was 1,900 µg/kg, and five other PAH compounds were detected between 49 µg/kg and 900 µg/kg.

The final soil sample was collected from location SB229-21, approximately 150 feet east of the former tank pit, at the water table at 8.5-10 feet bgs. The sample targeted a fluorescence intensity response that showed a wavelength typical of fuel contamination. The sample from 8.5

to 10 feet bgs showed visual evidence of gray staining and a fuel odor. The concentration of TPH-diesel was 12,000 mg/kg, consistent with LIF data. The concentration of benzene was 43,000 µg/kg, ethylbenzene was 48,000 µg/kg, xylenes were 65,500 µg/kg, toluene was 2,200 µg/kg, naphthalene was 63,000 µg/kg, and eight other PAH compounds were detected at concentrations between 12 J µg/kg and 3,700 µg/kg.

5.4 Temporary Well Screen Data

Table 4-1 presents the water level data and potential free-product monitoring observations for the temporary well screens installed at six of the SCAPS LIF locations (SB229-01, -02, 03, -09, -10, and -16). Water level data was collected at least 72 hours after piezometer installations. Traces of free product (e.g., product droplets) were observed on the interface probe during collection of water level data in temporary well screen locations SB229-01, -09, and -10 on April 7, 2009, but free product was not detected above the instrument's product-thickness measurement capability of 0.01 foot.

It should be noted that the direct push technology used to install the temporary well screens displaces and compacts soil around the direct push rods, causing a temporary variations in pore pressure that could allow normally immobile residual product to be released. Since the temporary well screens were not developed by pumping or surging, the trace product observed may be an artifact of using the direct push technology in soils containing residual immobile fuel.

5.5 Groundwater Monitoring and Sampling Results

5.5.1 Groundwater Elevation Data

The groundwater level and the presence or absence of fuel product in each well was measured using an interface probe relative to a permanently marked survey point on the well casing or monument riser. No fuel product was measured or observed in any of the wells, including SB229-MW01, where trace product droplets were previously observed on a temporary well screen.

The groundwater level measurements were used to determine the groundwater flow direction and identify variations of the groundwater table. Groundwater elevation data measured over four groundwater sampling events are provided in Table 5-2. Groundwater contour maps for four sampling events are provided in Figures 5-3 to 5-6. A summary of the groundwater elevation data is as follows:

Sampling Event Number	Date	Groundwater Elevation (feet above MSL)	Groundwater Flow Direction	Average Gradient (ft/ft)
1	August 6 and 7, 2009	3.35 to 3.54	Towards the east	0.001
2	November 12 and 13, 2009	3.74 to 3.94	Towards the east	0.001
3	July 19 and 20, 2010	3.62 to 4.17	Towards the east	0.001
4	December 8 and 9, 2010	3.67 to 3.82	Towards the east	0.001

Based on a comparison of groundwater elevation data from the four monitoring events, it appears that an anomalously high groundwater elevation was reported in monitoring well SB229-MW01 during the July 2010 event. SB229-MW01 is located within the former tank cavity, and therefore any mounded groundwater present is likely highly localized, temporary, and limited to the backfilled tank cavity and immediate vicinity. Since this is the result of a single anomalous reading, the groundwater elevation from this well was not used to draw the contours on Figure 5-5.

5.5.2 Purge Parameters

Purge parameters give evidence that remediation by natural attenuation (RNA) in groundwater may be occurring within the dissolved phase plume. Dissolved oxygen (DO) is typically the first electron acceptor to be utilized during the aerobic biodegradation of many organic compounds, including constituents of petroleum hydrocarbon fuels (US EPA, 2004). After DO concentrations fall below approximately 0.5 milligrams per liter (mg/L), anaerobic processes will begin if sufficient electron acceptors are present. DO measurements taken during all four events were below 0.5 mg/L from locations within the dissolved phase plume, and above 0.5 mg/L from locations outside of the dissolved phase plume, suggesting that aerobic biodegradation is occurring. After DO has been depleted, biodegradation shifts from aerobic to anaerobic. Anaerobic biodegradation processes reduce oxidized electron acceptors resulting in the generation of measurable reduced species within the dissolved phase plume. The oxidation/reduction potential (ORP) of groundwater is a measure of electron activity and is an indicator of the relative tendency of a solution to accept or transfer electrons. The lower the ORP, the more reducing and anaerobic is the environment (US EPA, 2004). The ORP measurements taken during all four events from locations within the dissolved phase plume were generally negative, suggesting that anaerobic biodegradation is occurring. The lowest ORP measurement (-303.6 millivolts) was observed in monitoring well BSW-14-4 during the November 2009 groundwater monitoring event. ORP measurements observed outside of the dissolved phase plume were significantly greater. Temperature and pH are also at favorable levels for RNA to occur. Biochemical processes are accelerated in groundwater at temperatures greater than 20°C (US EPA, 1998). Groundwater temperatures in excess of 20°C were measured in groundwater from all six wells during all four events. The optimal pH range for reductive pathway during anaerobic biodegradation is between 5 and 9 (US EPA, 1998). Groundwater pH measured from all six wells during all four events was within this range. Purge parameters are presented in Table 4-2.

5.5.3 Groundwater Sample Analytical Results

Groundwater samples were collected during four monitoring events to assess the nature and extent of petroleum hydrocarbon impact associated with former UST Site 229. Results from the four monitoring events are described in the following subsection. Validated laboratory analytical

results are presented in Appendix F, summarized in Table 5-3, are shown on Figure 5-7, and are graphed on Figures 5-8 through 5-10.

In summary, four of the wells show detections of TPH-diesel exceeding the PAL for all four sampling events, and two wells show non-detectable TPH-diesel for all four sampling events. The highest concentration is 2.4 mg/L from SB229-MW01 in the former tank cavity, approximately 10 times the PAL of 0.21 mg/L. Visual examination of the graphed TPH-diesel data (Figure 5-8) suggests that concentrations appear to be stable.

Napthalene concentrations slightly exceeded the PAL of 23 µg/L on the following two occasions:

- 31 J µg/L in well SB229-MW01 during August 2009
- 30 µg/L in well BSW-14-4 during December 2010.

All other PAH compounds consistently had concentrations below the PAL.

Each sampling event is discussed in the following subsections.

5.5.3.1 *First Groundwater Monitoring Event (August 2009)*

Groundwater samples were collected from monitoring wells on August 6 and 7, 2009. Based on the validated laboratory results, TPH-d was reported above the PAL in four of the six wells sampled. The maximum concentration of 2.4 mg/L was in a sample analyzed from well SB229-MW01. The only PAH reported above the screening criteria this event was naphthalene, which was detected in a sample analyzed from well SB229-MW01 at 31J ug/L, slightly above the PAL of 24.0 ug/L.

5.5.3.2 *Second Groundwater Monitoring Event (November 2009)*

Groundwater samples were collected from monitoring wells on November 12 and 13, 2009. Based on the validated laboratory results, TPH-d was reported above the PAL in four of the six wells sampled. The maximum concentration of 1.7 mg/L was in a sample analyzed from well SB229-MW01. No PAHs (including naphthalene) were reported above PALs in groundwater analyzed from all six wells during this event.

5.5.3.3 *Third Groundwater Monitoring Event (July 2010)*

Groundwater samples were collected from monitoring wells on July 19 and 20, 2010. Based on the validated laboratory results, TPH-d was reported above the PAL in four of the six wells sampled. The maximum concentration of 1.9 mg/L was found in samples analyzed from wells SB229-MW01 and SB229-MW02. No PAHs (including naphthalene) were reported above the PALs in groundwater analyzed from all six wells during this event.

5.5.3.4 *Fourth Groundwater Monitoring Event (December 2010)*

Groundwater samples were collected from monitoring wells on December 8 and 9, 2010.

Based on the validated laboratory results, TPH-d was reported above the PAL in four of the six wells sampled. The maximum concentration of 1.6 mg/L was in a sample analyzed from well SB229-MW02. The only PAH reported above the PAL this event was naphthalene, which was detected in a sample analyzed from well BSW-14-4 at 30 ug/L, slightly above the screening level of 24.0 µg/L.

6.0 CONCEPTUAL SITE MODEL

The CSM for the NAVWPNSTA Seal Beach UST Site 229 study area was compiled from historical research, site visits and available hydrogeological and chemical data from all investigations to date.

6.1 Potential Sources and Contaminants

A release of diesel fuel related to the former operations of the two 10,000-gallon USTs occurred within a limited area of the site. During four of groundwater sampling events, free product was not present in the monitoring wells. Mobile fuel product does not appear to exist at the site.

Soil is impacted with residual diesel fuel and related PAHs in the vicinity of the former tank, with a maximum TPH-diesel concentration in this area of 2,800 mg/kg. The thickness of the residual diesel near former UST Site 229 is greatest within the limits of the former UST excavation. Adjacent to the former excavation, thickness of soil impacted with residual diesel is less than 1 foot, and appears to continue to thin and pinch out within approximately 50 feet (Figure 5-2). Based on the SCAPS data, petroleum migration away from the UST was primarily within the saturated silty sand along the top of the clay/silt interbeds, which appears to help limit downward migration (Figure 6-1).

At approximately 50 feet from the former UST 229 location, to the south (cross-gradient) and east (down-gradient), thicker intervals of higher fuel concentrations are inferred from the SCAPS LIF data, which continue to thicken towards IR Site 14.

A USGS study conducted at IR Site 14 concluded that gasoline had spread almost radially through the subsurface soil to a distance of 150 to 300 feet from the source (USGS, 1991). The gasoline-contaminated soil was estimated to encompass an area of 160,000 square feet, with an approximate thickness of 1 to 2 feet near the water table. Note that the former tank cavity at UST Site 229 is located within 300 feet of the IR Site 14 source area.

Petroleum impacts detected in the south and eastern SCAPS locations away from the former UST Site 229 location appear to be related to IR Site 14, based upon groundwater flow direction and available soil and groundwater data from UST Site 229 and IR Site 14. The highest BTEX concentrations in soil (boring SB229-21) roughly correspond with the location of the highest BTEX concentrations in groundwater (well BSW-14-4) reported during IR Site 14 groundwater sampling in 2006 (MARRS, 2007). In addition, the highest concentration and greatest number of PAHs in soil were also reported at this same general location (boring SB229-21).

Dissolved-phase fuel is present in groundwater. Dissolved PAH concentrations are below PALs for all sampling events, except for two detections of naphthalene. Dissolved diesel concentrations appear to be stable. In addition, DO and ORP data from groundwater sampling suggesting that RNA is occurring.

6.1.1 Estimated Mass of Petroleum Hydrocarbons Left In Place

The SCAPS LIF data and soil sampling data was used to provide an updated boundary of the diesel impact in the vicinity of Former UST Site 229, as shown on Figure 5-2. The estimated area of Former UST Site 229 soil impacted with diesel is approximately 3,400 square feet. In order to estimate the volume of soil impacted with diesel, the impacted area was subdivided into cells and each cell assigned a thickness based on a conservative extrapolation from representative LIF data. The assigned thicknesses ranged from 1 to 4 feet, as shown on Figure 6-2. The volume of each cell was calculated and summed, resulting in an estimated volume of former UST Site 229 soil impacted with diesel of approximately 8,250 cubic feet (306 cubic yards). In order to estimate the mass of diesel left in place, the TPH-diesel concentration of 1,800 mg/kg from sample SB229-01-S-02 was applied to the cells representing the former tank excavation, and the TPH-diesel concentration of 2,800 mg/kg from sample SB229-02-S-01 was applied to the remaining volume of estimated soil impacted with diesel. A soil density of 1.5 grams per cubic centimeter was assumed. The resulting estimated mass of diesel left in place at Former UST Site 229 is approximately 1,900 lbs.

6.2 Pathways

Based on LIF and soil sampling data, diesel impact is not present at depths shallower than approximately 8 feet below ground surface, and the distribution appears to be a smear zone associated with water table fluctuations. Based on the three soil samples from the UST Site 229 vicinity, soil from ground surface to 10 feet bgs do not appear to exceed PALs. Therefore, direct contact with soil does not appear to be a complete pathway for exposure.

Dissolved-phase fuel appears to have migrated away from the source area in the downgradient direction in the shallow groundwater, towards the east and southeast.

6.3 Receptors

UST Site 229 lies on the seaward side of the Newport-Inglewood Fault, where groundwater is predominantly brackish to saline and unsuitable for human consumption. Based on the depth of the diesel impact, the concentrations of the PAHs relative to screening criteria, the general lack of VOCs, and the brackish quality of groundwater, no pathways to human receptors have been identified for this site.

6.3.1 Ecological Risk Screening Evaluation

The nearest edge of the SBNWR to the site is located approximately 400 feet east-southeast of the center of the former UST excavation at UST Site 229. An Ecological Risk Screening Evaluation of groundwater data collected from UST Site 229 was conducted by Geosyntec Consultants to determine if groundwater constituents from the site have the potential to impact the surface water body associated with the SBNWR. The Ecological Risk Screening Evaluation (Geosyntec, 2011) is provided in Appendix H.

In summary, The methodology used in the screening evaluation was consistent with ecological risk assessment guidance from the Department of the Navy entitled "*Navy Policy for Conducting Ecological Risk Assessment*" (DoN, 1999) and the California Department of Toxic Substance Control's "*Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities, Parts A and B (California Department of Toxic Substances Control [DTSC], 1996a,b).*" Ecologically-based groundwater screening levels were compared to the maximum concentrations of constituents detected in groundwater. Consistent with the SAP, ecological risk-based screening levels for surface water estuary habitat were used from the document "Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final-November 2007, revised May 2008" (RWQCB, San Francisco Bay Region, 2008).

The technical approach Geosyntec used for the Ecological Risk Screening Evaluation is the same approach used to calculate a dilution attenuation factor (DAF) for adjacent IR Site 14. The Technical Memorandum for NAVWPNSTA Installation Restoration Site 14 prepared in January 2005 (MARRS/Geosyntec, 2005) and approved by the RWQCB and DTSC, specifically Appendix B (MARRS/Geosyntec, 2005), provides a brief calculation of the dilution attenuation factor based on local tidal effects, calculated hydraulic conductivities, existing hydraulic gradients, and an estimate of the plume area at the tidal basin interface. Because UST 229 and Site 14 are adjacent and Site 14 lies between UST 229 and the SBNWR it is appropriate to consider the sites linked.

The Ecological Risk Screening Evaluation for UST Site 229 (Geosyntec, 2011) in Appendix H incorporates UST 229 and Site 14 data to support the use of a DAF for groundwater constituents of concern. Based on the results of the ecological risk screening, it is unlikely that surface water quality at the SBNWR is being or will be adversely affected by constituents detected at UST Site 229. The conclusion is based in the following findings:

- In general, site concentrations in monitoring wells located upgradient of SBNWR and Site 14 are below relevant ecological screening levels for PAHs.
- There is increasing research data pointing to biodegradation of fuel hydrocarbons under both aerobic and anaerobic conditions under a variety of soil and geochemical conditions (USGS, 2010).
- A DAF of 10 to 1 for groundwater to surface water mixing is considered conservative based on the analysis conducted for UST 229/Site 14 which showed a much higher dilution attenuation factor due to groundwater gradient and tidal mixing. After applying the DAF to the site concentrations in monitoring wells, if the PAHs in groundwater were to reach the SBNWR, they would be diluted to below relevant ecological screening levels prior to reaching ecological receptors.

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7.0 CONCLUSIONS AND RECOMMENDATIONS

This investigation consisted of using screening data from 22 SCAPS LIF pushes, the collection and analysis of 7 soil samples, the installation of 6 temporary well screens, the installation and development of 4 groundwater monitoring wells, and 4 groundwater sampling and analysis events covering the 4 newly installed wells and 2 existing wells. Fieldwork for former UST Site 229 was conducted in general accordance with the Final Work Plan and SAP (BRADY, 2009a), and SAP Addendum 01 (BRADY, 2009b).

Based on the validated laboratory results, TPH-d was reported above the project screening level of 0.21 mg/L in four of the six wells sampled (SB229-MW01, SB229 MW02, SB229-MW03 and BSW-14-4) during all four events. The maximum TPH-diesel concentration of 2.4 mg/L was from a sample analyzed from well SB229-MW01 during the August 2009 event. The only PAH reported above the screening criteria was naphthalene, which was detected slightly above the screening level of 24.0 ug/L in samples analyzed from wells SB229-MW01 (31J ug/L) during the August 2009 event, and BSW-14-4 (30 ug/L) during the December 2010 event.

The following conclusions and recommendations were formed based on the results of this investigation as they relate to the DQOs established for this project.

7.1 Data Quality Objective Conclusions and Recommendations

The following DQOs were established in the SAP and approved by the Navy and regulatory team. The DQOs addressed by this investigation are as follows:

1. ***If*** *free-phase petroleum hydrocarbons are measured or observed to be present at any level in a groundwater monitoring well,* ***then*** *corrective action will be recommended, otherwise NFA regarding free-phase petroleum hydrocarbons will be recommended.*

   No free-phase petroleum hydrocarbons was measured or observed in any of the six monitoring wells during four groundwater sampling events. This suggests that traces of product (droplets) that were observed from temporary well screens are an artifact of the direct push technology used to install the temporary well screens. Mobile fuel product does not appear to exist at the site, therefore no further action is recommended for free-phase petroleum hydrocarbons at former UST Site 229.

2. ***If*** *the former diesel fuel release area is bounded by SCAPS LIF locations with LIF intensity counts below 10,000, and the boundary is confirmed by soil sample data from the fixed-base laboratory reporting concentrations of fuel-related constituents below project screening criteria (SAP Worksheet #15),* ***then*** *a recommendation of NFA regarding petroleum contamination of soil will be made for all areas outside the boundary, and the area within the boundary may require corrective action if the soil is*

causing a need for corrective action of groundwater, as determined in decision rules 4a through 4d.

The former diesel release area was bounded by SCAPS LIF locations with LIF intensity counts below 10,000 counts, and confirmed by soil sampling data compared to PALs, except for SCAPS LIF location SB229-02 located south east of the former UST location. LIF intensity at SB229-02 was 11,346 counts in a 0.8-foot-thick interval between 10.9 and 11.7 feet bgs. TPH-diesel in soil at this location was 2,800 mg/kg.

Additional step-out locations were performed away from SB229-02. In general, these step out locations away from UST Site 229 showed increasing thicknesses of residual fuel that yielded extremely high fluorescence intensity, in a down- and cross-gradient direction towards the IR Site 14 to the southeast.

Based on the LIF data intensities, depths, and thicknesses, it appears that the residual diesel impact to soil from former UST Site 229 pinches out somewhere between SB229-02 and the step out pushes to the southeast. The residual fuel towards the southeast appears to be related to the IR Site 14, which has previously been characterized and granted NFA.

3. ***If*** *the validated fixed-base laboratory analysis by EPA Method 8260B of groundwater from a sampling event (from either temporary or permanent groundwater monitoring wells) reports concentrations of BTEX or naphthalene greater than the project screening criteria (SAP Worksheet #15),* ***then****, per agreement at Planning Meeting with California RWQCB (SAP Worksheet #9), analyses of groundwater by EPA Method 8260B reporting also MTBE will be recommended for subsequent groundwater sampling events*.

   Based on the interim data from the SCAPS investigation, a subsequent meeting on July 14, 2009 between the Navy and the RWQCB representative, and Final SAP Addendum 01 (BRADY, 2009b), BTEX compounds by EPA Method 8260B were removed from the groundwater sampling analytical protocol due to the lack of BTEX detections reported in site soil samples. This resulted in no need for analysis of MTBE by EPA Method 8260B.

4. a. ***If*** *validated fixed-base laboratory analysis from the first groundwater sampling event of four temporary or permanent groundwater monitoring wells, positioned with one located upgradient, one in the location of the highest LIF fluorescence, and two located downgradient, reports concentrations of fuel-related constituents below project screening criteria (SAP Worksheet #15),* ***then*** *NFA related to UST Site 229 will be recommended.*

Based on the validated analytical data from the six permanent monitoring wells sampled during the first groundwater event in August 2009, TPH-d and naphthalene were reported above the project screening criteria (See decision rule 4b).

4. *b.* ***If*** *validated fixed-base laboratory analysis from the first groundwater sampling event of four temporary or permanent groundwater monitoring wells, positioned with one located upgradient, one in the location of the highest LIF fluorescence, and two located downgradient, reports any concentrations of fuel-related constituents above project screening criteria (SAP Worksheet #15),* ***then*** *four quarters of sampling from permanent groundwater monitoring wells will be recommended to evaluate plume stability.*

   Since TPH-d and naphthalene were reported above the project screening levels during the first groundwater event in August 2009, three additional monitoring events were recommended to evaluate plume stability (See decision rule 4c).

4. *c. Based on the LIF fluorescence results, four permanent groundwater monitoring wells will be installed, with one located upgradient, one in the location of the highest fluorescence, and two located downgradient. Groundwater monitoring will be conducted quarterly for one year. COC concentrations and groundwater elevations over time for each groundwater monitoring well will be plotted to evaluate the stability of the COCs in groundwater.* ***If*** *concentrations of fuel-related constituents detected above the MCLs are stable or decreasing or are below the Project Screening Criteria,* ***then*** *NFA will be recommended.*

   Four groundwater monitoring events were conducted. Based on the validated analytical results, TPH-diesel was reported above the project screening criteria of 0.21 mg/L in four of the six wells sampled (SB229-MW01, SB229 MW02, SB229-MW03 and BSW-14-4) during all four events at a maximum concentration of 2.4 mg/L in a sample analyzed from well SB229-MW01 during the August 2009 event. TPH-diesel concentrations appear to be stable across the site and display moderate seasonal variability.

   The only PAH reported above the project screening criteria was naphthalene, which was detected slightly above the screening criteria of 24.0 ug/L in only two samples analyzed during the four events. Naphthalene was reported at 31J ug/L in well SB229-MW01 during the first event in August 2009, and was reported at 30 ug/L in well BSW-14-4 during the fourth event in December 2010.

4. *d.* ***If*** *validated fixed-base laboratory analysis from four quarterly groundwater sampling events of four permanent groundwater monitoring wells, positioned with one located upgradient, one in the location of the highest LIF fluorescence, and two located*

downgradient, reports concentrations of fuel-related constituents are increasing, ***then*** *additional investigation or corrective action will be recommended.*

This decision rule is not applicable (See decision rule 4c).

Primary Goal: ***If*** *the nature and extent of the fuel release has been defined by the preceding decision rules, and the plume is stable or decreasing,* ***then*** *a recommendation will be made for site closure with NFA, otherwise recommendations for further action will be made based on the revised CSM.*

The nature and extent of the diesel release at former UST Site 229 hast ben adequately defined by the SAP decision rules. The plume appears to be stable. No complete pathways to human receptors have been identified. Additionally, an ecological risk screening evaluation has concluded that any dissolved phase diesel constituents migrating towards ecological receptors will be diluted and attenuated to below relevant ecological screening levels prior to reaching ecological receptors.

Therefore, it is recommended that former UST Site 229 be granted a status of NFA.

8.0 REFERENCES

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Tables

TABLE 2-1

Summary of UST 229 Excavation Soil Sample Results
Former UST Site 229, NAVWPNSTA Seal Beach

Analyte	Total Number of Samples	Number of Detections	Reported Range of Concentrations
TPH-d	4	3	770 to 3,500 mg/kg
Benzene	4	1	43 µg/kg
Toluene	4	2	29 and 34 µg/kg
Ethylbenzene	4	1	560 µg/kg
Total xylenes	4	4	18 to 920 µg/kg

Notes:
Source of data: Riedel Environmental Services, Inc., (RES) (RES, 1991)

Acronyms:
mg/kg milligrams per kilogram
µg/kg micrograms per kilogram
TPH-d total petroleum hydrocarbons as diesel

TABLE 4-1
Temporary Piezometer Data
Former UST Site 229, NAVWPNSTA Seal Beach

Temporary Piezometer ID	Installation Date	Measurment Date	Depth to Water (feet bgs)	Free Product Thickness (feet)
SB229-01	4/1/2009	4/7/2009	9.02	trace*
SB229-02	4/1/2009	4/7/2009	8.91	-
SB229-03	4/1/2009	4/7/2009	8.95	-
SB229-09	4/2/2009	4/7/2009	8.37	trace*
SB229-10	4/2/2009	4/7/2009	8.83	trace*
SB229-16	4/3/2009	4/7/2009	8.30	-

Notes :

The Temporary Piezometer ID corresponds to the SCAPS boring with the same numerical identifier.

* - Trace indicates free product droplets were observed on the interface probe, but not detected instruments measurement capability of 0.01 foot.

Acronyms:

bgs - below ground surface

TABLE 4-2
Purge Parameters
Former UST Site 229, NAVWPNSTA Seal Beach

Well ID	Date Sampled	Water Temp (°C)	Specific Conductivity (mS/cm)	pH	ORP / Eh (mV)	DO (mg/L)	Turbidity (NTU)
BSW-14-4	8/7/2009	22.42	1.470	6.43	-274.5	0.10	0.48
	11/13/2009	23.06	1.336	6.71	-303.6	0.31	2.73
	7/20/2010	21.67	1.413	6.70	-262.5	0.28	2.99
	12/9/2010	21.57	0.972	6.73	-164.7	0.20	2.12
BSW-14-6	8/7/2009	21.70	1.507	6.55	64.3	1.09	4.04
	11/13/2009	21.98	1.347	6.97	145.5	0.95	1.95
	7/20/2010	20.85	1.404	6.77	177.4	1.46	2.79
	12/9/2010	21.05	0.947	6.85	160.8	0.79	4.50
SB229-MW01	8/7/2009	23.25	0.888	6.59	-51.0	0.12	1.54
	11/12/2009	23.29	0.844	6.90	-212.7	0.30	2.22
	7/19/2010	21.99	0.847	6.72	-142.7	0.32	6.10
	12/8/2010	22.39	0.505	6.99	-85.2	0.18	0.70
SB229-MW02	8/6/2009	23.34	1.368	6.41	24.1	0.15	2.22
	11/12/2009	23.88	1.294	6.82	-122.5	0.37	1.25
	7/19/2010	22.45	0.973	6.64	31.5	0.33	2.71
	12/8/2010	22.38	0.754	6.91	38.3	0.28	1.40
SB229-MW03	8/7/2009	22.58	1.245	8.33	95.7	0.12	1.67
	11/12/2009	23.50	1.159	7.68	-128.0	0.19	2.24
	7/19/2010	22.06	1.180	7.59	-27.2	0.19	2.91
	12/9/2010	22.34	0.795	7.79	168.0	0.17	4.24
SB229-MW04	8/6/2009	23.48	0.699	7.23	-20.6	1.85	2.75
	11/12/2009	23.73	0.676	7.43	25.7	0.89	2.02
	7/19/2010	22.75	0.624	7.25	93.6	0.62	4.79
	12/8/2010	22.77	0.425	7.38	178.0	0.90	0.00

Acronyms:

ORP / Eh	Oxidation Reduction Potential
DO	Dissolved Oxygen
mg/L	Milligrams per Liter
mV	Millivolts
mS/cm	Microsiemens per Centimeter
^{o}C	Degrees Centigrade
NTU	Nephelometric Turbidity Unit

TABLE 4-3
SCAPS Push Locations
Former UST Site 229, NAVWPNSTA Seal Beach

Scaps CPT/LIF	X	Y	GPS Date
SB229-01	6003027.50	2219079.48	4/1/2009
SB229-02	6003037.07	2219063.43	4/1/2009
SB229-03	6003014.12	2219098.35	4/1/2009
SB229-04	6002990.30	2219055.93	4/2/2009
SB229-05	6002987.12	2219109.28	4/2/2009
SB229-06	6003003.09	2219117.86	4/2/2009
SB229-07	6003041.89	2219102.84	4/2/2009
SB229-08	6002992.66	2219136.20	4/2/2009
SB229-09	6003085.94	2219057.66	4/2/2009
SB229-10	6003044.97	2219009.09	4/2/2009
SB229-11	6003081.80	2219011.29	4/2/2009
SB229-12	6003142.15	2219052.92	4/3/2009
SB229-13	6003038.31	2218974.00	4/3/2009
SB229-14	6003086.82	2219108.26	4/3/2009
SB229-15	6002991.14	2219010.28	4/3/2009
SB229-16	6002992.45	2218954.45	4/3/2009
SB229-17	6002940.38	2219007.27	4/3/2009
SB229-18	6003098.08	2218958.32	4/3/2009
SB229-19	6003150.24	2218993.80	4/6/2009
SB229-20	6003153.52	2218953.66	4/6/2009
SB229-21	6003189.12	2219072.38	4/7/2009
SB229-22	6003189.19	2219010.76	4/7/2009

Notes:
Locations collected using a Trimble Pro-XRS receiver.
Coordinates in NAD83 State Plane 6, Feet.

TABLE 5-1
Soil Laboratory Analytical Results
Former UST Site 229, NAVWPNSTA Seal Beach

Analyte Name	PAL	PAL Source	Units	SB229-01-S-01 5.0'-6.5' bgs	SB229-01-S-02 11.0'-12.5' bgs	SB229-02-S-01 10.5'-12.0' bgs	SB229-08-S-01 9.0'-10.5' bgs	SB229-10-S-01 9.0'-10.5' bgs	SB229-19-S-01 8.5'-10.0' bgs	SB229-21-S-01 8.5'-10.0' bgs
TPH as diesel (EPA Method 8015B)										
TPH-DIESEL RANGE	100	RCL	mg/kg	20 U	**1800**	**2800**	26 U	10 J	**1800**	**12000**
BTEX (EPA Method 8260B)										
BENZENE	3	SSL	ug/kg	5.6 U	**6.7**	**7**	5.9 U	5.2 U	5.9 U	**43000**
ETHYLBENZENE	890	SSL	ug/kg	5.6 U	6.8	38	5.9 U	5.2 U	190 J	**48000**
O-XYLENE	1,600	SSL	ug/kg	5.6 U	5.6 U	2.7 J	5.9 U	5.2 U	20 J	**2500**
P-XYLENE	1,600	SSL	ug/kg	11 U	11 U	11 U	12 U	10 U	300 J	**63000**
TOLUENE	760	SSL	ug/kg	5.6 U	5.6 U	5.7 U	5.9 U	5.2 U	5 J	**2200**
Naphthalene (EPA Method 8260B)										
NAPHTHALENE	0.55	SSL	ug/kg	5.6 U	**17**	**21**	5.9 U	5.2 U	**920**	**20000**
PAHs (8270 SIM)										
ACENAPHTHENE	27,000	SSL	ug/kg	31 U	59	36 U	39 U	38 U	250	1100
ACENAPHTHYLENE	NA	NA	ug/kg	31 U	27 J	36 U	39 U	38 U	35 U	36 U
ANTHRACENE	450,000	SSL	ug/kg	31 U	26 J	36 U	39 U	38 U	77	320
BENZO[A]ANTHRACENE	14	SSL	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	55
BENZO[A]PYRENE	310	SSL	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	36 U
BENZO[B]FLUORANTHENE	47	SSL	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	36 U
BENZO[G,H,I]PERYLENE	NA	NA	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	12 J
BENZO[K]FLUORANTHENE	460	SSL	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	36 U
CHRYSENE	1,400	SSL	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	36 U
DIBENZ[A,H]ANTHRACENE	15	SSL	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	36 U
FLUORANTHENE	210,000	SSL	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	84
FLUORENE	33,000	SSL	ug/kg	31 U	37 U	36 U	39 U	38 U	660	2100
INDENO[1,2,3-CD]PYRENE	160	SSL	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	36 U
NAPHTHALENE	0.55	SSL	ug/kg	31 U	37 U	36 U	39 U	38 U	**1900**	**63000**
PHENANTHRENE	NA	NA	ug/kg	31 U	37 U	36 U	39 U	38 U	900	3700
PYRENE	150,000	SSL	ug/kg	31 U	15 J	58	39 U	38 U	49	270

Notes:

U	Indicates the analyte was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
NA	not available (No SSL is available for this analyte)
PAL	Project action limit
RCL	recommended soil cleanup level (LUFT Manual)
SSL	soil screening level (US EPA, Region 9 PRGs, September 2008)

Bold values exceed PAL

TABLE 5-2
Groundwater Elevation Data
Former UST Site 229, NAVWPNSTA Seal Beach

Well Identification	TOC Elevation (ft above MSL)[1]	Depth to Groundwater (ft below TOC)				Groundwater Elevation (ft above MSL)				Difference in Groundwater Elevation (ft)[2]		
		08/06/09	11/12/09	07/19/10	12/09/10	08/06/09	11/12/09	07/19/10	12/09/10	08/06/09 - 11/12/09	11/12/09 - 07/19/10	07/19/10 - 12/09/10
SB229-MW01	12.20	8.66	8.26	8.03	8.38	3.54	3.94	4.17	3.82	0.40	0.23	-0.35
SB229-MW02	12.54	9.02	8.62	8.77	8.76	3.52	3.92	3.77	3.78	0.40	-0.15	0.01
SB229-MW03	11.01	7.54	7.16	7.27	7.27	3.47	3.85	3.74	3.74	0.38	-0.11	0.00
SB229-MW04	12.43	8.94	8.54	8.69	8.67	3.49	3.89	3.74	3.76	0.40	-0.15	0.02
BSW-14-4	10.99	7.64	7.25	7.37*	7.32	3.35	3.74	3.62*	3.67	0.39	-0.12	0.05
BSW-14-6	11.74	8.23	7.82	7.96*	7.93	3.51	3.92	3.78*	3.81	0.41	-0.14	0.03

Notes :

1 - Elevations are relative to the North American Vertical Datum of 1988 (NAVD88).

2 - The differences in groundwater elevations from the previous sampling event. Values are positive for water level rise and negative for water level decline.

* - Measurement performed on 7/20/10

Acronyms:

ft - feet

MSL - mean sea level

TOC - top of casing

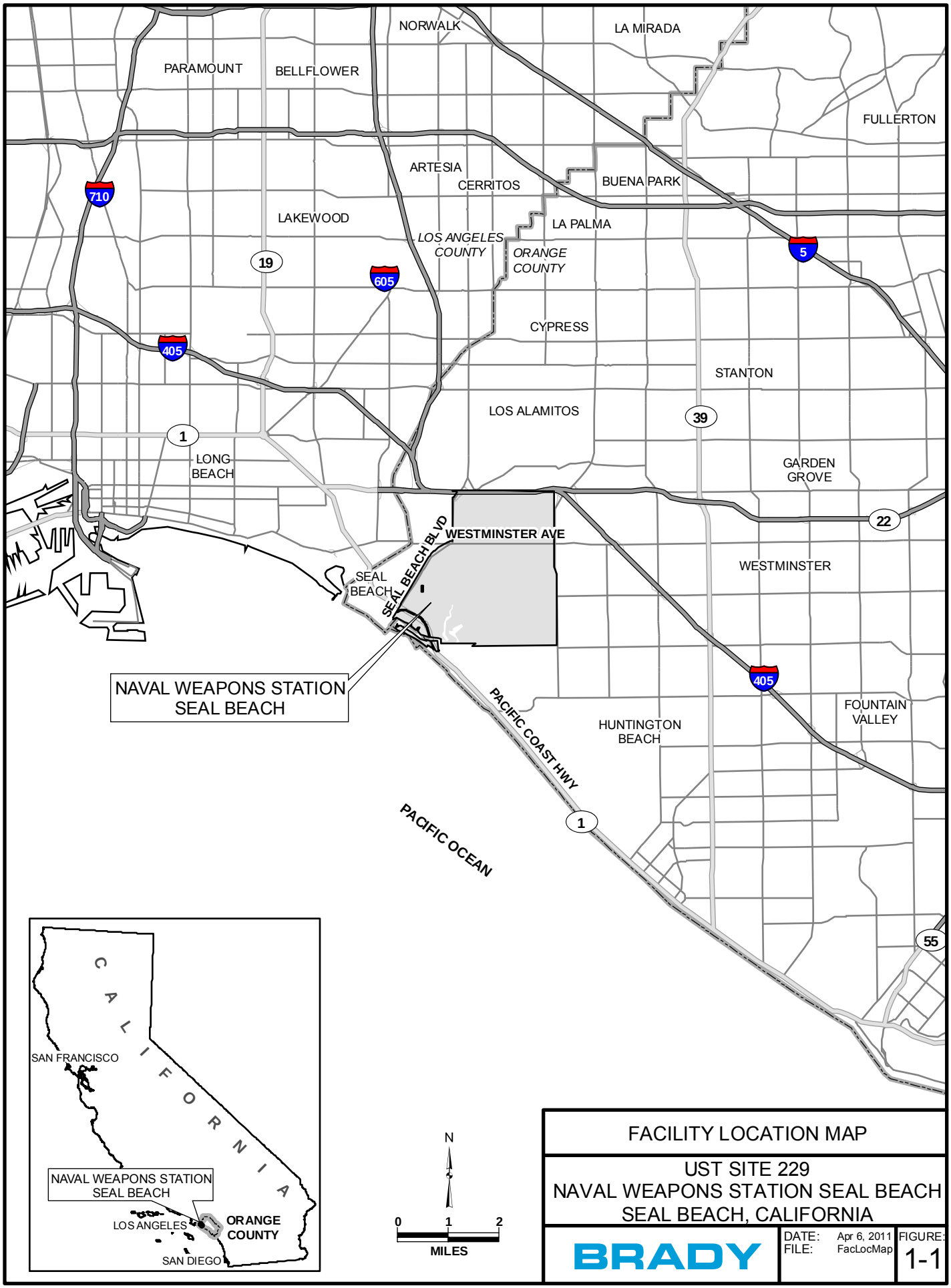
TABLE 5-3
Groundwater Analytical Results
Former UST Site 229, NAVWPNSTA Seal Beach

Sample Information		Analyte	TPH-DIESEL RANGE	ACENAPHTHENE	ACENAPHTHYLENE	ANTHRACENE	BENZO[A]ANTHRACENE	BENZO[A]PYRENE	BENZO[B]FLUORANTHENE	BENZO[G,H,I]PERYLENE	BENZO[K]FLUORANTHENE	CHRYSENE	DIBENZ[A,H]ANTHRACENE	FLUORANTHENE	FLUORENE	INDENO[1,2,3-CD]PYRENE	NAPHTHALENE	PHENANTHRENE	PYRENE
		Analytical Method	8015B	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM
		Units	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
		PAL	0.21	23.0	30.0	0.73	0.027	0.20	0.029	0.10	3.7	0.35	7.5	8.0	3.9	0.048	24.0	4.6	2.0
		PAL Source*	ESL1	ESL2	ESL3	**	ESL4	**	**	**	**	ESL5	ESL5	**	ESL2	**	ESL2	ESL6	ESL5
Well ID	**Sample Date**	**Sample ID**																	
BSW -14-4	8/7/2009	BSW-14-4-3Q09-GW01	**0.59**	0.13 J	0.062 J	0.028 UJ	0.011 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.15 J	0.028 U	9.1	0.04 J	0.028 U
	11/13/2009	BSW-14-4-4Q09-GW01	**0.77**	0.13	0.052	0.028 U	0.0094 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.12	0.028 U	7	0.067 J	0.028 UJ
	7/20/2010	BSW-14-4-3Q10-GW01	**0.34 J**	0.064	0.025 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.064	0.028 U	2.6	0.016 J	0.028 U
	12/9/2010	BSW-14-4-4Q10-GW01	**1.1**	0.16	0.060	0.028 U	0.011 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.17	0.028 U	**30**	0.11	0.010 J
BSW-14-6	8/7/2009	BSW-14-6-3Q09-GW01	0.47 U	0.028 UJ	0.028 UJ	0.028 UJ	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 UJ	0.028 U	0.028 UJ	0.028 UJ	0.028 U
	11/13/2009	BSW-14-6-4Q09-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.035 U	0.028 UJ	0.028 UJ
	7/20/2010	BSW-14-6-3Q10-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
	12/9/2010	BSW-14-6-4Q10-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.061 U	0.028 U	0.028 U
SB229-MW01	8/7/2009	SB229MW1-3Q09-GW01	**2.4**	0.93 J	0.72 J	0.028 UJ	0.015 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	3.3 J	0.028 U	**31 J**	3 J	0.037
	11/12/2009	SB229MW1-4Q09-GW01	**1.7**	0.95	0.55	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	1.9	0.028 U	17	3.3J	0.032 J
	7/19/2010	SB229MW1-3Q10-GW01	**1.9**	0.37	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.49	0.028 U	0.13	0.028 U	0.018 J
	12/8/2010	SB229MW1-4Q10-GW01	**1.4**	0.44	0.21	0.059	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	1.0	0.028 U	0.44	0.11	0.029
SB229-MW02	8/6/2009	SB229MW2-3Q09-GW01	**0.85**	0.028 UJ	0.028 UJ	0.028 UJ	0.015 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 UJ	0.028 U	0.028 UJ	0.028 UJ	0.028 U
	11/12/2009	SB229MW2-4Q09-GW01	**1.3**	0.053	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.013 J	0.028 U	0.028 U	0.028 U	0.028 U	0.042 U	0.028 UJ	0.028 UJ
	7/19/2010	SB229MW2-3Q10-GW01	**1.9**	0.028 U	0.023 J	0.028 U	0.013 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
	12/8/2010	SB229MW2-4Q10-GW01	**1.6**	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.029 U	0.028 U	0.014 J
SB229-MW03	8/7/2009	SB229MW3-3Q09-GW01	**0.29 J**	0.018 J	0.024 J	0.028 UJ	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.077 J	0.028 U	0.047 UJ	0.028 UJ	0.028 U
	11/12/2009	SB229MW3-4Q09-GW01	**0.24 J**	0.028 U	0.013 J	0.028 U	0.028U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028U	0.028 U	0.028 J	0.028U	0.036 U	0.028 UJ	0.028 UJ
	7/19/2010	SB229MW3-3Q10-GW01	**0.42 J**	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
	12/9/2010	SB229MW3-4Q10-GW01	**0.29 J**	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
SB229-MW04	8/6/2009	SB229MW4-3Q09-GW01	0.47 U	0.028 UJ	0.028 UJ	0.028 UJ	0.014 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 UJ	0.028 U	0.028 UJ	0.028 UJ	0.028 U
	11/12/2009	SB229MW4-4Q09-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.049 J	0.028 UJ
	7/19/2010	SB229MW4-3Q10-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
	12/8/2010	SB229MW4-4Q10-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.087 U	0.028 U	0.028 U

TABLE 5-3
Groundwater Analytical Results
Former UST Site 229, NAVWPNSTA Seal Beach

Notes and Acronyms:
Concentrations depicted in **Bold** exceeded the analyte's PAL.
* The PALs are the "Lowest Estuary Aquatic Habitat Goal" Environmental Screening Levels (ESLs) listed on Table F4a of the ESL document;
these goals address potential discharge of groundwater to surface water and subsequent impact on aquatic life; potential dilution upon discharge to surface water was not considered (RWQCBSF, 2007)
** The ESL source is not listed for chemicals which had no concentrations reported above the detection limit.
ESL1 - drinking water goal based on studies carried out for the San Francisco airport pursuant to RWQCB Order No. 99-045
ESL2 - US EPA Ecotox fresh water (FW) chronic level
ESL3 - 10% US EPA surface water (SW) acute lowest observed effects level (LOEL)
ESL4 - US DOE FW chronic preliminary remediation goal
ESL5 - 50% Ontario Ministry of Environment and Energy FW chronic LOEL
ESL6 - US EPA SW criterion for continuous concentration
PAL - Project Action Limit (from Worksheet #15 of the Sampling and Analysis Plan (BRADY, 2009).
US EPA - United States Environmental Protection Agency
US DOE - United States Department of Energy
U - Indicates the analyte was analyzed for but not detected at or above the stated limit.
J -Indicates an estimated value.

Figures



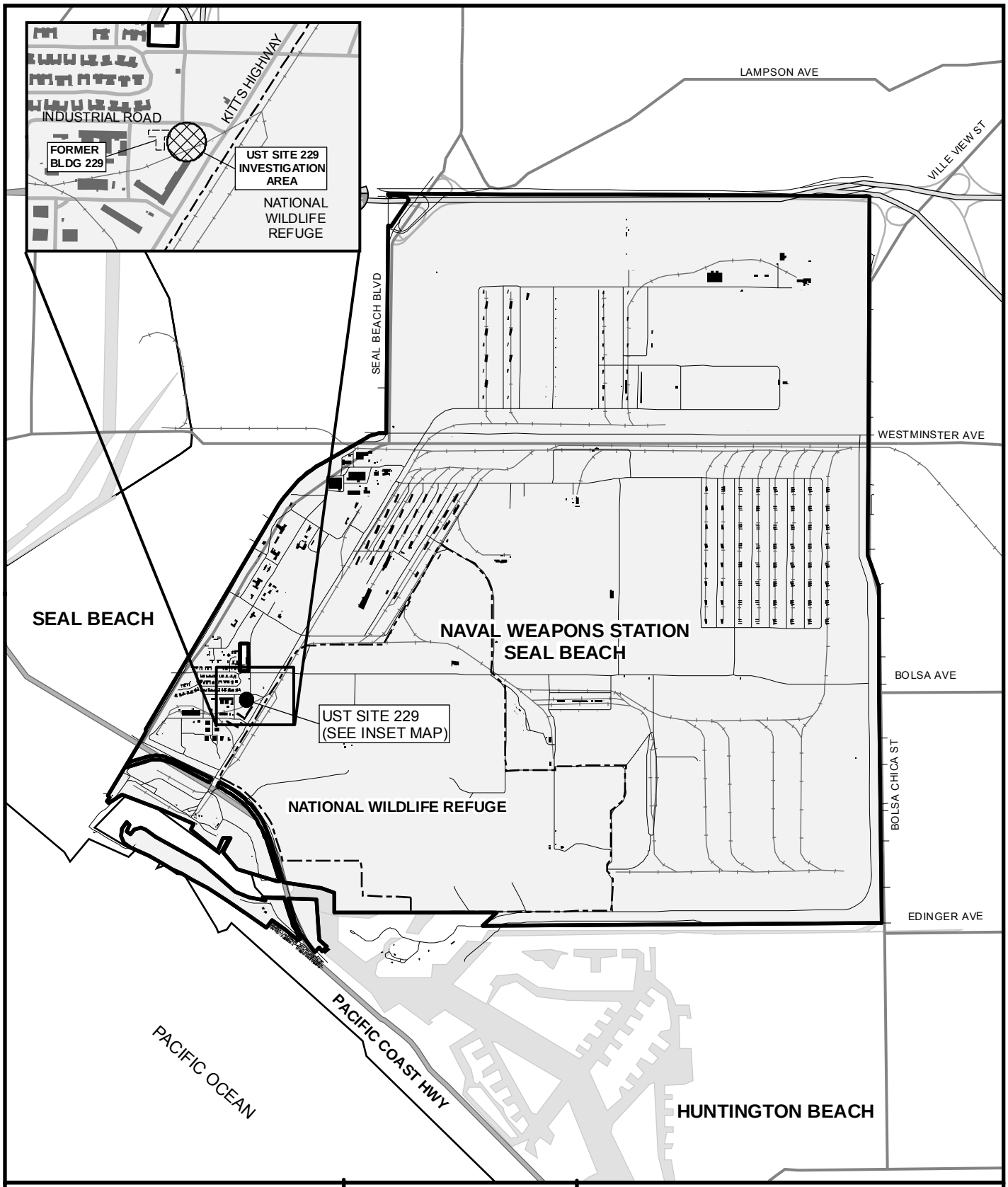
FACILITY LOCATION MAP

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

BRADY

DATE: Apr 6, 2011
FILE: FacLocMap

FIGURE: 1-1



N

0 0.25 0.5 1

MILES

SITE LOCATION MAP

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

BRADY

DATE: Apr 6, 2011
FILE: SealBch BaseMap2

FIGURE: 2-1

DRAFT

INDUSTRIAL ROAD

IRP-14-TMW-10

PREVIOUS ESTIMATED EXTENT OF CONTAMINATION

SB229-08

POLE

SB229-MW04

UST 229 SITE
LOCATION OF PREVIOUS EXCAVATION.
(TANKS REMOVED 1991, TANK SUPPORTS
STILL IN GROUND)

SB229-06

SB229-05

SB229-07

SB229-03

SB229-14

BSW-14-5

FORMER BUILDING 229

SB229-01 AND SB229-MW01
(COLOCATED)

SB229-21

BSW-14-3

SB229-02

SB229-09

SB229-12

SB229-04

SB229-MW02

BSW-14-4

BSW-14-2

IR SITE 14
FORMER
GAS STATION

RAILROAD TRACK

SB229-17

SB229-15

POLE

SB229-10

SB229-11

SB229-MW03

SB229-22

TRANSFORMER
PAD

SB229-19

RAILROAD TRACK

BSW-14-1

SB229-13

SB229-18

POLE

SB229-20

SB229-16

BSW-14-6

POLE

KITTS HIGHWAY

BLDG 225

OVERVIEW MAP - NWS SEAL BEACH

N

0 30 60

FEET

MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

LEGEND

- MONITORING WELLS (BRADY, 2009)
- SCAPS LOCATION (BRADY, 2009)
- EXISTING MONITORING WELL

SITE PLAN AND SCAPS LOCATIONS

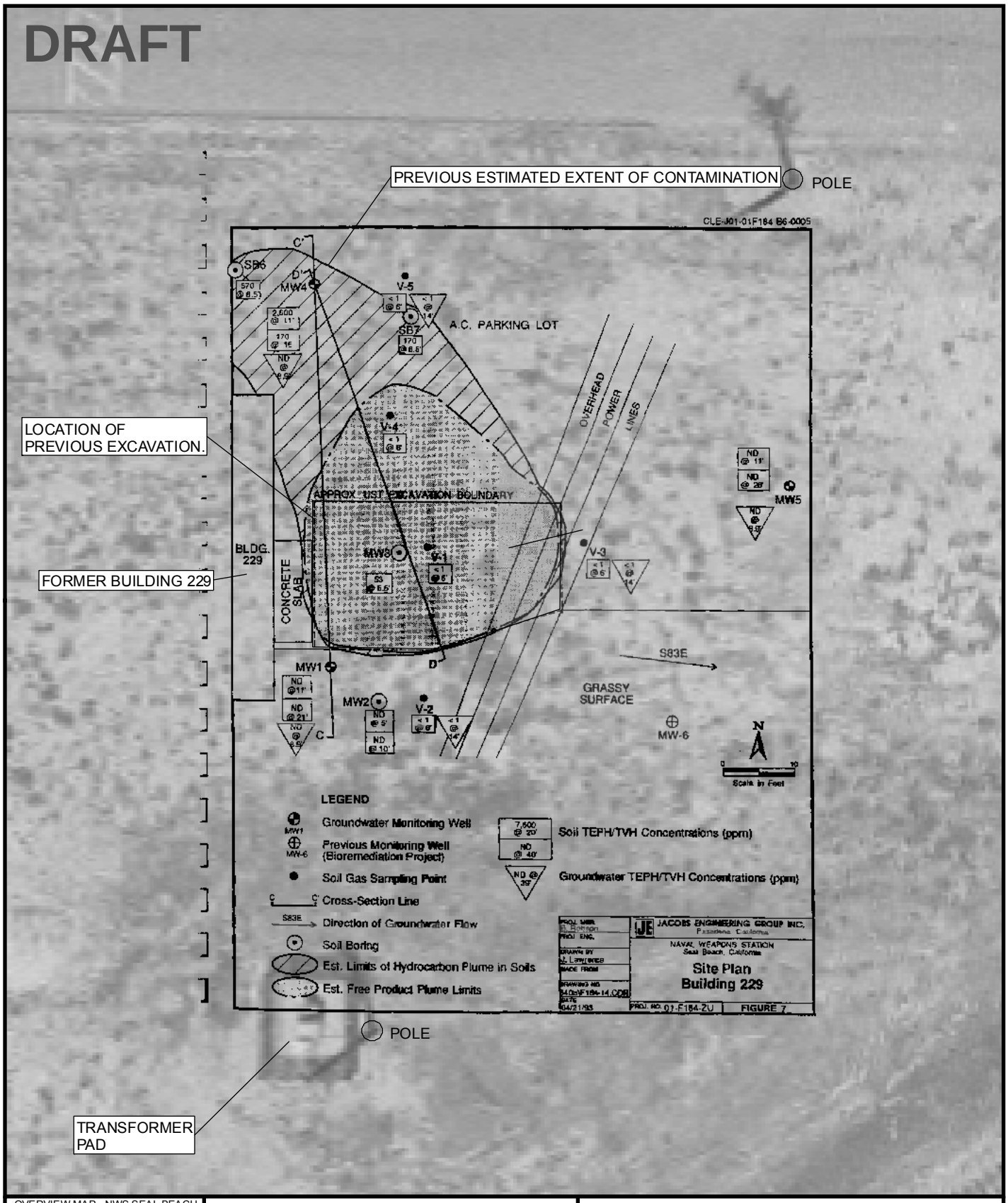
UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

BRADY

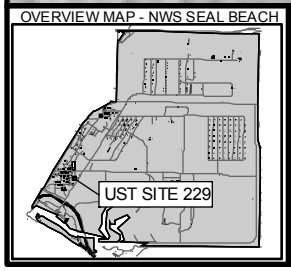
DATE: Apr 28, 2011
FILE: SitePlan

FIGURE: 2-2

DRAFT



OVERVIEW MAP - NWS SEAL BEACH



N

0 10 20

FEET

PREVIOUS INVESTIGATION

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

BRADY

DATE: Apr 28, 2011
FILE: PrevInv

FIGURE: 2-3

DRAFT

ABOVE GROUND STORAGE TANKS
350
GARDENERS ROAD
INDUSTRIAL ROAD
PREVIOUS ESTIMATED EXTENT OF CONTAMINATION
UST 229 SITE
LOCATION OF PREVIOUS EXCAVATION.
(TANKS REMOVED 1991, TANK SUPPORTS STILL IN GROUND)
FORMER BUILDING 229
MTBE 10 ug/L
Benzene 10 ug/L
BSW-14-7
BSW-14-10
IRP-14-TMW-1
IRP-14-TMW-10
IRP-14-TMW-2
BSW-14-5
4.5 FT MSL
KITTS HIGHWAY
BSW-14-8
MTBE 10 ug/L
MTBE 100 ug/L
Benzene 10 ug/L
BSW-14-3
Benzene 100 ug/L
Benzene 1,000 ug/L
BSW-14-4
BSW-14-2
IR SITE 14 FORMER GAS STATION
4.1 FT MSL
BSW-14-11
BSW-14-1
GW FLOW DIRECTION
SEAL BEACH NATIONAL WILDLIFE REFUGE
BSW-14-6
IR SITE 14 (SOUTH)
(ABANDONED USTs 1940'S, 1960'S
NO FURTHER RESPONSE ACTION PLANNED)
BLDG 225
BSW-14-9

OVERVIEW MAP - NWS SEAL BEACH

N

0 40 80

FEET

MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

NOTES
1. GROUNDWATER AND ANALYTE CONTOURS FOR OCTOBER 2006. (SOURCE: FINAL GROUNDWATER MONITORING REPORT, MARRS, JUNE 1, 2007)

ug/L = MICROGRAMS PER LITER

IR SITE 14 - BENZENE AND MTBE IN GROUNDWATER (2006)

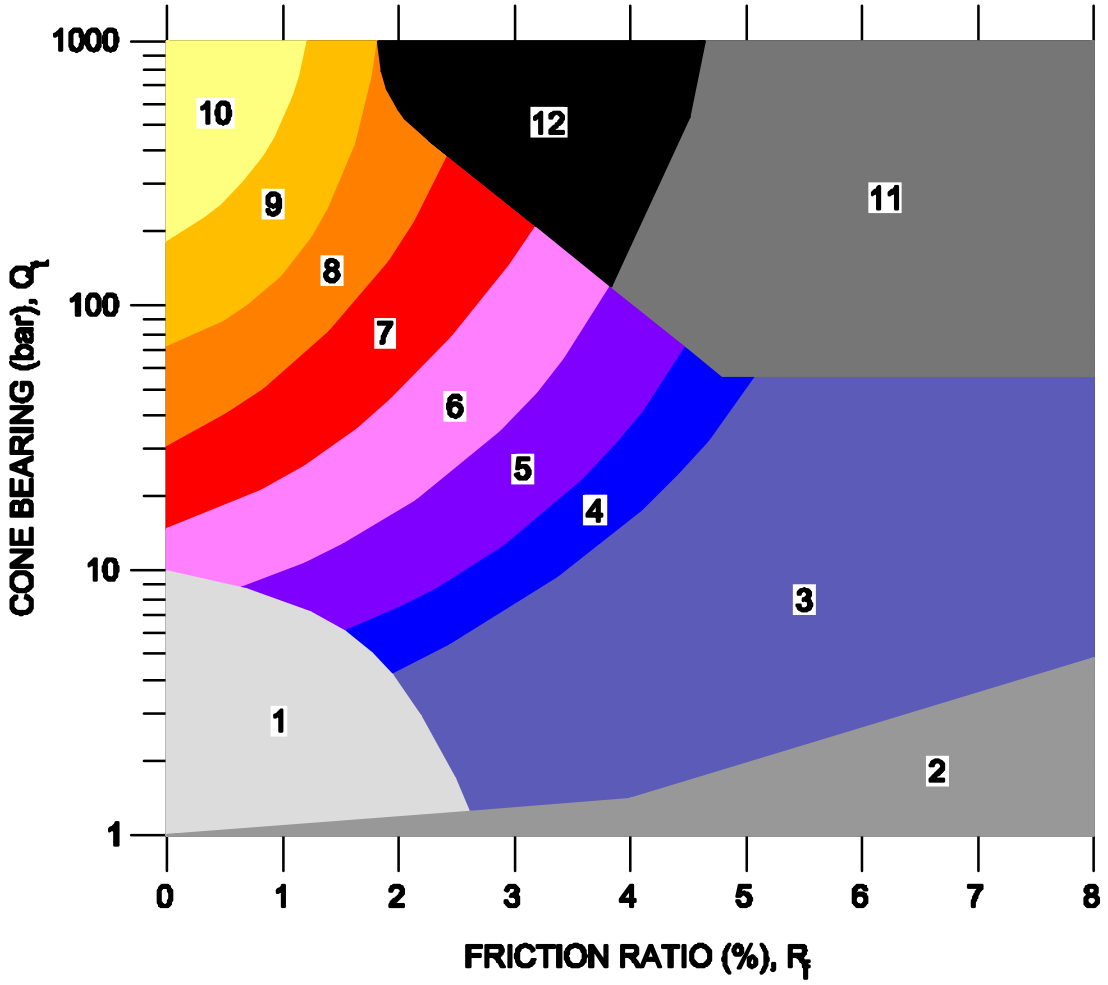
UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

BRADY

DATE: Apr 28, 2011
FILE: IR14Data

FIGURE: 2-4

CPT CLASSIFICATION CHART
(after Robertson and Campanella, 1988)



Friction Ratio (R_f) = Sleeve Friction (F_s)/Cone Pressure (Q_t) x 100%
1 ton per square foot (tsf) ≈ 0.9576 bar
N = Standard penetration value, blows/foot

Zone		Q_t/ N	Soil Behavior Type
1		2	sensitive fine grained
2		1	organic material
3		1	clay
4		1.5	silty clay to clay
5		2	clayey silt to silty clay
6		2.5	sandy silt to clayey silt
7		3	silty sand to sandy silt
8		4	sand to silty sand
9		5	sand
10		6	gravelly sand to sand
11		1	very stiff fine grained*
12		2	sand to clayey sand*

* overconsolidated or cemented

Figure 5-1

DRAFT

SB229-08-S-01
SOIL 9.0'-10.5' BGS
ALL ANALYTES ND

NEW ESTIMATED EXTENT OF HYDROCARBON PLUME IN SOIL

INDUSTRIAL ROAD

IRP-14-TMW-10

POLE

POLE

UST 229 SITE
LOCATION OF PREVIOUS EXCAVATION. (TANKS REMOVED 1991, TANK SUPPORTS STILL IN GROUND)

SB229-21-S-01

SOIL	8.5'-10.0' BGS
TPH-d	12,000 mg/kg
BENZENE	43,000 ug/kg
ETHYLBENZENE	48,000 ug/kg
O-XYLENE	2,500 ug/kg
P-XYLENE	63,000 ug/kg
TOLUENE	2,200 ug/kg
NAPHTHALENE	20,000 ug/kg
ACENAPHTHENE	1,100 ug/kg
ANTHRACENE	320 ug/kg
BENZO[A]ANTHRACENE	55 ug/kg
BENZO[G,H,I]PERYLENE	12J ug/kg
FLUORANTHENE	84 ug/kg
FLUORENE	2,100 ug/kg
NAPHTHALENE	63,000 ug/kg
PHENANTHRENE	3,700 ug/kg
PYRENE	270 ug/kg
ALL OTHER ANALYTES	ND

SB229-01-S-01
SOIL 5.0'-6.5' BGS
ALL ANALYTES ND

FORMER BUILDING 229

SB229-01-S-02

SOIL	11.0'-12.5' BGS
TPH-d	1,800 mg/kg
BENZENE	6.7 ug/kg
ETHYLBENZENE	6.8 ug/kg
NAPHTHALENE	17 ug/kg
ACENAPHTHENE	59 ug/kg
ACENAPHTHYLENE	27J ug/kg
ANTHRACENE	26J ug/kg
PYRENE	15J ug/kg
ALL OTHER ANALYTES	ND

A
B
B'
C
C'
A'

SB229-08
SB229-06
SB229-05
SB229-03
SB229-07
SB229-01
SB229-02
SB229-04
SB229-14
SB229-09
SB229-12
SB229-21
SB229-17
SB229-15
SB229-10
SB229-11
SB229-22
SB229-19
SB229-13
SB229-16
SB229-18
SB229-20

BSW-14-5
BSW-14-3
BSW-14-4
BSW-14-2
BSW-14-1
BSW-14-6

TRANSFORMER PAD

POLE

POLE

POLE

POLE

RAILROAD TRACK

RAILROAD TRACK

FORMER GAS STATION

SB229-02-S-01

SOIL	10.5'-12.0' BGS
TPH-d	2,800 mg/kg
BENZENE	7.0 ug/kg
ETHYLBENZENE	38 ug/kg
O-XYLENE	2.7J ug/kg
NAPHTHALENE	21 ug/kg
PYRENE	58 ug/kg
ALL OTHER ANALYTES	ND

SB229-10-S-01
SOIL 9.0'-10.5' BGS
TPH-d 10J mg/kg
ALL OTHER ANALYTES ND

SB229-19-S-01

SOIL	8.5'-10.0' BGS
TPH-d	1,800 mg/kg
ETHYLBENZENE	190J ug/kg
O-XYLENE	20J ug/kg
P-XYLENE	300J ug/kg
TOLUENE	5J ug/kg
NAPHTHALENE	920 ug/kg
ACENAPHTHENE	250 ug/kg
ANTHRACENE	77 ug/kg
FLUORENE	660 ug/kg
NAPHTHALENE	1,900 ug/kg
PHENANTHRENE	900 ug/kg
PYRENE	49 ug/kg
ALL OTHER ANALYTES	ND

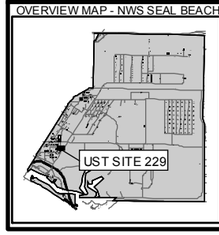
ANALYTE LIST (SOIL)
TPH-DIESEL RANGE
ACENAPHTHENE
ACENAPHTHYLENE
ANTHRACENE
BENZO[A]ANTHRACENE
BENZO[A]PYRENE
BENZO[B]FLUORANTHENE
BENZO[G,H,I]PERYLENE
BENZO[K]FLUORANTHENE
CHRYSENE
DIBENZ[A,H]ANTHRACENE
FLUORANTHENE
FLUORENE
INDENO[1,2,3-CD]PYRENE
NAPHTHALENE
PHENANTHRENE
PYRENE

APPROXIMATE GW FLOW DIRECTION

KITTS HIGHWAY

BLDG 225

OVERVIEW MAP - NWS SEAL BEACH



N

0 30 60
FEET
MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

NOTE:
1. BSW-14-4 GROUNDWATER DATA FROM MARRS, 2007

LIF = LASER INDUCED FLUORESCENCE
mg/kg = MILLIGRAMS PER KILOGRAM
ug/kg = MICROGRAMS PER KILOGRAM
mg/L = MILLIGRAMS PER LITER
ug/L = MICROGRAMS PER LITER
ND = NOT DETECTED
J = ESTIMATED VALUE

LEGEND
SCAPS LOCATION
SOIL SAMPLE LOCATION (SHOWN ON VERTICAL PROFILE)
EXISTING MONITORING WELL

SCAPS LIF RESULTS
NO FUEL FLUORESCENCE
POTENTIAL OR WEAK FUEL FLUORESCENCE
FUEL FLUORESCENCE

SCAPS INTENSITY MEASUREMENT (VERTICAL PROFILE SHOWN)
LIF INTENSITY
DEPTH

SCAPS LIF AND SOIL SAMPLING SUMMARY

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

BRADY

DATE: Apr 28, 2011
FILE: SoilTPHRes

FIGURE: 5-2

DRAFT

SB229-MW04
GROUNDWATER 8/6/2009

BENZO[A]ANTHRACENE	0.014 J	ug/L
ALL OTHER ANALYTES	ND	

NEW ESTIMATED EXTENT OF HYDROCARBON PLUME IN SOIL

UST 229 SITE
(TANKS REMOVED 1991)
LOCATION OF PREVIOUS EXCAVATION.
(TANK SUPPORTS IN GROUND)

FORMER BUILDING 229

SB229-MW01
GROUNDWATER 8/7/2009

TPH-DIESEL RANGE	**2.4**	**mg/L**
ACENAPHTHENE	0.93 J	ug/L
ACENAPHTHYLENE	0.72 J	ug/L
BENZO[A]ANTHRACENE	0.015 J	ug/L
FLUORENE	3.3 J	ug/L
NAPHTHALENE	**31 J**	**ug/L**
PHENANTHRENE	3 J	ug/L
PYRENE	0.037	ug/L
ALL OTHER ANALYTES	ND	

SB229-MW02
GROUNDWATER 8/6/2009

TPH-DIESEL RANGE	**0.85**	**mg/L**
BENZO[A]ANTHRACENE	0.015 J	ug/L
ALL OTHER ANALYTES	ND	

SB229-MW03
GROUNDWATER 8/7/2009

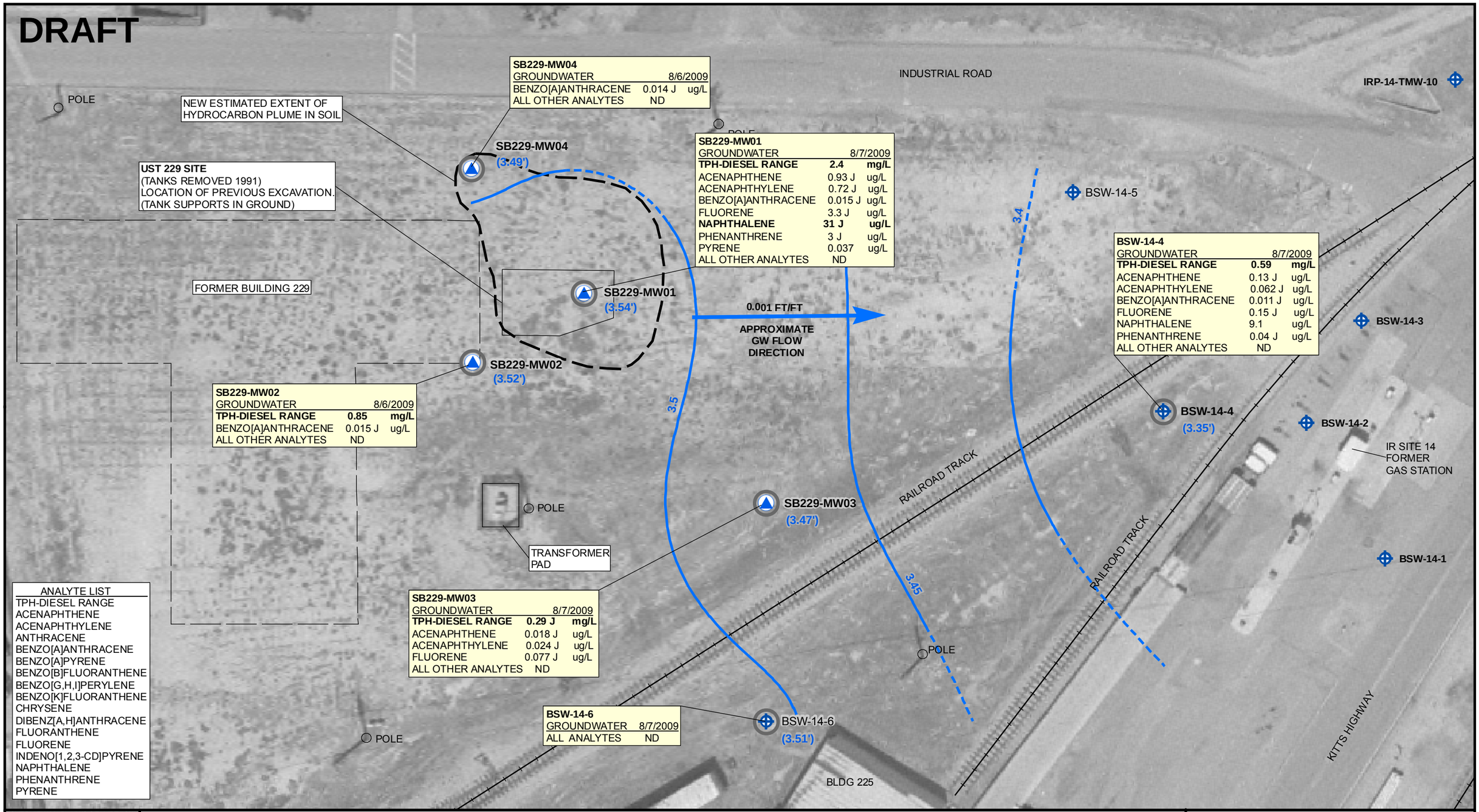
TPH-DIESEL RANGE	**0.29 J**	**mg/L**
ACENAPHTHENE	0.018 J	ug/L
ACENAPHTHYLENE	0.024 J	ug/L
FLUORENE	0.077 J	ug/L
ALL OTHER ANALYTES	ND	

BSW-14-6
GROUNDWATER 8/7/2009
ALL ANALYTES ND

BSW-14-4
GROUNDWATER 8/7/2009

TPH-DIESEL RANGE	**0.59**	**mg/L**
ACENAPHTHENE	0.13 J	ug/L
ACENAPHTHYLENE	0.062 J	ug/L
BENZO[A]ANTHRACENE	0.011 J	ug/L
FLUORENE	0.15 J	ug/L
NAPHTHALENE	9.1	ug/L
PHENANTHRENE	0.04 J	ug/L
ALL OTHER ANALYTES	ND	

ANALYTE LIST
TPH-DIESEL RANGE
ACENAPHTHENE
ACENAPHTHYLENE
ANTHRACENE
BENZO[A]ANTHRACENE
BENZO[A]PYRENE
BENZO[B]FLUORANTHENE
BENZO[G,H,I]PERYLENE
BENZO[K]FLUORANTHENE
CHRYSENE
DIBENZ[A,H]ANTHRACENE
FLUORANTHENE
FLUORENE
INDENO[1,2,3-CD]PYRENE
NAPHTHALENE
PHENANTHRENE
PYRENE



OVERVIEW MAP - NWS SEAL BEACH

N

0 25 50
FEET
MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

NOTES
1. ALL RESULTS SHOWN ARE FROM VALIDATED LABORATORY ANALYTICAL DATA
2. RESULTS IN BOLD EXCEEDED THE ANALYTE SCREENING LEVEL

mg/L = MILLIGRAMS PER LITER
ug/L = MICROGRAMS PER LITER
ND = NOT DETECTED
J = ESTIMATED VALUE

LEGEND
GROUNDWATER SAMPLE LOCATION
SITE 229 MONITORING WELL LOCATION
EXISTING MONITORING WELL
(3.51') MEASURED GROUNDWATER ELEVATION (NAVD88)
GROUNDWATER ELEVATION CONTOUR DASHED WHERE INFERRED (NAVD88, AUGUST 2009)

GROUNDWATER RESULTS
AUGUST, 2009

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

BRADY

DATE: May 13, 2011
FILE: GW_Aug09

FIGURE: 5-3

DRAFT

SB229-MW04
GROUNDWATER 11/12/2009
ALL ANALYTES ND

SB229-MW01
GROUNDWATER 11/12/2009

TPH-DIESEL RANGE	**1.7**	**mg/L**
ACENAPHTHENE	0.95	ug/L
ACENAPHTHYLENE	0.55	ug/L
FLUORENE	1.9	ug/L
NAPHTHALENE	17	ug/L
PHENANTHRENE	3.3 J	ug/L
PYRENE	0.032 J	ug/L
ALL OTHER ANALYTES	ND	

BSW-14-4
GROUNDWATER 11/13/2009

TPH-DIESEL RANGE	**0.77**	**mg/L**
ACENAPHTHENE	0.13	ug/L
ACENAPHTHYLENE	0.052	ug/L
BENZO[A]ANTHRACENE	0.0094 J	ug/L
FLUORENE	0.12	ug/L
NAPHTHALENE	7.0	ug/L
PHENANTHRENE	0.067 J	ug/L
ALL OTHER ANALYTES	ND	

SB229-MW02
GROUNDWATER 11/12/2009

TPH-DIESEL RANGE	**1.3**	**mg/L**
ACENAPHTHENE	0.053	ug/L
CHRYSENE	0.013 J	ug/L
ALL OTHER ANALYTES	ND	

SB229-MW03
GROUNDWATER 11/12/2009

TPH-DIESEL RANGE	**0.24 J**	**mg/L**
ACENAPHTHYLENE	0.013 J	ug/L
BENZO[A]ANTHRACENE	0.01 J	ug/L
DIBENZ[A,H]ANTHRACENE	0.01 J	ug/L
FLUORENE	0.028 J	ug/L
INDENO[1,2,3-CD]PYRENE	0.0094 J	ug/L
ALL OTHER ANALYTES	ND	

BSW-14-6
GROUNDWATER 11/13/2009
ALL ANALYTES ND

NEW ESTIMATED EXTENT OF HYDROCARBON PLUME IN SOIL

UST 229 SITE
LOCATION OF PREVIOUS EXCAVATION. (TANKS REMOVED 1991, TANK SUPPORTS STILL IN GROUND)

FORMER BUILDING 229

TRANSFORMER PAD

POLE

INDUSTRIAL ROAD

IRP-14-TMW-10

BSW-14-5

BSW-14-3

BSW-14-2

BSW-14-1

IR SITE 14 FORMER GAS STATION

RAILROAD TRACK

KITTS HIGHWAY

BLDG 225

SB229-MW04 (3.89')

SB229-MW01 (3.94')

SB229-MW02 (3.92')

SB229-MW03 (3.85')

BSW-14-6 (3.92')

BSW-14-4 (3.74')

3.9

3.8

3.75

3.85

0.0009 FT/FT

APPROXIMATE GW FLOW DIRECTION

ANALYTE LIST
TPH-DIESEL RANGE
ACENAPHTHENE
ACENAPHTHYLENE
ANTHRACENE
BENZO[A]ANTHRACENE
BENZO[A]PYRENE
BENZO[B]FLUORANTHENE
BENZO[G,H,I]PERYLENE
BENZO[K]FLUORANTHENE
CHRYSENE
DIBENZ[A,H]ANTHRACENE
FLUORANTHENE
FLUORENE
INDENO[1,2,3-CD]PYRENE
NAPHTHALENE
PHENANTHRENE
PYRENE

OVERVIEW MAP - NWS SEAL BEACH

N

0 30 60
FEET
MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

NOTES
1. ALL RESULTS SHOWN ARE FROM VALIDATED LABORATORY ANALYTICAL DATA
2. RESULTS IN BOLD EXCEEDED THE ANALYTE SCREENING LEVEL

mg/L = MILLIGRAMS PER LITER
ug/L = MICROGRAMS PER LITER
ND = NOT DETECTED
J = ESTIMATED VALUE

LEGEND
- GROUNDWATER SAMPLE LOCATION
- SITE 229 MONITORING WELL LOCATION
- EXISTING MONITORING WELL
- (3.92') MEASURED GROUNDWATER ELEVATION (NAVD88)
- GROUNDWATER ELEVATION CONTOUR DASHED WHERE INFERRED (NAVD88, NOVEMBER 2009)

GROUNDWATER RESULTS
NOVEMBER, 2009

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

BRADY

DATE: May 13, 2011
FILE: GW_Nov09

FIGURE: 5-4

DRAFT

SB229-MW04
GROUNDWATER 7/19/2010
NAPTHALENE 0.028J ug/L
ALL OTHER ANALYTES ND

SB229-MW01
GROUNDWATER 7/19/2010
TPH-DIESEL RANGE 1.9 mg/L
ACENAPHTHENE 0.37 ug/L
FLUORENE 0.49 ug/L
NAPHTHALENE 0.13 ug/L
PYRENE 0.018J ug/L
ALL OTHER ANALYTES ND

BSW-14-4
GROUNDWATER 7/20/2010
TPH-DIESEL RANGE 0.34J mg/L
ACENAPHTHENE 0.064 ug/L
ACENAPHTHYLENE 0.025J ug/L
FLUORENE 0.064 ug/L
NAPHTHALENE 2.6 ug/L
PHENANTHRENE 0.016J ug/L
ALL OTHER ANALYTES ND

SB229-MW02
GROUNDWATER 7/19/2010
TPH-DIESEL RANGE 1.9 mg/L
ACENAPHTHYLENE 0.023J ug/L
BENZO[A]ANTHRACENE 0.013J ug/L
NAPHTHALENE 0.028J ug/L
ALL OTHER ANALYTES ND

SB229-MW03
GROUNDWATER 7/19/2010
TPH-DIESEL RANGE 0.42 J mg/L
ALL OTHER ANALYTES ND

BSW-14-6
GROUNDWATER 7/20/2010
ALL ANALYTES ND

NEW ESTIMATED EXTENT OF HYDROCARBON PLUME IN SOIL

UST 229 SITE
LOCATION OF PREVIOUS EXCAVATION. (TANKS REMOVED 1991, TANK SUPPORTS STILL IN GROUND)

FORMER BUILDING 229

TRANSFORMER PAD

INDUSTRIAL ROAD

RAILROAD TRACK

KITTS HIGHWAY

BLDG 225

IR SITE 14 FORMER GAS STATION

POLE

SB229-MW04 (3.74')
SB229-MW01 (4.17' SEE NOTE 3)
SB229-MW02 (3.77')
SB229-MW03 (3.74')
BSW-14-6 (3.78')
BSW-14-4 (3.62')
BSW-14-5
BSW-14-3
BSW-14-2
BSW-14-1
IRP-14-TMW-10

3.75
3.8
3.75
3.7
3.65

0.001 FT/FT
APPROXIMATE GW FLOW DIRECTION

ANALYTE LIST
TPH-DIESEL RANGE
ACENAPHTHENE
ACENAPHTHYLENE
ANTHRACENE
BENZO[A]ANTHRACENE
BENZO[A]PYRENE
BENZO[B]FLUORANTHENE
BENZO[G,H,I]PERYLENE
BENZO[K]FLUORANTHENE
CHRYSENE
DIBENZ[A,H]ANTHRACENE
FLUORANTHENE
FLUORENE
INDENO[1,2,3-CD]PYRENE
NAPHTHALENE
PHENANTHRENE
PYRENE

OVERVIEW MAP - NWS SEAL BEACH

N

0 30 60
FEET
MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

NOTES
1. ALL RESULTS SHOWN ARE FROM VALIDATED LABORATORY ANALYTICAL DATA
2. RESULTS IN BOLD EXCEEDED THE ANALYTE SCREENING LEVEL
3. SB229-MW1 NOT USED FOR GW CONTOURS, DATA CHARACTERIZED AS ANOMOLOUS

mg/L = MILLIGRAMS PER LITER
ug/L = MICROGRAMS PER LITER
ND = NOT DETECTED
J = ESTIMATED VALUE

LEGEND
GROUNDWATER SAMPLE LOCATION
SITE 229 MONITORING WELL LOCATION
EXISTING MONITORING WELL
(3.78') MEASURED GROUNDWATER ELEVATION (NAVD88)
GROUNDWATER ELEVATION CONTOUR DASHED WHERE INFERRED (NAVD88, JULY 2010)

GROUNDWATER RESULTS
JULY, 2010

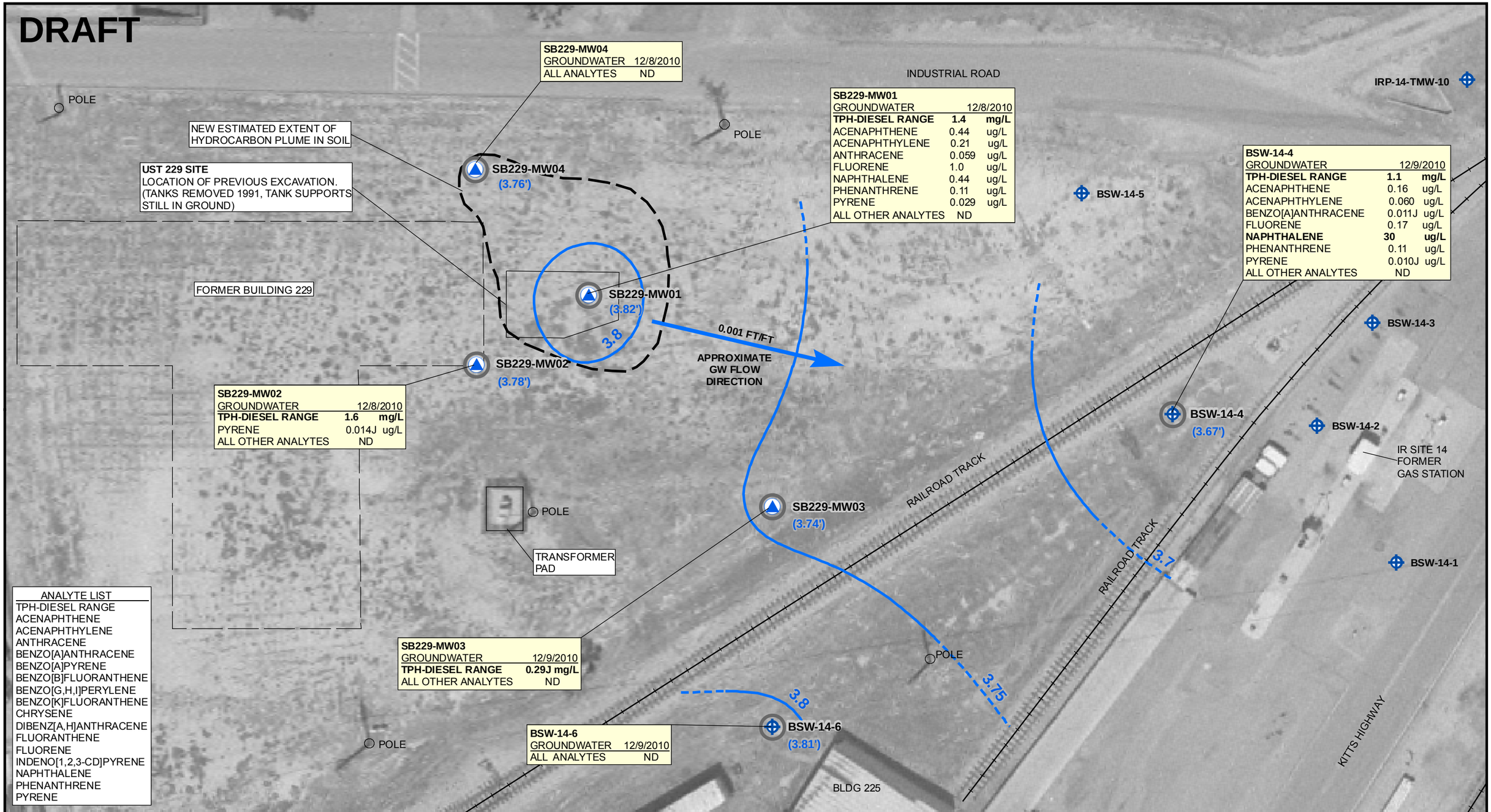
UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

BRADY

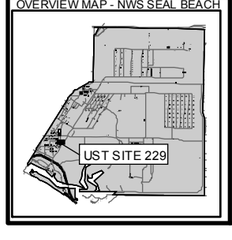
DATE: May 13, 2011
FILE:GW_Jul10_Redo

FIGURE:
5-5

DRAFT



OVERVIEW MAP - NWS SEAL BEACH



N

0 30 60

FEET

MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

NOTES
1. ALL RESULTS SHOWN ARE FROM VALIDATED LABORATORY ANALYTICAL DATA
2. RESULTS IN BOLD EXCEEDED THE ANALYTE SCREENING LEVEL

mg/L = MILLIGRAMS PER LITER
ug/L = MICROGRAMS PER LITER
ND = NOT DETECTED
J = ESTIMATED VALUE

LEGEND
- GROUNDWATER SAMPLE LOCATION
- SITE 229 MONITORING WELL LOCATION
- EXISTING MONITORING WELL
- (3.81') MEASURED GROUNDWATER ELEVATION (NAVD88)
- GROUNDWATER ELEVATION CONTOUR DASHED WHERE INFERRED (NAVD88, DECEMBER 2010)

GROUNDWATER RESULTS
DECEMBER, 2010

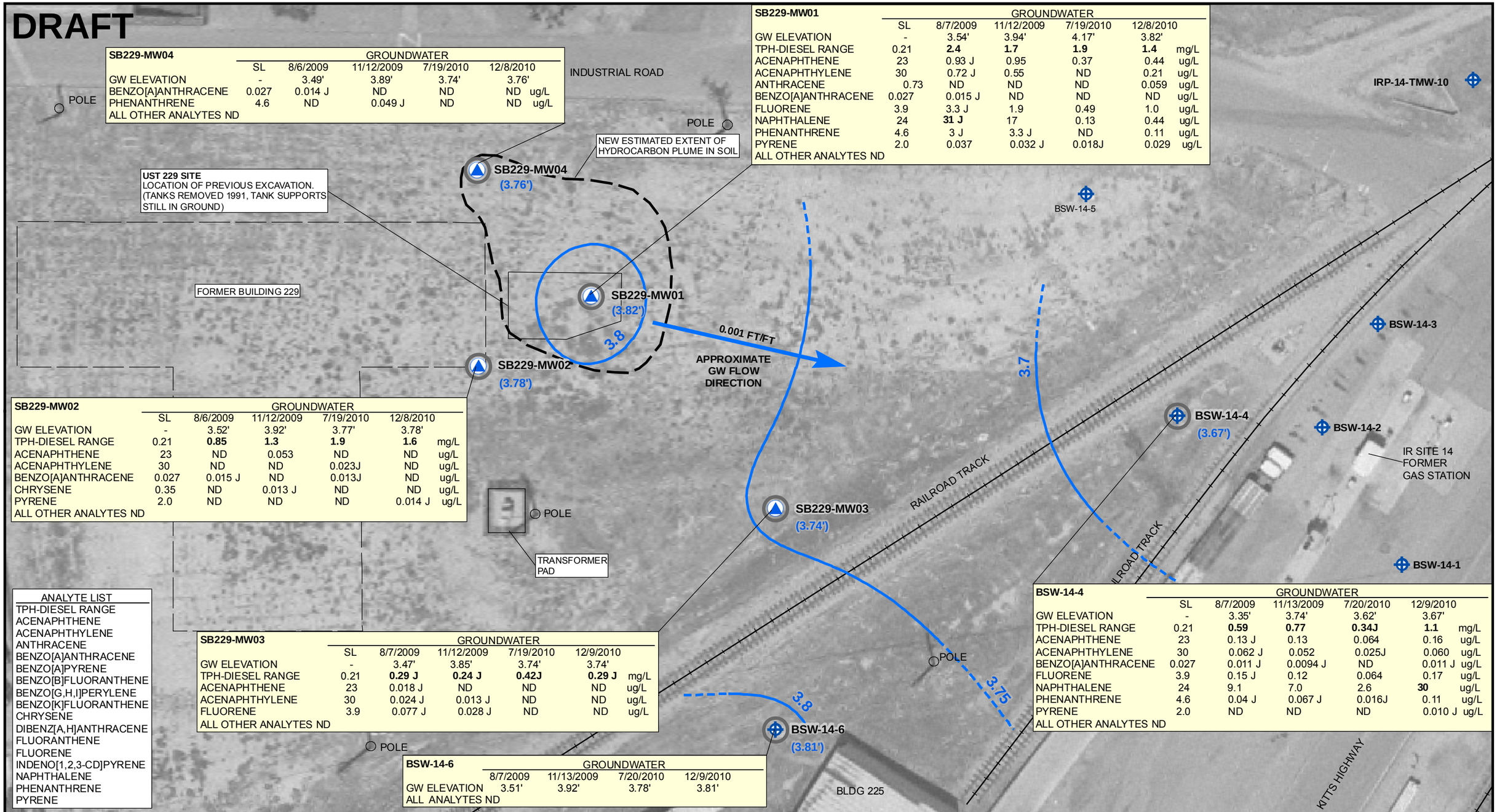
UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

BRADY

DATE: May 13, 2011
FILE: GW_Dec10

FIGURE: 5-6

DRAFT



SB229-MW04

	GROUNDWATER					
	SL	8/6/2009	11/12/2009	7/19/2010	12/8/2010	
GW ELEVATION	-	3.49'	3.89'	3.74'	3.76'	
BENZO[A]ANTHRACENE	0.027	0.014 J	ND	ND	ND	ug/L
PHENANTHRENE	4.6	ND	0.049 J	ND	ND	ug/L
ALL OTHER ANALYTES ND						

SB229-MW01

	GROUNDWATER					
	SL	8/7/2009	11/12/2009	7/19/2010	12/8/2010	
GW ELEVATION	-	3.54'	3.94'	4.17'	3.82'	
TPH-DIESEL RANGE	0.21	**2.4**	**1.7**	**1.9**	**1.4**	mg/L
ACENAPHTHENE	23	0.93 J	0.95	0.37	0.44	ug/L
ACENAPHTHYLENE	30	0.72 J	0.55	ND	0.21	ug/L
ANTHRACENE	0.73	ND	ND	ND	0.059	ug/L
BENZO[A]ANTHRACENE	0.027	0.015 J	ND	ND	ND	ug/L
FLUORENE	3.9	3.3 J	1.9	0.49	1.0	ug/L
NAPHTHALENE	24	**31 J**	17	0.13	0.44	ug/L
PHENANTHRENE	4.6	3 J	3.3 J	ND	0.11	ug/L
PYRENE	2.0	0.037	0.032 J	0.018J	0.029	ug/L
ALL OTHER ANALYTES ND						

SB229-MW02

	GROUNDWATER					
	SL	8/6/2009	11/12/2009	7/19/2010	12/8/2010	
GW ELEVATION	-	3.52'	3.92'	3.77'	3.78'	
TPH-DIESEL RANGE	0.21	**0.85**	**1.3**	**1.9**	**1.6**	mg/L
ACENAPHTHENE	23	ND	0.053	ND	ND	ug/L
ACENAPHTHYLENE	30	ND	ND	0.023J	ND	ug/L
BENZO[A]ANTHRACENE	0.027	0.015 J	ND	0.013J	ND	ug/L
CHRYSENE	0.35	ND	0.013 J	ND	ND	ug/L
PYRENE	2.0	ND	ND	ND	0.014 J	ug/L
ALL OTHER ANALYTES ND						

SB229-MW03

	GROUNDWATER					
	SL	8/7/2009	11/12/2009	7/19/2010	12/9/2010	
GW ELEVATION	-	3.47'	3.85'	3.74'	3.74'	
TPH-DIESEL RANGE	0.21	**0.29 J**	**0.24 J**	**0.42J**	**0.29 J**	mg/L
ACENAPHTHENE	23	0.018 J	ND	ND	ND	ug/L
ACENAPHTHYLENE	30	0.024 J	0.013 J	ND	ND	ug/L
FLUORENE	3.9	0.077 J	0.028 J	ND	ND	ug/L
ALL OTHER ANALYTES ND						

BSW-14-6

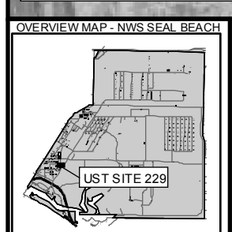
	GROUNDWATER			
	8/7/2009	11/13/2009	7/20/2010	12/9/2010
GW ELEVATION	3.51'	3.92'	3.78'	3.81'
ALL ANALYTES ND				

BSW-14-4

	GROUNDWATER					
	SL	8/7/2009	11/13/2009	7/20/2010	12/9/2010	
GW ELEVATION	-	3.35'	3.74'	3.62'	3.67'	
TPH-DIESEL RANGE	0.21	**0.59**	**0.77**	**0.34J**	**1.1**	mg/L
ACENAPHTHENE	23	0.13 J	0.13	0.064	0.16	ug/L
ACENAPHTHYLENE	30	0.062 J	0.052	0.025J	0.060	ug/L
BENZO[A]ANTHRACENE	0.027	0.011 J	0.0094 J	ND	0.011 J	ug/L
FLUORENE	3.9	0.15 J	0.12	0.064	0.17	ug/L
NAPHTHALENE	24	9.1	7.0	2.6	**30**	ug/L
PHENANTHRENE	4.6	0.04 J	0.067 J	0.016J	0.11	ug/L
PYRENE	2.0	ND	ND	ND	0.010 J	ug/L
ALL OTHER ANALYTES ND						

ANALYTE LIST
- TPH-DIESEL RANGE
- ACENAPHTHENE
- ACENAPHTHYLENE
- ANTHRACENE
- BENZO[A]ANTHRACENE
- BENZO[A]PYRENE
- BENZO[B]FLUORANTHENE
- BENZO[G,H,I]PERYLENE
- BENZO[K]FLUORANTHENE
- CHRYSENE
- DIBENZ[A,H]ANTHRACENE
- FLUORANTHENE
- FLUORENE
- INDENO[1,2,3-CD]PYRENE
- NAPHTHALENE
- PHENANTHRENE
- PYRENE

OVERVIEW MAP - NWS SEAL BEACH



N

0 30 60

FEET

MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

NOTES
1. ALL RESULTS SHOWN ARE FROM VALIDATED LABORATORY ANALYTICAL DATA
2. RESULTS IN BOLD EXCEEDED THE ANALYTE SCREENING LEVEL

mg/L = MILLIGRAMS PER LITER
ug/L = MICROGRAMS PER LITER
J = ESTIMATED VALUE
ND = ANALYTE NOT DETECTED
SL = SCREENING LEVEL

LEGEND
- GROUNDWATER SAMPLE LOCATION
- SITE 229 MONITORING WELL LOCATION
- EXISTING MONITORING WELL
- (3.81') MEASURED GROUNDWATER ELEVATION (NAVD88)
- GROUNDWATER ELEVATION CONTOUR DASHED WHERE INFERRED (NAVD88, DECEMBER 2010)

GROUNDWATER RESULTS
8/2009, 11/2009, 7/2010, 12/2010

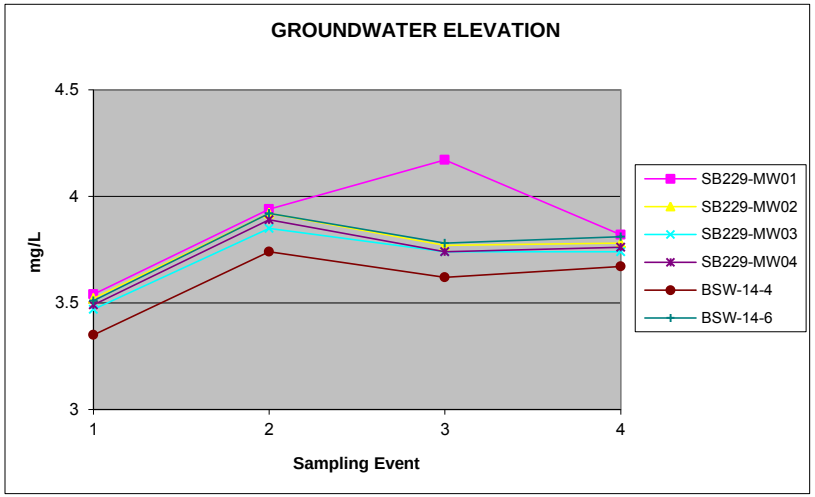
UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

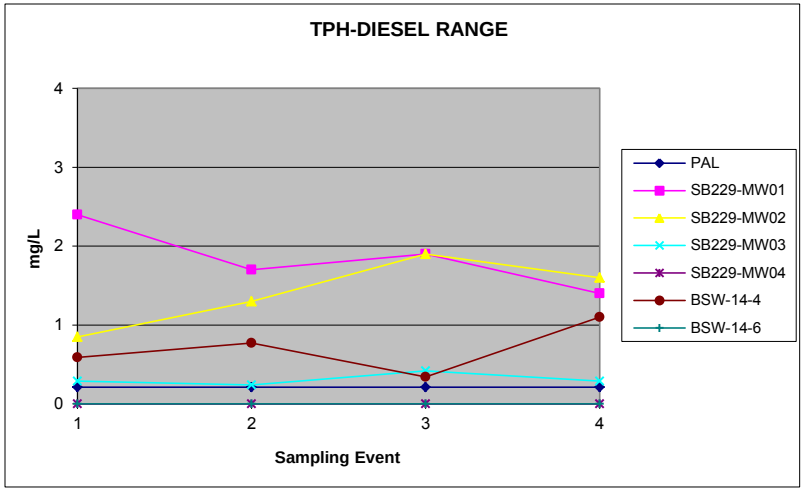
BRADY

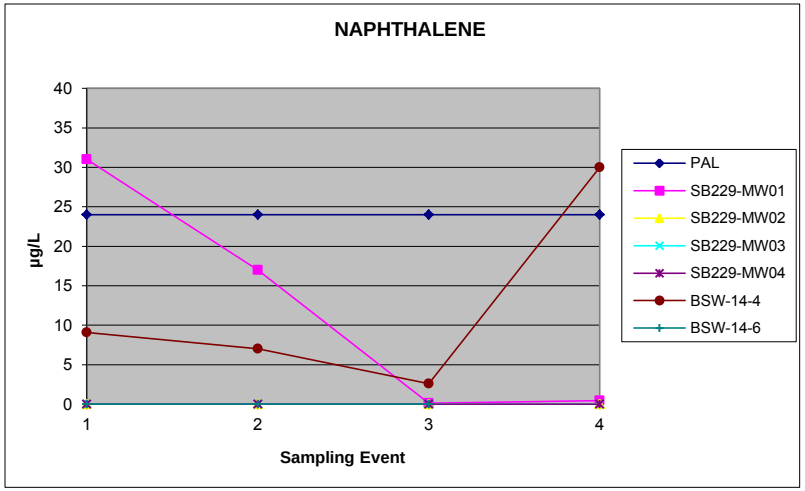
DATE: May 13, 2011
FILE: GW_All

FIGURE: 5-7

Groundwater Monitoring Graphs







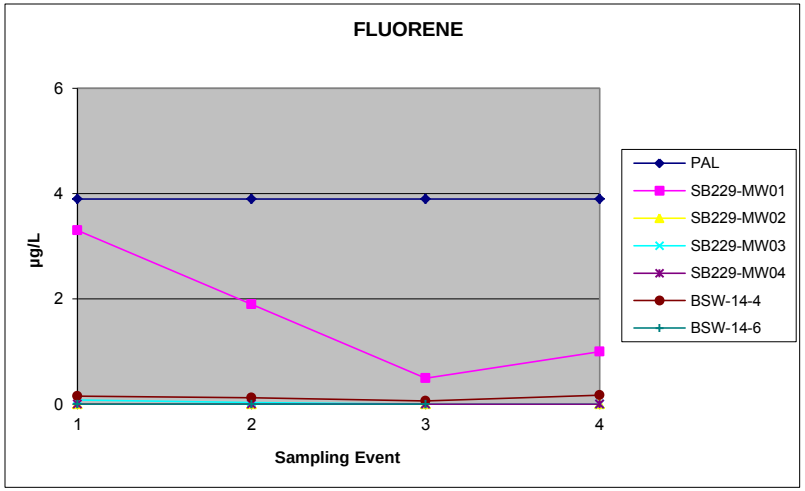
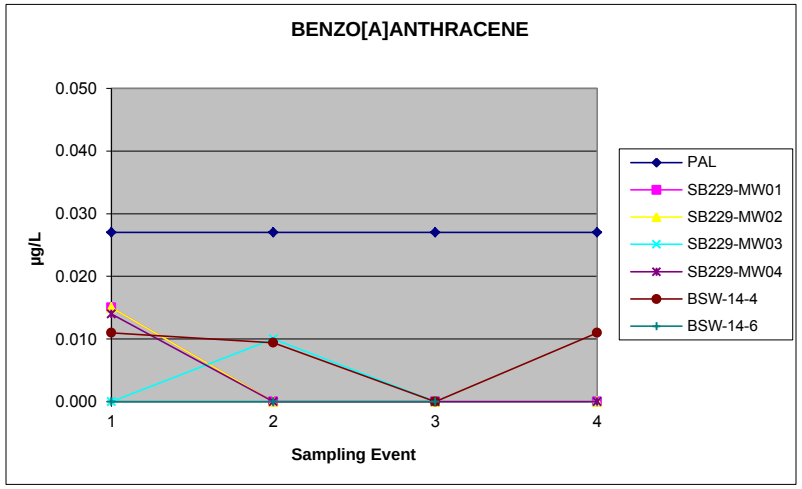
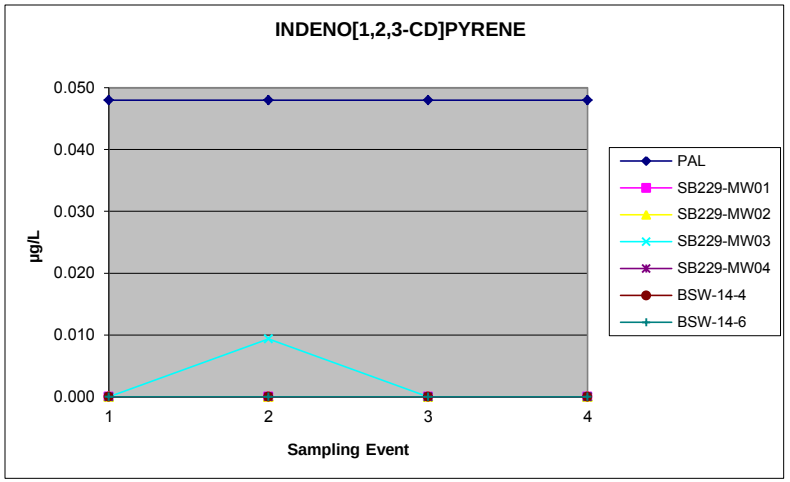
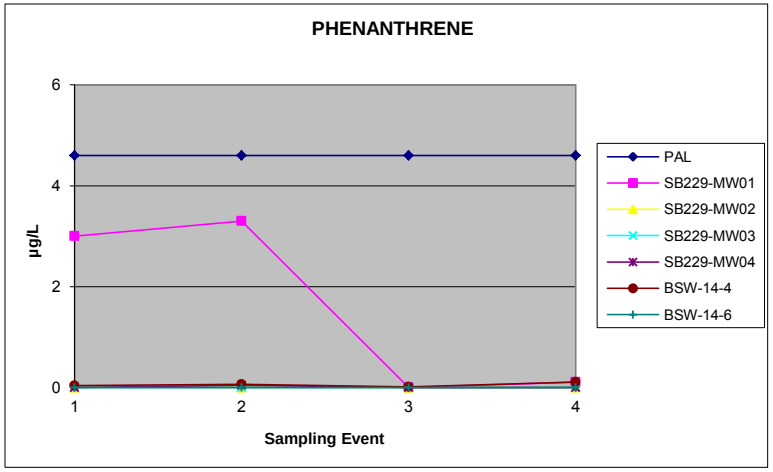


Figure 5-8

Groundwater Monitoring Graphs







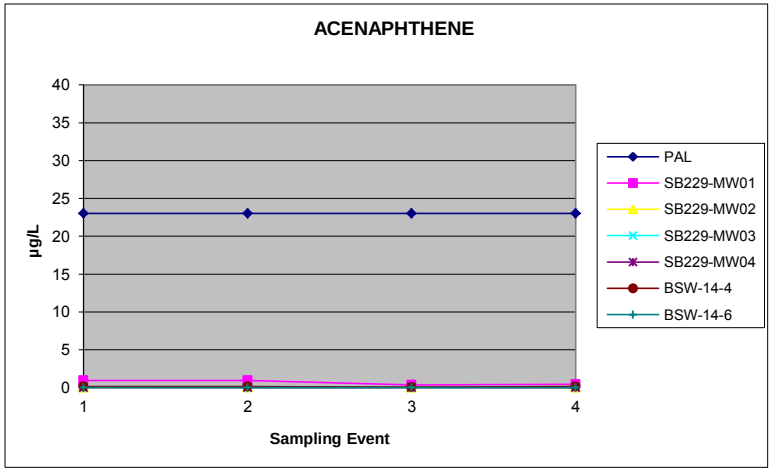
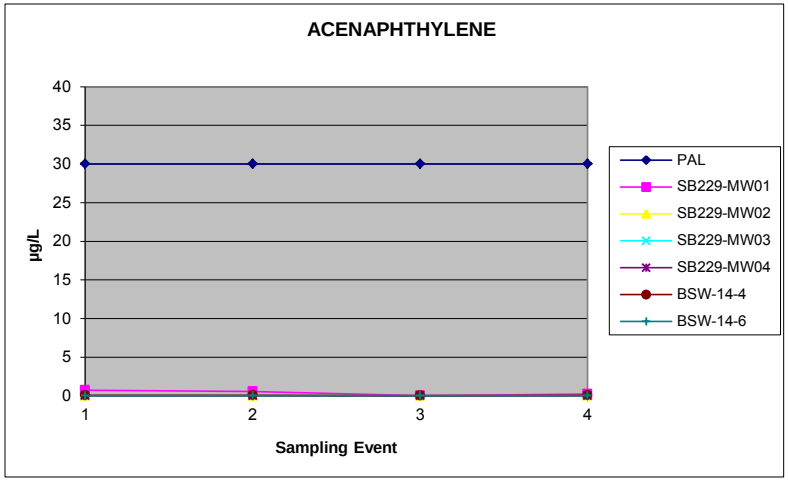
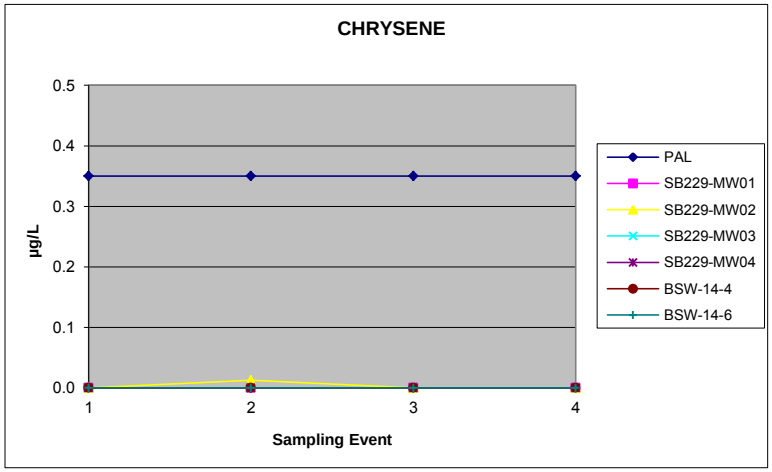
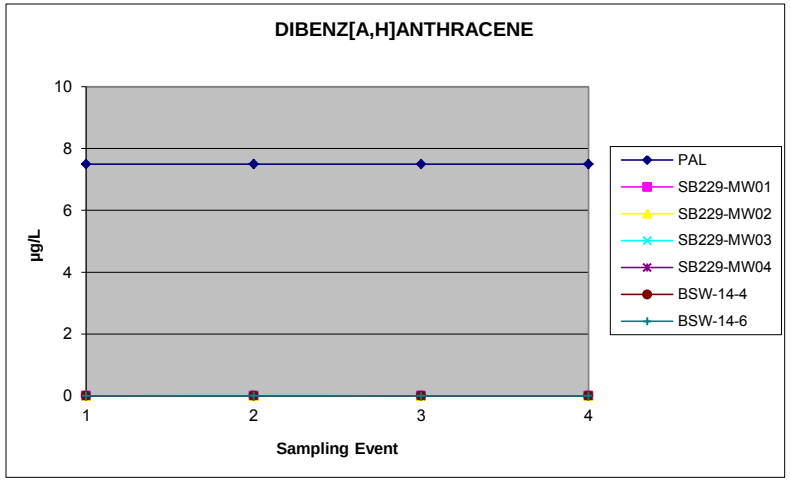


Figure 5-9

Groundwater Monitoring Graphs







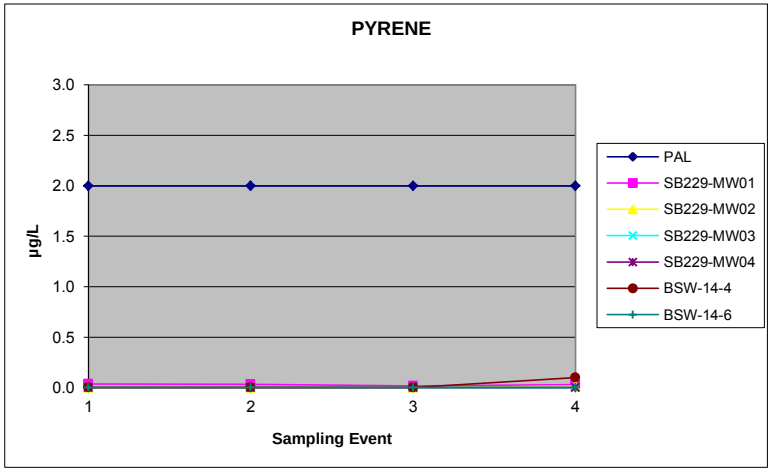
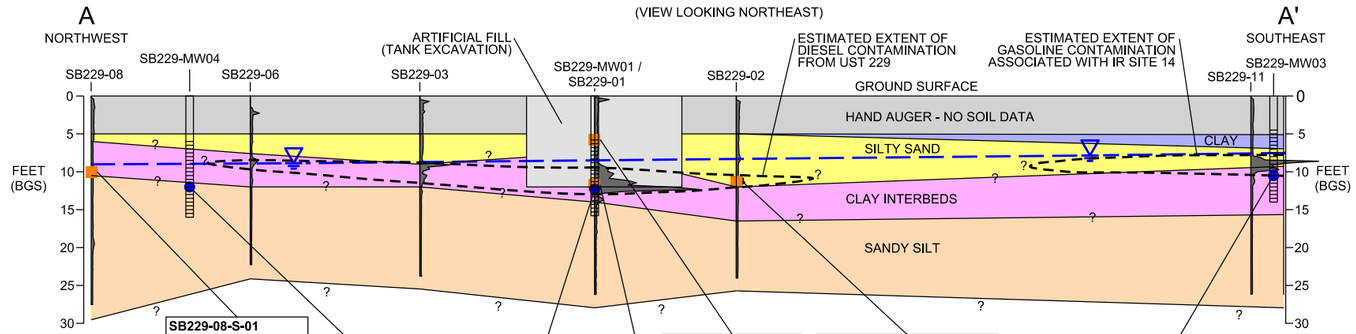


Figure 5-10

SECTION A-A'

(VIEW LOOKING NORTHEAST)



SB229-08-S-01
SOIL 9.0'-10.5' BGS
ALL ANALYTES ND

SB229-01-S-01
SOIL 5.0'-6.5' BGS
ALL ANALYTES ND

SB229-02-S-01
SOIL 10.5'-12.0' BGS

TPH-d	2,800 mg/kg
BENZENE	7.0 ug/kg
ETHYLBENZENE	38 ug/kg
O-XYLENE	2.7J ug/kg
NAPHTHALENE	21 ug/kg
PYRENE	58 ug/kg

ALL OTHER ANALYTES ND

SB229-MW04

	SL	GROUNDWATER 8/6/2009	11/12/2009	7/19/2010	12/8/2010	
GW ELEVATION	-	3.49'	3.89'	3.74'	3.76'	
BENZO[A]ANTHRACENE	0.027	0.014 J	ND	ND	ND	ug/L
PHENANTHRENE	4.6	ND	0.049 J	ND	ND	ug/L

ALL OTHER ANALYTES ND

SB229-01-S-02
SOIL 11.0'-12.5' BGS

TPH-d	1,800 mg/kg
BENZENE	6.7 ug/kg
ETHYLBENZENE	6.8 ug/kg
NAPHTHALENE	17 ug/kg
ACENAPHTHENE	59 ug/kg
ACENAPHTHYLENE	27J ug/kg
ANTHRACENE	26J ug/kg
PYRENE	15J ug/kg

ALL OTHER ANALYTES ND

SB229-MW01

	SL	GROUNDWATER 8/7/2009	11/12/2009	7/19/2010	12/8/2010	
GW ELEVATION	-	3.54'	3.94'	4.17'	3.82'	
TPH-DIESEL RANGE	0.21	**2.4**	**1.7**	**1.9**	**1.4**	mg/L
ACENAPHTHENE	23	0.93 J	0.95	0.37	0.44	ug/L
ACENAPHTHYLENE	30	0.72 J	0.55	ND	0.21	ug/L
ANTHRACENE	0.73	ND	ND	ND	0.059	ug/L
BENZO[A]ANTHRACENE	0.027	0.015 J	ND	ND	ND	ug/L
FLUORENE	3.9	3.3 J	1.9	0.49	1.0	ug/L
NAPHTHALENE	24	**31 J**	17	0.13	0.44	ug/L
PHENANTHRENE	4.6	3 J	3.3 J	ND	0.11	ug/L
PYRENE	2.0	0.037	0.032 J	0.018J	0.029	ug/L

ALL OTHER ANALYTES ND

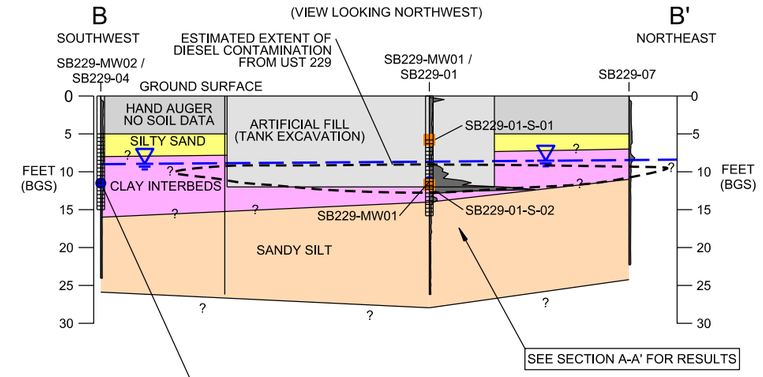
SB229-MW03

	SL	GROUNDWATER 8/7/2009	11/12/2009	7/19/2010	12/9/2010	
GW ELEVATION	-	3.47'	3.85'	3.74'	3.74'	
TPH-DIESEL RANGE	0.21	**0.29 J**	**0.24 J**	**0.42J**	**0.29 J**	mg/L
ACENAPHTHENE	23	0.018 J	ND	ND	ND	ug/L
ACENAPHTHYLENE	30	0.024 J	0.013 J	ND	ND	ug/L
FLUORENE	3.9	0.077 J	0.028 J	ND	ND	ug/L

ALL OTHER ANALYTES ND

SECTION B-B'

(VIEW LOOKING NORTHWEST)



SEE SECTION A-A' FOR RESULTS

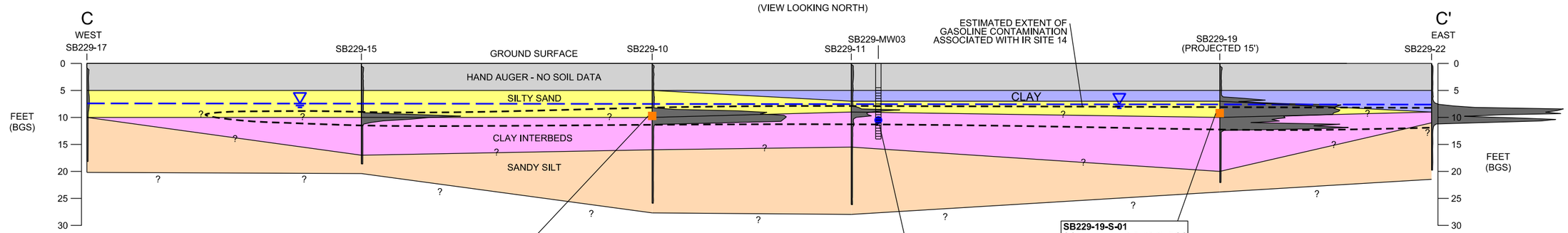
SB229-MW02

	SL	GROUNDWATER 8/6/2009	11/12/2009	7/19/2010	12/8/2010	
GW ELEVATION	-	3.52'	3.92'	3.77'	3.78'	
TPH-DIESEL RANGE	0.21	**0.85**	**1.3**	**1.9**	**1.6**	mg/L
ACENAPHTHENE	23	ND	0.053	ND	ND	ug/L
ACENAPHTHYLENE	30	ND	ND	0.023J	ND	ug/L
BENZO[A]ANTHRACENE	0.027	0.015 J	ND	0.013J	ND	ug/L
CHRYSENE	0.35	ND	0.013 J	ND	ND	ug/L
PYRENE	2.0	ND	ND	ND	0.014 J	ug/L

ALL OTHER ANALYTES ND

SECTION C-C'

(VIEW LOOKING NORTH)



SB229-10-S-01
SOIL 9.0'-10.5' BGS
TPH-d 10J mg/kg
ALL OTHER ANALYTES ND

SB229-MW03

	SL	GROUNDWATER 8/7/2009	11/12/2009	7/19/2010	12/9/2010	
GW ELEVATION	-	3.47'	3.85'	3.74'	3.74'	
TPH-DIESEL RANGE	0.21	0.29 J	0.24 J	0.42J	0.29 J	mg/L
ACENAPHTHENE	23	0.018 J	ND	ND	ND	ug/L
ACENAPHTHYLENE	30	0.024 J	0.013 J	ND	ND	ug/L
FLUORENE	3.9	0.077 J	0.028 J	ND	ND	ug/L

ALL OTHER ANALYTES ND

SB229-19-S-01
SOIL 8.5'-10.0' BGS

TPH-d	1,800 mg/kg
ETHYLBENZENE	190J ug/kg
O-XYLENE	20J ug/kg
P-XYLENE	300J ug/kg
TOLUENE	5J ug/kg
NAPHTHALENE	920 ug/kg
ACENAPHTHENE	250 ug/kg
ANTHRACENE	77 ug/kg
FLUORENE	660 ug/kg
NAPHTHALENE	1,900 ug/kg
PHENANTHRENE	900 ug/kg
PYRENE	49 ug/kg

ALL OTHER ANALYTES ND

ANALYTE LIST
TPH-DIESEL RANGE
ACENAPHTHENE
ACENAPHTHYLENE
ANTHRACENE
BENZO[A]ANTHRACENE
BENZO[A]PYRENE
BENZO[B]FLUORANTHENE
BENZO[G,H,I]PERYLENE
BENZO[K]FLUORANTHENE
CHRYSENE
DIBENZ[A,H]ANTHRACENE
FLUORANTHENE
FLUORENE
INDENO[1,2,3-CD]PYRENE
NAPHTHALENE
PHENANTHRENE
PYRENE

0 10 20 40
HORIZONTAL SCALE: 1 INCH=40 FEET
VERTICAL SCALE: 1 INCH=40 FEET

NOTES
1. RESULTS IN BOLD EXCEEDED THE ANALYTE SCREENING LEVEL

BGS = BELOW GROUND SURFACE
mg/kg = MILLIGRAMS PER KILOGRAM
ug/kg = MICROGRAMS PER KILOGRAM
mg/L = MILLIGRAMS PER LITER
ug/L = MICROGRAMS PER LITER
ND = NOT DETECTED
J = ESTIMATED VALUE
SL = SCREENING LIMIT

LEGEND
- SOIL SAMPLE (BRADY, 2009)
- GROUNDWATER SAMPLE (BRADY, 2009-2010)
- WATER TABLE
- SCAPS LIF INTENSITY PROFILE

CONCEPTUAL SITE MODEL
CROSS SECTIONS

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

BRADY

Date: Apr 29, 2011
File No. Seal Beach_XSECT _100420_V8_2D

FIGURE:
6-1

DRAFT

SB229-08-S-01
SOIL 9.0'-10.5' BGS
ALL ANALYTES ND

SB229-08

NEW ESTIMATED EXTENT OF DIESEL IMPACTED SOIL

POLE

CELL USED FOR VOLUME ESTIMATION, ESTIMATED THICKNESS OF IMPACTED SOIL IS SHOWN

SB229-06

SB229-05

SB229-14

SB229-07

SB229-03

PREVIOUS EXTENT OF CONTAMINATION

SB229-01-S-01
SOIL 5.0'-6.5' BGS
ALL ANALYTES ND

SB229-01-S-02
SOIL 11.0'-12.5' BGS

TPH-d	1,800 mg/kg
BENZENE	6.7 ug/kg
ETHYLBENZENE	6.8 ug/kg
NAPHTHALENE	17 ug/kg
ACENAPHTHENE	59 ug/kg
ACENAPHTHYLENE	27J ug/kg
ANTHRACENE	26J ug/kg
PYRENE	15J ug/kg
ALL OTHER ANALYTES	ND

SB229-01

UST 229 SITE
LOCATION OF PREVIOUS EXCAVATION.
(TANKS REMOVED 1991, TANK SUPPORTS STILL IN GROUND)

SB229-02

SB229-02-S-01
SOIL 10.5'-12.0' BGS

TPH-d	2,800 mg/kg
BENZENE	7.0 ug/kg
ETHYLBENZENE	38 ug/kg
O-XYLENE	2.7J ug/kg
NAPHTHALENE	21 ug/kg
PYRENE	58 ug/kg
ALL OTHER ANALYTES	ND

SB229-09

SB229-04

ANALYTE LIST (SOIL)
TPH-DIESEL RANGE
ACENAPHTHENE
ACENAPHTHYLENE
ANTHRACENE
BENZO[A]ANTHRACENE
BENZO[A]PYRENE
BENZO[B]FLUORANTHENE
BENZO[G,H,I]PERYLENE
BENZO[K]FLUORANTHENE
CHRYSENE
DIBENZ[A,H]ANTHRACENE
FLUORANTHENE
FLUORENE
INDENO[1,2,3-CD]PYRENE
NAPHTHALENE
PHENANTHRENE
PYRENE

OVERVIEW MAP - NWS SEAL BEACH

N

0 15 30
FEET
MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

NOTE:
mg/kg = MILLIGRAMS PER KILOGRAM
ug/kg = MICROGRAMS PER KILOGRAM
ND = NOT DETECTED
J = ESTIMATED VALUE

LEGEND
SCAPS LOCATION
SCAPS LIF RESULTS
NO FUEL FLUORESCENCE
POTENTIAL OR WEAK FUEL FLUORESCENCE
FUEL FLUORESCENCE

ESTIMATED EXTENT OF DIESEL IMPACTED SOIL

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

BRADY

DATE: Apr 29, 2011
FILE: VolCalc

FIGURE: 6-2

Appendix A

Final Internal Interim Technical Memorandum, SCAPS Investigation

DEPARTMENT OF THE NAVY – NAVFAC SOUTHWEST
Naval Facilities Engineering Command
1220 Pacific Highway, San Diego, California 92132-5190

FINAL

INTERIM INTERNAL TECHNICAL MEMORANDUM
SCAPS INVESTIGATION
UNDERGROUND STORAGE TANK SITE 229,
NAVAL WEAPONS STATION SEAL BEACH, CALIFORNIA

Contract Number: N68711-03-D-4302

NAVFAC SW CTO 0120

DCN: RBAE-4302-0120-0069

August 5, 2009

Prepared by:

Richard Brady & Associates
Engineering and Construction

3710 Ruffin Road
San Diego, California 92123-4349

DEPARTMENT OF THE NAVY – NAVFAC SOUTHWEST
Naval Facilities Engineering Command
1220 Pacific Highway, San Diego, California 92132-5190

FINAL

INTERIM INTERNAL TECHNICAL MEMORANDUM
SCAPS INVESTIGATION
UNDERGROUND STORAGE TANK SITE 229,
NAVAL WEAPONS STATION SEAL BEACH, CALIFORNIA

Contract Number: N68711-03-D-4302

NAVFAC SW CTO 0120

DCN: RBAE-4302-0120-0069

Prepared by:

8-5-09

Donald McHugh, PG 8219 Date
Project Manager

Review by:

8-5-2009

Timothy Shields Date
Program Manager

PROFESSIONAL ENGINEER
DONALD McHUGH
No. 8219
STATE OF CALIFORNIA

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Figure 6 Total Petroleum Hydrocarbons-Diesel in Soil

Figure 7 Proposed Monitoring Wells

TABLES

Table 1 Laboratory Analytical Results

APPENDICES

Appendix A SCAPS LIF Logs

Appendix B SCAPS Soil Sample Logs

Appendix C Analytical Laboratory Data

ACRONYMS/ABBREVIATIONS

AVGAS	aviation gasoline
bgs	below ground surface
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CPT	Cone Penetrometer Test
IR	Installation Restoration
IRP	Installation Restoration Program
JEG	Jacobs Engineering Group
LIF	Laser Induced Fluorescence
MARRS	MARRS Services, Inc.
µg/kg	micrograms per kilogram
NAVFAC SW	Naval Facilities Engineering Command Southwest
NAVWPNSTA	Naval Weapons Station
nm	nanometer ($1x10^{-9}$ meter)
PAHs	Polycyclic Aromatic Hydrocarbons
POL	Petroleum Oil and Lubricants
PVC	polyvinyl chloride
QAO	Quality Assurance Officer
RBA	Richard Brady & Associates
RES	Riedel Environmental Services, Inc
RWQCB	California Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SCAPS	Site Characterization and Analysis Penetrometer System
SHAW	Shaw Environmental and Infrastructure, Inc.
TPH-d	Total Petroleum Hydrocarbons as diesel
US EPA	United States Environmental Protection Agency
UST	Underground Storage Tank

Interim Internal Technical Memorandum
SCAPS Investigation
Underground Storage Tank Site 229
Naval Weapons Station Seal Beach, California

1.0 PURPOSE

This Interim Internal Technical Memorandum was prepared by Richard Brady & Associates (RBA) under subcontract to Shaw Environmental and Infrastructure, Inc. (SHAW) for Naval Facilities Engineering Command Southwest (NAVFAC SW). The purpose of this document is to provide an update on the Site Characterization and Analysis Penetrometer System (SCAPS) Investigation at former Underground Storage Tank (UST) Site 229 at Naval Weapons Station (NAVWPNSTA) Seal Beach, California (Figures 1 and 2). This document provides an updated conceptual site model (CSM) and recommendations for the location and construction of four permanent groundwater monitoring wells to assess potential dissolved phase petroleum hydrocarbons in groundwater. A comprehensive Site Characterization Report will be prepared subsequent to the installation and sampling of the monitoring wells. All proposed work will be conducted in accordance with the Final Sampling and Analysis Plan (SAP) (RBA, 2009).

2.0 BACKGROUND

UST Site 229 is located southwest of the intersection of Industrial Road and Kitts Highway adjacent to the eastern edge of former Building 229. The former UST tank pit covers an area of approximately 200 square feet. Building 229 was demolished in the 1990s and no surface expression of the building remains. Building 229 was the office of the NAVWPNSTA Seal Beach Comptroller/Controller and was used for accounting functions. The USTs were reportedly used to fuel a boiler that provided heat for the building.

Two 10,000-gallon steel USTs that formerly stored diesel fuel were removed from the site in 1991 by Riedel Environmental Services, Inc., (RES). RES collected four soil samples from the UST excavation for analysis of Total Petroleum Hydrocarbons as diesel (TPH-d) by United States Environmental Protection Agency (US EPA) Method 8015; and Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) by US EPA Method 8020. (RES, 1991)

Upon completion of the excavation, UST removal, and sampling activities, RES backfilled the excavation with fill material. The concrete anchor pad for the two USTs was left in place at a depth of approximately 11 feet below ground surface (bgs). Based on the TPH-d and BTEX concentrations reported in soil samples from the UST excavation, RES recommended further investigation of NAVWPNSTA Seal Beach UST Site 229. (RES, 1991)

In 1992, Jacobs Engineering Group (JEG) conducted a UST Site Assessment Study at NAVWPNSTA Seal Beach UST Site 229. This UST Site Assessment consisted of a geophysical survey, a screening level soil gas study consisting of the collection of five soil gas samples, the advancement of seven soil borings, and the conversion of three of the seven soil borings to groundwater monitoring wells. Eleven soil samples were analyzed for TPH-extractable as diesel

by US EPA Method 8015 and BTEX by US EPA Method 8020. The five soil gas samples were analyzed for TPH. Three groundwater samples collected from monitoring wells MW-1, MW-4, and MW-5 surrounding the former tank pit were analyzed for TPH-extractable as diesel by US EPA Method 8015, and BTEX by US EPA Method 8020. (JEG, 1993)

Hydrocarbon concentrations were not reported in any of the five soil gas samples. However, residual petroleum product was visible on temporary soil gas probes V-1 and V-4, installed above the water table in the former tank pit and just north of the tank pit, upon removal of the probes indicating product had migrated away from the UST location. (JEG, 1993)

Benzene and toluene were not reported in any of the 11 soil samples analyzed during the JEG assessment. Ethylbenzene and total xylenes were reported in soils in the 11-foot bgs sample in MW-1 at concentrations of 230 and 170 micrograms per kilogram (µg/kg), respectively. TPH-extractable quantitated as diesel was reported in 5 of the 11 soil samples analyzed, with concentrations ranging from 53 milligrams per kilogram (mg/kg) in the 5.5-foot bgs sample from MW-3, to 2,600 mg/kg in the 11-foot bgs sample from MW-4. TPH-extractable as diesel was also reported in soil samples collected from 8.5-feet bgs in soil borings SB6 and SB7. (JEG, 1993)

Soil borings MW-1, MW-4, and MW-5 surrounding the former tank pit were advanced to a depth of 28 feet bgs and were subsequently converted to groundwater monitoring wells, developed, and sampled. Each of the three monitoring wells was generally screened from 5 feet bgs to 28 feet bgs, and groundwater was encountered at approximately 8.5 feet bgs in each well. TPH-extractable as diesel and BTEX were not reported in any of the three groundwater samples from these three wells. (JEG, 1993)

JEG concluded that free product potentially exists on the groundwater above the in-place anchor pad from the former two 10,000-gallon USTs. In addition, JEG concluded that hydrocarbons in groundwater appeared to be confined within approximately 10 feet north of the former excavation, and that the soil was impacted with hydrocarbons above the groundwater in the former excavation and approximately 25 feet northwest of the excavation beyond soil boring SB6 and monitoring well MW-4. JEG recommended that hydrocarbon impacted soil be removed and remediated, and that any free product be removed during excavation activities. At the conclusion of the JEG site assessment all three groundwater monitoring wells were properly destroyed. (JEG, 1993)

No other additional work was conducted at the Site 229 after 1993 due to an experimental bioremediation study conducted by Stanford University (Reinhard, et. al., 2000) at Installation Restoration (IR) Site 14 (Former Gas Station Site), located directly to the east of UST Site 229. This study was conducted under the Department of Defense Environmental Security Technology Certification Program. The investigators of the study at IR Site 14 requested that no intrusive work be conducted at UST 229 during the bioremediation study. A subsequent groundwater investigation of IR Site 14 was completed by MARRS Services, Inc. in 2007. Findings concerning the groundwater conditions in the vicinity of IR Site 14 indicated that the depth to

groundwater at that time was approximately 8 to 10 feet bgs, with a gradient on the order of 10^{-2} to 10^{-3} generally trending from west-northwest to east-southeast. (MARRS, 2007)

3.0 SCAPS WORK PERFORMED TO DATE

Twenty-two SCAPS CPT/LIF pushes were completed at UST Site 229 at locations depicted on Figure 3. The CPT/LIF work was conducted in two deployments between March 31, 2009 and April 7, 2009. Lithologic data was collected using a Cone Penetrometer Test (CPT) probe. The CPT is an instrumented probe that measures the cone resistance and sleeve friction of the probe penetration. Data for cone resistance and sleeve friction are simultaneously recorded in units of tons per square foot at approximately 1-inch vertical intervals. The data processing unit calculates the friction ratio (the ratio of sleeve friction to cone resistance). The friction ratio and cone resistance values are mapped to corresponding soil behavior classifications using Robertson and Campanella's method, providing continuous, real-time profiling of the subsurface lithology.

The Laser Induced Fluorescence (LIF) probe augments the above-described standard CPT capabilities to include Petroleum Oil and Lubricants (POL) detection. SCAPS uses the LIF via the push-rod and probe fiber-optic cable system to detect relative subsurface soil POL concentrations. The SCAPS 308-nanometer (nm) xenon-chloride laser technology is best suited for investigating sites that include compounds containing two-ring (or greater) Polycyclic Aromatic Hydrocarbons (PAHs), such as aviation gasoline (AVGAS), gasoline, JP-4, JP-5, diesel fuel, or oils.

The LIF provides measurements of POL with a vertical resolution of approximately 2 inches as the probe is pushed into the ground at a rate of 3 feet per minute. As the LIF probe is pushed into the ground, laser light is transmitted via fiber optics within the rod-probe assembly. The laser light is transmitted to the adjacent soil through an optical window mounted in the probe. As the optical window passes by the soil, the PAHs contained in POL are induced to fluoresce by the laser. This fluorescence signal is carried back to the surface through a second optical fiber in the probe-rod assembly. The return signal is analyzed by a linear photodiode array spectrophotometer and recorded on the onboard computer.

As the CPT/LIF probe is advanced, computer-generated real-time continuous logs of fluorescence intensity and wavelength are produced simultaneously with the CPT soil resistance, cone pressure and soil classification logs. Fluorescence intensity and wavelength logs are used to evaluate the relative abundance of subsurface POL contaminants and to evaluate whether or not different types of POL are present. CPT/LIF logs are presented in Appendix A. Graphic LIF intensity logs for the 22 SCAPS pushes are presented on Figure 4. The updated CSM showing the groundwater, geology, and fuel impact based on LIF data is presented as cross-sections on Figure 5.

Soil samples were collected on April 28 and 29, 2009 using 6-inch-long, stainless steel tubes and a direct-push drive sampling tool. Samples for BTEX were immediately collected using three 5-gram EnCore® sampling containers in accordance with US EPA Method 5035. Samples for TPH-diesel and Naphthalene analysis were collected using the drive tube. A total of seven soil samples were analyzed for BTEX, Naphthalene, PAHs, and TPH-diesel by EMAX Laboratories

Inc. in Torrance, California. The laboratory analyses were scheduled in accordance with the Final SAP (RBA, 2009) and the agreements made at the November 28, 2008 planning meeting.

4.0 SCAPS SOIL SAMPLING RESULTS

A total of seven soil samples were collected and analyzed for potential petroleum hydrocarbon impacts at six SCAPS CPT/LIF sampling locations: SB229-01, -02, -08, -10, -19 and -21 (Figure 3). The soil samples were analyzed for BTEX, Naphthalene, PAHs, and TPH-diesel to determine the potential for impacts from the UST fuel product release, and to correlate with corresponding SCAPS LIF data. The analytical results, shown in Table 1, are briefly described below, and presented graphically in the attached Soil Sample Logs (Appendix B), TPH-diesel results are shown on Figures 6 and Analytical Laboratory Data is included in Appendix C.

Two soil samples were collected from location SB229-01 in the former UST tank pit, one above the water table at 5 - 6.5 feet bgs, and the second below the water table at 11 - 12.5 feet bgs. The soil sample from 5 - 6.5 feet bgs was collected from a depth interval of background fluorescence intensity that did not show a wavelength typical of fuel contamination. The sample showed no visual evidence or other indications of hydrocarbon impacts. Analytical results were non-detect for all constituents, consistent with LIF data. The soil sample from 11 - 12.5 feet bgs targeted an elevated fluorescence intensity response that showed a wavelength typical of fuel contamination. The sample showed visual evidence of green/gray staining and had a weathered fuel odor. The concentration of TPH-diesel was 1800 mg/kg, concentrations of benzene and ethylbenzene were below 7 µg/kg; naphthalene was 17 µg/kg; and concentrations of four other PAH compounds ranged from 15.0 µg/kg to 59 µg/kg.

One soil sample was collected from location SB229-02, situated just down gradient of the former tank pit, below the water table at 10.5 - 12 feet bgs. The sample targeted an interval of slightly elevated fluorescence intensity response that showed a wavelength typical of fuel. The sample showed visual evidence of green/gray staining and a diesel fuel odor. The concentration of TPH-diesel was 2800 mg/kg; benzene was 7 µg/kg, ethylbenzene was 38 µg/kg, xylenes were estimated at 2.7 J µg/kg, naphthalene was 21 µg/kg; and pyrene was 58 µg/kg.

One soil sample was collected from location SB229-08, north and up gradient of the former fuel tank pit, below the water table at 11 - 12.5 feet bgs. The sample was collected from a depth interval of background fluorescence intensity that did not show a wavelength typical of fuel contamination. This sample showed no visual evidence of staining or fuel odor, and analytical results were non-detect for all constituents, consistent with the LIF data.

One soil sample was collected from location SB229-10, approximately 60 feet south of the former fuel tank pit, below the water table at 9 - 10.5 feet bgs. The sample targeted an interval of elevated fluorescence intensity response that showed a wavelength typical of fuel contamination. The sample showed visual evidence of staining and diesel fuel odor down to 10 feet bgs, with a decline in odors and stains from 10 - 10.5 feet bgs. The sample from 10 - 10.5 feet bgs was submitted from beneath an identified narrow silty confining layer within the designated sampling interval that was below the observed petroleum impacts. The sample was submitted to confirm the attenuation characteristics of the narrow confining silty layer that could

affect proposed well construction specifications in this portion of the site. Laboratory analytical results of the bottom of the 10 - 10.5 feet bgs sample tube indicate a very low estimated detection of diesel range petroleum hydrocarbons (10.0 J mg/kg), suggesting heterogeneous distribution of fuel impact over the sampling interval consistent with the visual and olfactory observations. All other constituents were not detected.

One soil sample was collected from location SB229-19, approximately 130 feet southeast and farther down gradient of the former tank pit, at the water table at 8.5 - 10 feet bgs. The sample targeted an elevated fluorescence intensity response that showed a wavelength typical of fuel contamination. The sample showed visual evidence of gray staining and a diesel fuel odor. The concentration of TPH-diesel was 1800 mg/kg; the concentration of benzene was estimated at 5.9 J µg/kg, ethylbenzene was estimated 190 J µg/kg, xylenes were estimated at 320 J µg/kg, and toluene was estimated at 5.0 J µg/kg; naphthalene was 1900 µg/kg; and five other PAH compounds were detected between 49 µg/kg and 900 µg/kg.

The final soil sample was collected from location SB229-21, approximately 150 feet east of the former tank pit, at the water table at 8.5-10 feet bgs. The sample targeted a fluorescence intensity response that showed a wavelength typical of fuel contamination. The sample from 8.5-10 feet bgs showed visual evidence of gray staining and a fuel odor. The concentration of TPH-diesel was 12000 mg/kg; benzene was 43000 µg/kg, ethylbenzene was 48000 µg/kg, xylenes were 65500 µg/kg, toluene was 2200 µg/kg, naphthalene was 63000 µg/kg; and eight other PAH compounds were detected at concentrations between 12 J µg/kg and 3700 µg/kg.

5.0 CONCEPTUAL SITE MODEL

The CSM for the NAVWPNSTA Seal Beach UST Site 229 study area was compiled from historical research, site visits and available hydrogeological and chemical data from all investigations to date. The CSM will be refined as needed based on future groundwater sampling data.

5.1 Potential Sources and Contaminants

A release of diesel fuel related to the former operations of the two 10,000-gallon USTs occurred within a limited area of the site. The source area appears limited to the immediate vicinity of the former UST excavation. A three-dimensional depiction of the CSM at the source area is shown on Figure 6.

In the presumed downgradient direction from the site (based on IR Site 14 data, MARRS, 2007), soil appears to be impacted with diesel fuel constituents concurrent with the depth of groundwater. This diesel-impacted zone is a few feet thick at most. This indicates that diesel fuel constituents have migrated downgradient from the site in shallow groundwater. Based on the SCAPS LIF data, petroleum migration was primarily within the saturated silty sand along the top of the clay/silt interbeds, which would act to help limit downward migration (Figure 5).

Petroleum impacts in the easternmost SCAPS locations (e.g., SB229-21) may be related, at least partly, to IR Site 14, based upon groundwater flow direction and available soil and groundwater

data from UST Site 229 and IR Site 14. The highest BTEX concentrations in soil (boring SB229-21) roughly correspond with the location of the highest BTEX concentrations in groundwater (well BSW-14-4) reported during recent IR Site 14 groundwater sampling in 2006 (MARRS, 2007). In addition, the highest concentration and greatest number of PAHs in soil were also reported at this same location (boring SB229-21).

5.2 Pathways

The primary pathway for petroleum migration is infiltration of diesel in the vadose zone soil extending downward to the shallow groundwater. Free product may be present on the groundwater in the immediate vicinity of the former UST 229 excavation, although there was no indication of free product in the SCAPS CPT pushes. One possibility is that free product, if present, currently exists as a discontinuous residual phase in the soil at and downgradient of the site. Dissolved-phase fuel appears to have migrated away from the source area in the down-gradient direction in the shallow groundwater, presumed to be towards the southeast.

5.3 Receptors

Shallow groundwater resources in the immediate vicinity, and downgradient, of the former tank excavation, have the potential to be used by ecological receptors, and no pathways to human receptors have been identified for this site. No other current complete pathways have been identified for diesel constituents from Site 229 to reach ecological receptors. The nearest edge of the Seal Beach National Wildlife Refuge to the site is located approximately 400 feet east southeast of the center of the former UST excavation at UST Site 229.

6.0 PROPOSED ADDITIONAL WORK

The results of the 22 SCAPS LIF locations and the laboratory analysis of seven confirmatory soil samples from six of the SCAPS locations indicate that the groundwater beneath the UST 229 site has been potentially affected by petroleum hydrocarbons that could be associated with the identified release from the USTs formerly at Site 229. It is recommended that further groundwater monitoring be completed at this location utilizing groundwater monitoring wells to provide representative samples of the groundwater for further detailed analysis, and determine with greater accuracy the elevation and direction of groundwater flow associated with this location and release.

Given the soil conditions identified in this investigation to date and the requirements of the SAP, recommendations for potential well placement and well construction are as follows:

- One up gradient well to be located in the vicinity of SB229-08 to measure groundwater quality outside of the Site 229 tank pit area.
- One source well to be situated in the former tank pit location near SB229-01. This well information is to be used to provide potential source data for subsequent down gradient groundwater testing and monitoring efforts.
- Two additional down or cross-gradient monitoring wells, installed at locations evaluate potential extent limits to fuel constituent migration that could be associated

with the Site 229 tank pit release and to provide enhanced information regarding groundwater flow. Potential proposed locations include SB229-04 and SB229-11.

- BTEX by US EPA Method 82650b will not be analyzed in groundwater samples collected from the four new monitoring wells due to the lack of BTEX in soil samples collected at these locations. Groundwater samples collected from the four new wells will be analyzed for TPH-d by USEPA Method 8015M and PAHs including naphthalene by USEPA Method 8270 SIM.
- Groundwater samples will be collected from existing monitoring wells BSW-14-4 and BSW-14-6 and analyzed for TPH-d by USEPA Method 8015M and PAHs including naphthalene by US EPA Method 8270 SIM.

Proposed potential monitoring well locations are provided in Figure 7.

Potential well construction specifications based upon groundwater conditions encountered in this investigation completed to date and in accordance with the SAP are 2-inch diameter flush-threaded Schedule 40 polyvinyl chloride (PVC) well casing and screen completed to a maximum total depth of 17 feet bgs with threaded cap bottom. Well screen length is recommended to be 10 feet of 0.010 inch slotted pipe casing to address the shallow occurrence of groundwater and potential seasonal groundwater elevation fluctuations. Well filter pack and seals include #2/16 clean washed filter pack sand placed from the bottom of the well to within 5 feet of ground surface, and sealed with a minimum of 2 linear feet of hydrated bentonite chips and capped with a traffic rated well vault box set in three feet of high-strength concrete at ground surface. All monitoring well construction should be completed in accordance with all applicable federal, state and local construction and permitting requirements.

7.0 REFERENCES

California Regional Water Quality Control Board – Santa Ana Region (RWQCB), 2007. Information Request for Underground Storage Tank Site 229, U.S. Naval Weapons Station Seal Beach, GeoTracker ID: T0605901373. May 31.

Jacobs Engineering Group (JEG), 1993. Naval Weapons Station Seal Beach, California, Underground Storage Tank Studies Site Assessment Report. April 30.

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Reinhard, Dr. M.; Hopkins, G; Cunningham, Dr. J. A.; and Lebron, C. 2000. Enhanced In Situ Anaerobic Bioremediation of Fuel-Contaminated Ground Water. Stanford University, Department of Civil and Environmental Engineering. September.

Richard Brady & Associates (RBA), 2008. Final SCAPS Investigation Kickoff Meeting Minutes, Underground Storage Tank Site 229, Naval Weapons Station Seal Beach, California. September 11.

_____, 2009. Final Workplan Extended Site Assessment of Former Underground Storage Tank Site 229, Naval Weapons Station Seal Beach, California. March 23.

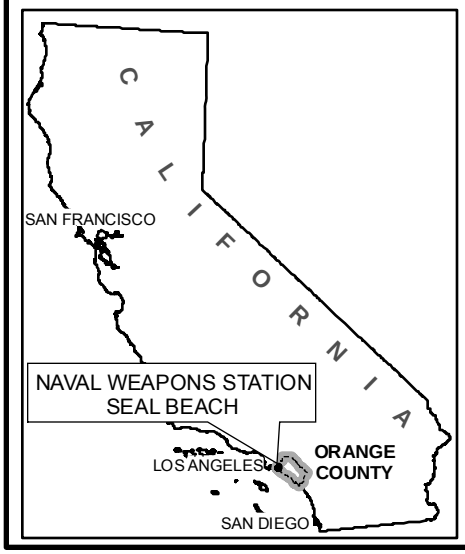
Riedel Environmental Services, Inc. (RES), 1991. Underground Storage Tank Closure Report, Contract # N6674-89-5323. July.

Robertson, P.K. and Campanella, R.G., 1988. Guidelines for Use, Interpretation and Application of the CPT and CPTU, UBC, Soil Mechanics Series No. 105.

United States Environmental Protection Agency (EPA), 2006. Guidance for The Data Quality Objectives Process, EPA QA/G-4, EPA/600/R-96/055. February.

_____, 2008. "Regional Screening Levels for Chemical Contaminants at Superfund Sites" (formerly EPA Region 9 Preliminary Remediation Goals). September 12. Available online at http://www.epa.gov/region09/superfund/prg/index.html.

Figures



FACILITY LOCATION MAP

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

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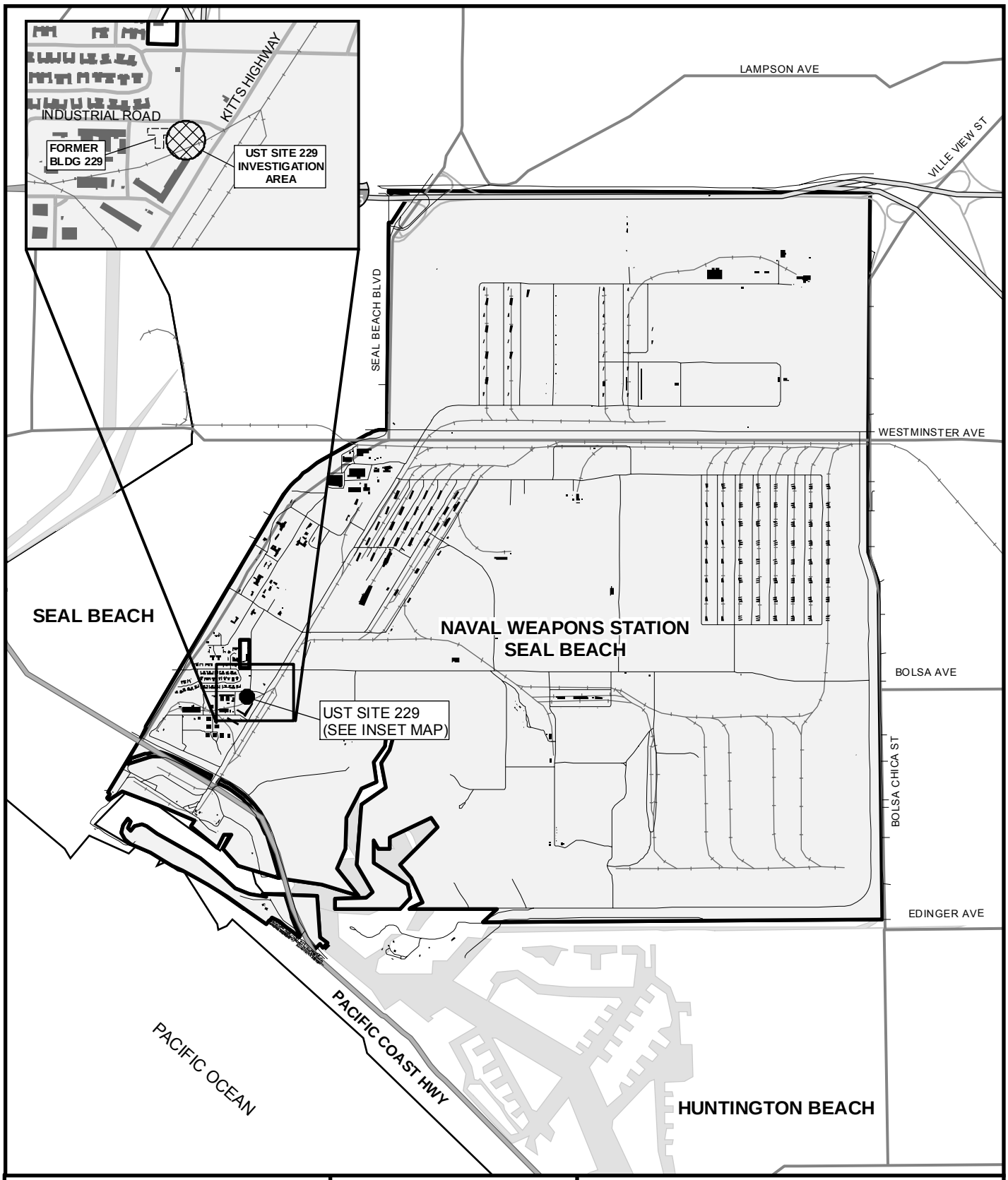
3710 Ruffin Road
San Diego California 92123
Telephone 858.496.0500 Fax 858.496.0505

DATE: Oct 29, 2008
FILE: SealBch FacLocMap

FIGURE: 1



N

0 0.25 0.5 1

MILES

SITE LOCATION MAP

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

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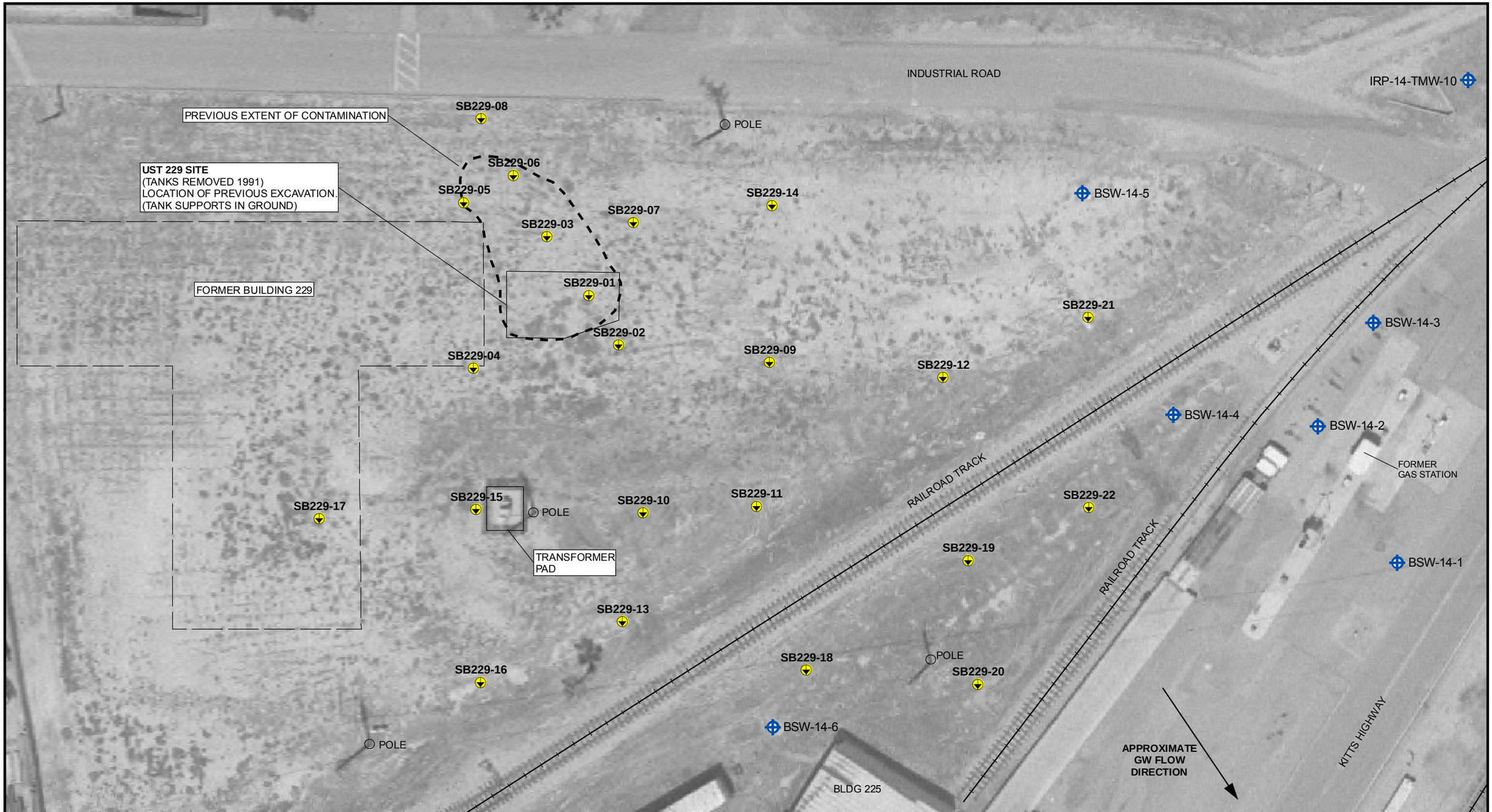
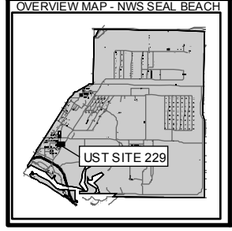
DATE: Oct 29, 2008
FILE: SealBch BaseMap2

FIGURE: 2



OVERVIEW MAP - NWS SEAL BEACH



N

0 30 60

FEET

MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

LEGEND

SCAPS LOCATION

EXISTING MONITORING WELL

SITE PLAN AND SCAPS LOCATIONS

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

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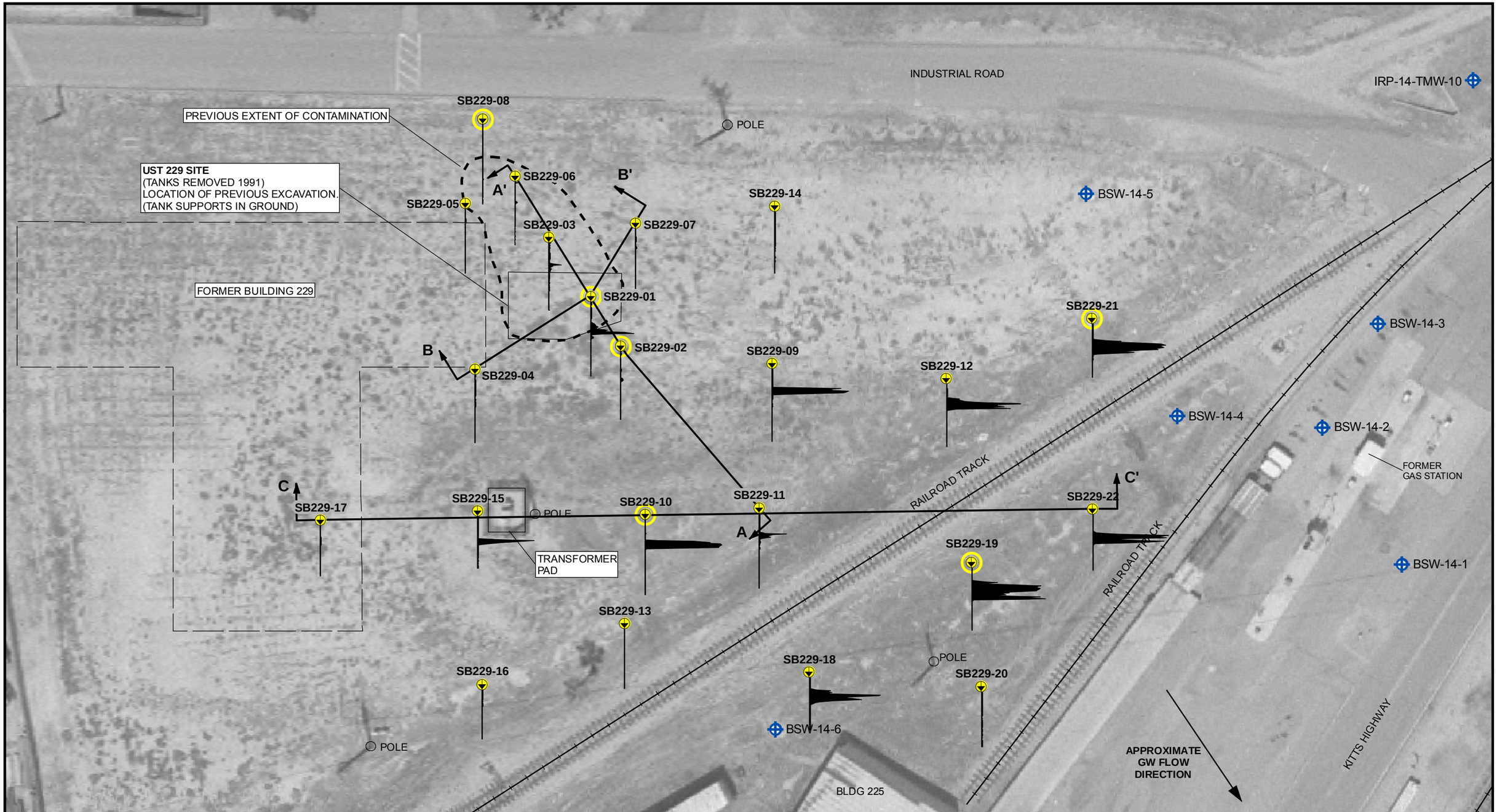
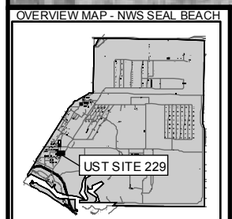
DATE: July 9, 2009
FILE: UstSite229 Loc_090616

FIGURE: 3



OVERVIEW MAP - NWS SEAL BEACH



N

0 30 60

FEET

MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

NOTE:
SEE FIGURE 5 FOR CROSS-SECTIONS.

LEGEND

- SCAPS LOCATION
- SCAPS LOCATION AND SOIL SAMPLE
- EXISTING MONITORING WELL

DEPTH — INTENSITY

SCAPS INTENSITY MEASUREMENT

SCAPS LIF RESULTS AND SOIL SAMPLE LOCATIONS

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
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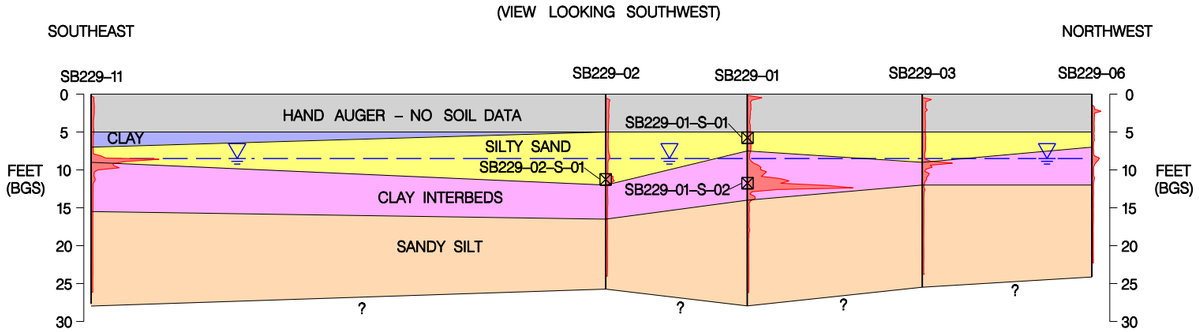
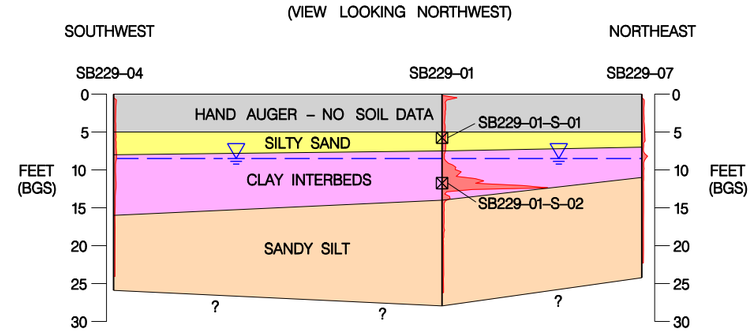
FIGURE: 4

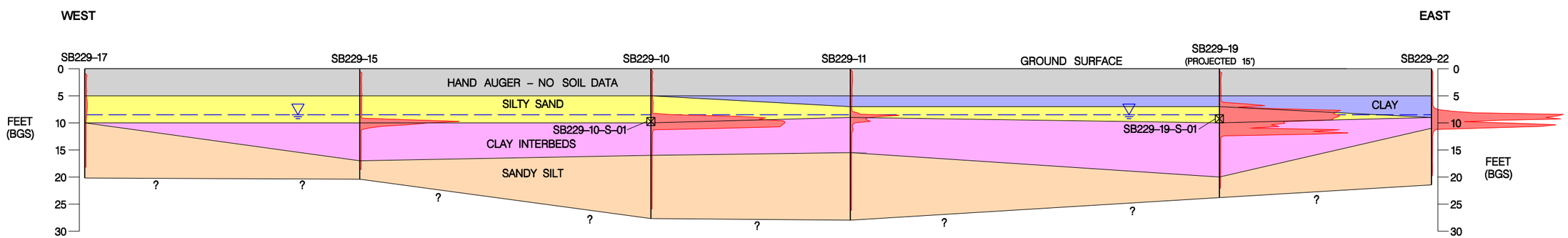
SECTION A–A'
(VIEW LOOKING SOUTHWEST)



SECTION B–B'
(VIEW LOOKING NORTHWEST)



SECTION C–C'
(VIEW LOOKING NORTH)



LEGEND

WATER TABLE

SCAPS LIF INTENSITY PROFILE

0 10 20 40

HORIZONTAL SCALE: 1 INCH = 40 FEET
VERTICAL SCALE: 1 INCH = 40 FEET

CONCEPTUAL SITE MODEL
CROSS SECTIONS

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

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Date: June 26, 2009
File No. Seal Beach XSECT _090626_V8.dgn

FIGURE: 5

INDUSTRIAL ROAD

IRP-14-TMW-10

SB229-08-S-01 SOIL
TPH-d ND

PREVIOUS EXTENT OF CONTAMINATION

SB229-08

POLE

SB229-06

UST 229 SITE
(TANKS REMOVED 1991)
LOCATION OF PREVIOUS EXCAVATION.
(TANK SUPPORTS IN GROUND)

SB229-05

SB229-03

SB229-07

SB229-14

SB229-21-S-01 SOIL
TPH-d 12,000 MG/KG
BENZENE 43,000 UG/KG
TOLUENE 2,200 UG/KG
ETHYLBENZENE 48,000 UG/KG
O-XYLENE 2,500 UG/KG
P-XYLENE 63,000 UG/KG

BSW-14-5

BSW-14-4 (SEE NOTE)			GROUNDWATER
	MAR-06	AUG-06	OCT-06	
TPH-g	2	0.83	1	MG/L
BENZENE	3,000	1,800	1,400	UG/L
TOLUENE	200	26	11	UG/L
ETHYLBENZENE	91	8.8	8.1	UG/L
XYLENE, TOTAL	108	67.8	52.9	UG/L

SB229-01-S-02 SOIL
TPH-d 1,800 MG/KG

SB229-01

FORMER BUILDING 229

SB229-02-S-01 SOIL
TPH-d 2,800 MG/KG

SB229-21

BSW-14-3

SB229-04

SB229-02

SB229-09

SB229-12

BSW-14-4

BSW-14-2

FORMER
GAS STATION

SB229-10-S-01 SOIL
TPH-d 10J MG/KG

RAILROAD TRACK

SB229-17

SB229-15

POLE

SB229-10

SB229-11

SB229-22

TRANSFORMER
PAD

SB229-19-S-01 SOIL
TPH-d 1,800 MG/KG

SB229-19

RAILROAD TRACK

BSW-14-1

SB229-13

SB229-18

POLE

SB229-20

SB229-16

BSW-14-6

POLE

APPROXIMATE
GW FLOW
DIRECTION

KITTS HIGHWAY

BLDG 225

OVERVIEW MAP - NWS SEAL BEACH

N

0 30 60

FEET

MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

NOTE:
BSW-14-4 GROUNDWATER DATA FROM MARRS, 2007

LEGEND

SCAPS LOCATION

SCAPS LOCATION AND SOIL SAMPLE

EXISTING MONITORING WELL

DEPTH INTENSITY

SCAPS INTENSITY MEASUREMENT

TOTAL PETROLEUM
HYDROCARBONS-DIESEL
IN SOIL

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

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DATE: July 15, 2009
FILE: UstSite229 Soil_090623

FIGURE: 6

INDUSTRIAL ROAD

IRP-14-TMW-10

PREVIOUS EXTENT OF CONTAMINATION

SB229-08

POLE

UST 229 SITE
(TANKS REMOVED 1991)
LOCATION OF PREVIOUS EXCAVATION.
(TANK SUPPORTS IN GROUND)

SB229-06

SB229-05

SB229-14

BSW-14-5

SB229-07

SB229-03

FORMER BUILDING 229

SB229-01

SB229-21

BSW-14-3

SB229-02

SB229-09

SB229-12

SB229-04

BSW-14-4

BSW-14-2

FORMER GAS STATION

RAILROAD TRACK

SB229-17

SB229-15

POLE

SB229-10

SB229-11

SB229-22

TRANSFORMER PAD

SB229-19

BSW-14-1

RAILROAD TRACK

SB229-13

SB229-18

POLE

SB229-20

SB229-16

BSW-14-6

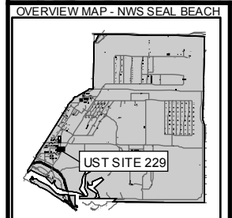
POLE

APPROXIMATE GW FLOW DIRECTION

KITTS HIGHWAY

BLDG 225

OVERVIEW MAP - NWS SEAL BEACH



N

0 30 60

FEET

MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

LEGEND

- PROPOSED MONITORING WELL LOCATION
- SCAPS LOCATION
- EXISTING MONITORING WELL

PROPOSED MONITORING WELLS

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

Richard Brady and Associates
Engineering and Construction
3710 Ruffin Road
San Diego California 92123
Telephone 858.496.0500 Fax 858.496.0505

DATE: July 9, 2009
FILE: UstSite229 Wells_090623

FIGURE: 7

Table

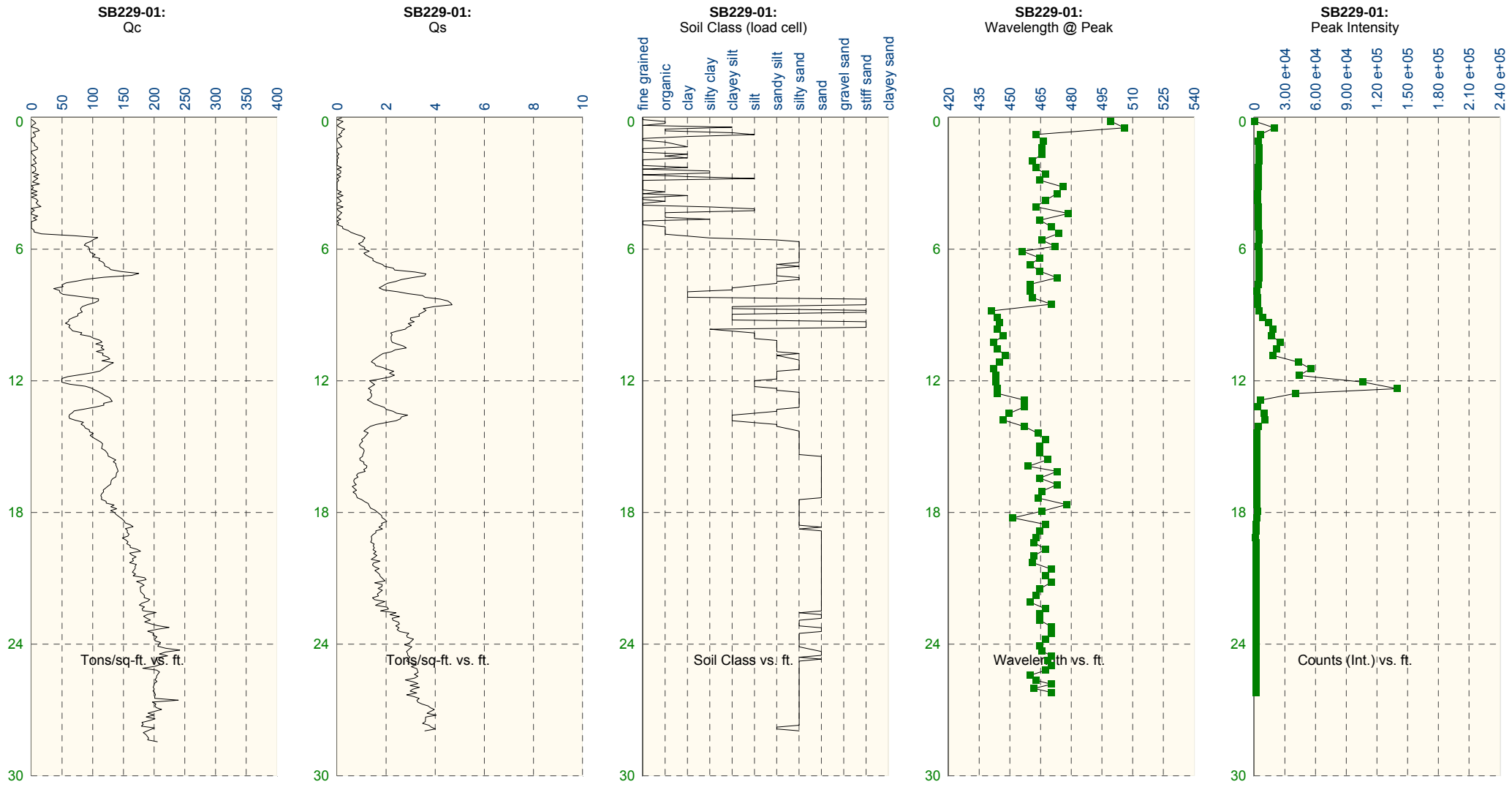
Table 1
Laboratory Analytical Results

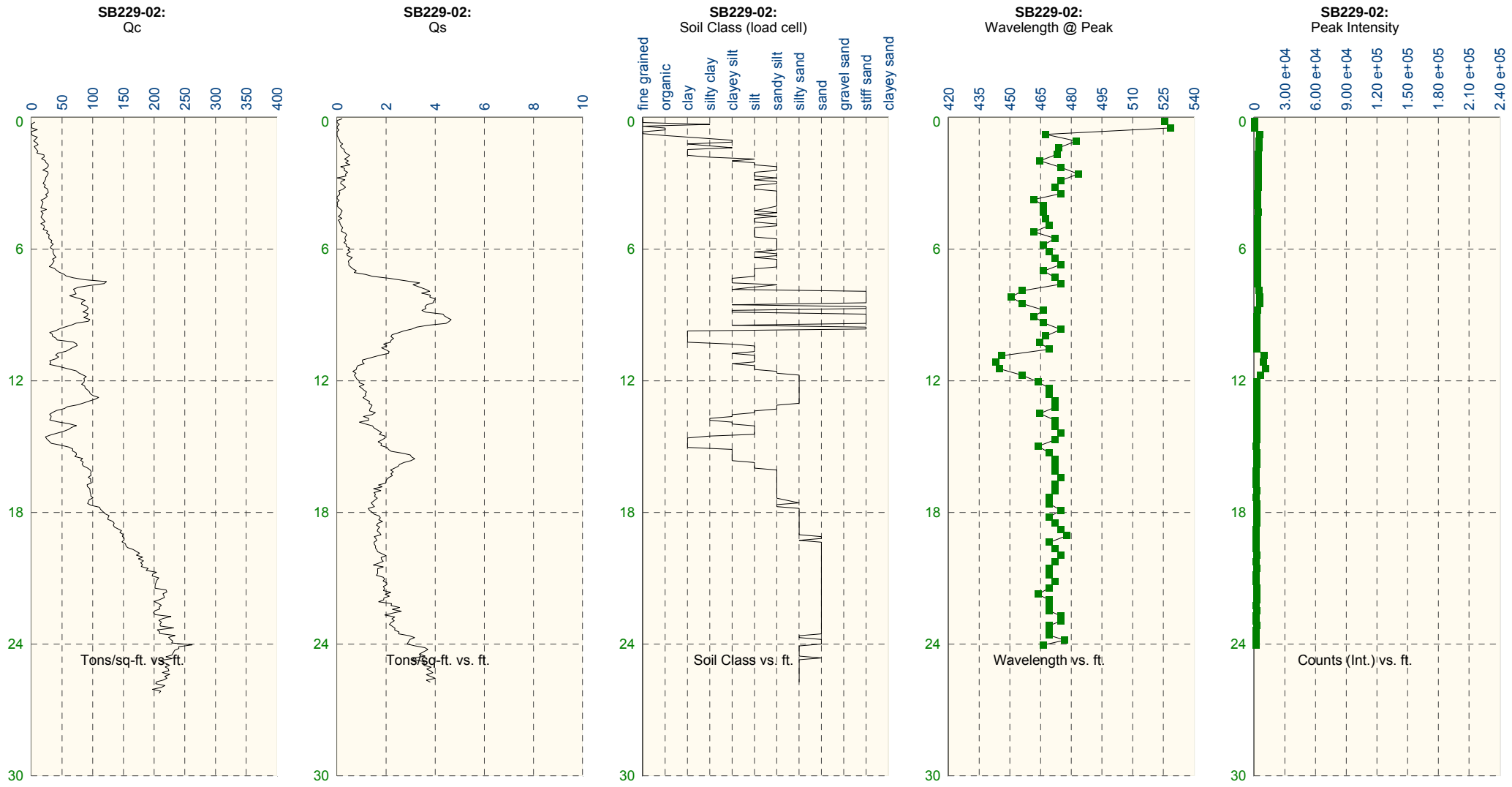
Analyte Name	Units	SB229-01-S-01 5.0'-6.5' bgs	SB229-01-S-02 11.0'-12.5' bgs	SB229-02-S-01 10.5'-12.0' bgs	SB229-08-S-01 9.0'-10.5' bgs	SB229-10-S-01 9.0'-10.5' bgs	SB229-19-S-01 8.5'-10.0' bgs	SB229-21-S-01 8.5'-10.0' bgs
TPH as diesel (EPA Method 8015B)								
TPH-DIESEL RANGE	mg/kg	20 U	1800	2800	26 U	10 J	1800	12000
BTEX (EPA Method 8260B)								
BENZENE	ug/kg	5.6 U	6.7	7	5.9 U	5.2 U	5.9 U	43000
ETHYLBENZENE	ug/kg	5.6 U	6.8	38	5.9 U	5.2 U	190 J	48000
O-XYLENE	ug/kg	5.6 U	5.6 U	2.7 J	5.9 U	5.2 U	20 J	2500
P-XYLENE	ug/kg	11 U	11 U	11 U	12 U	10 U	300 J	63000
TOLUENE	ug/kg	5.6 U	5.6 U	5.7 U	5.9 U	5.2 U	5 J	2200
Naphthalene (EPA Method 8260B)								
NAPHTHALENE	ug/kg	5.6 U	17	21	5.9 U	5.2 U	920	20000
PAHs (8270 SIM)								
ACENAPHTHENE	ug/kg	31 U	59	36 U	39 U	38 U	250	1100
ACENAPHTHYLENE	ug/kg	31 U	27 J	36 U	39 U	38 U	35 U	36 U
ANTHRACENE	ug/kg	31 U	26 J	36 U	39 U	38 U	77	320
BENZO[A]ANTHRACENE	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	55
BENZO[A]PYRENE	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	36 U
BENZO[B]FLUORANTHENE	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	36 U
BENZO[G,H,I]PERYLENE	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	12 J
BENZO[K]FLUORANTHENE	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	36 U
CHRYSENE	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	36 U
DIBENZ[A,H]ANTHRACENE	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	36 U
FLUORANTHENE	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	84
FLUORENE	ug/kg	31 U	37 U	36 U	39 U	38 U	660	2100
INDENO[1,2,3-CD]PYRENE	ug/kg	31 U	37 U	36 U	39 U	38 U	35 U	36 U
NAPHTHALENE	ug/kg	31 U	37 U	36 U	39 U	38 U	1900	63000
PHENANTHRENE	ug/kg	31 U	37 U	36 U	39 U	38 U	900	3700
PYRENE	ug/kg	31 U	15 J	58	39 U	38 U	49	270

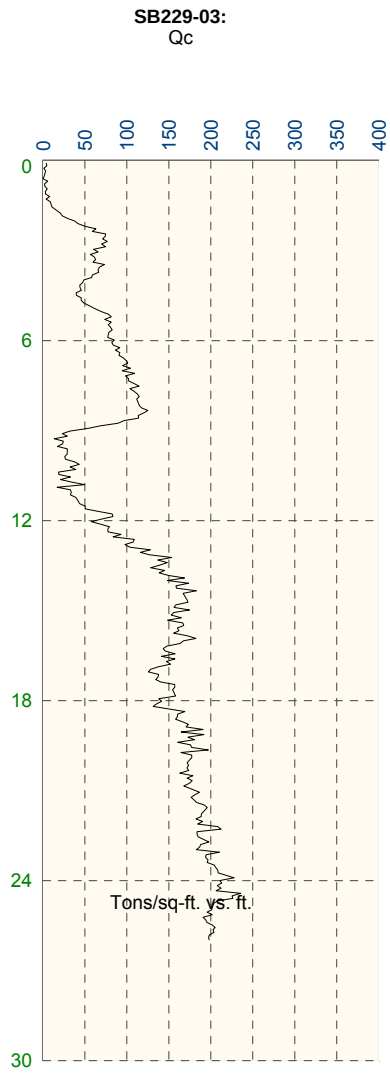
Notes:
U Indicates the analyte was analyzed for but not detected at or above the stated limit.
J Indicates an estimated value.

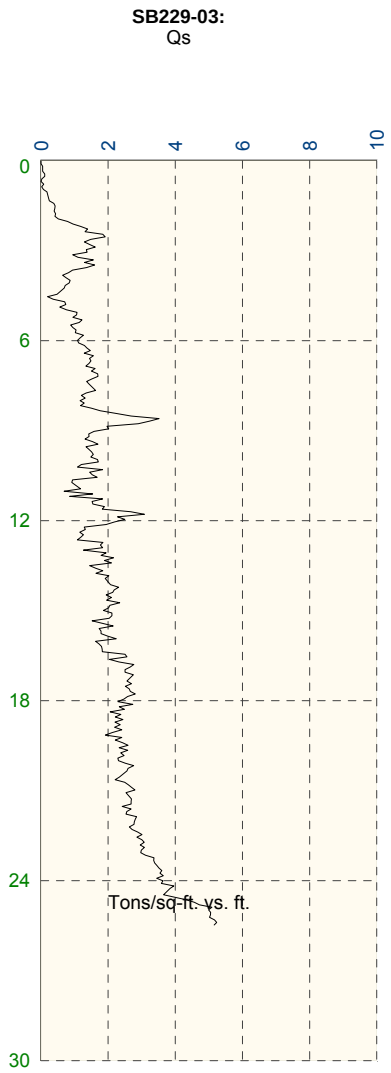
Appendix A

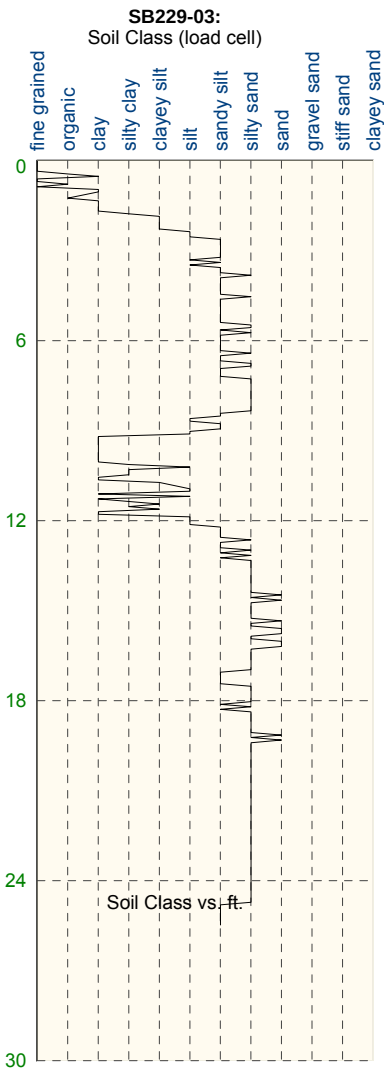
SCAPS LIF Logs

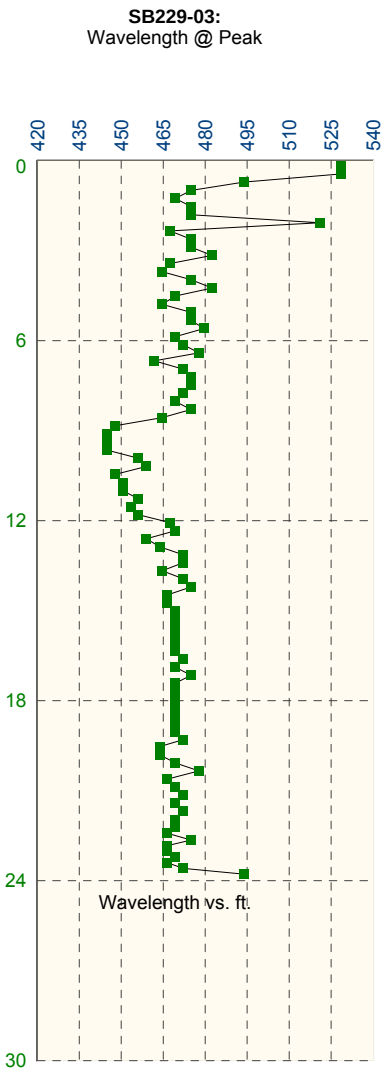

SB229-01:
Qc
0 50 100 150 200 250 300 350 400
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-01:
Qs
0 2 4 6 8 10
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-01:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0 6 12 18 24 30
Soil Class vs. ft.
SB229-01:
Wavelength @ Peak
420 435 450 465 480 495 510 525 540
0 6 12 18 24 30
Wavelength vs. ft.
SB229-01:
Peak Intensity
0 3.00 e+04 6.00 e+04 9.00 e+04 1.20 e+05 1.50 e+05 1.80 e+05 2.10 e+05 2.40 e+05
0 6 12 18 24 30
Counts (Int.) vs. ft.

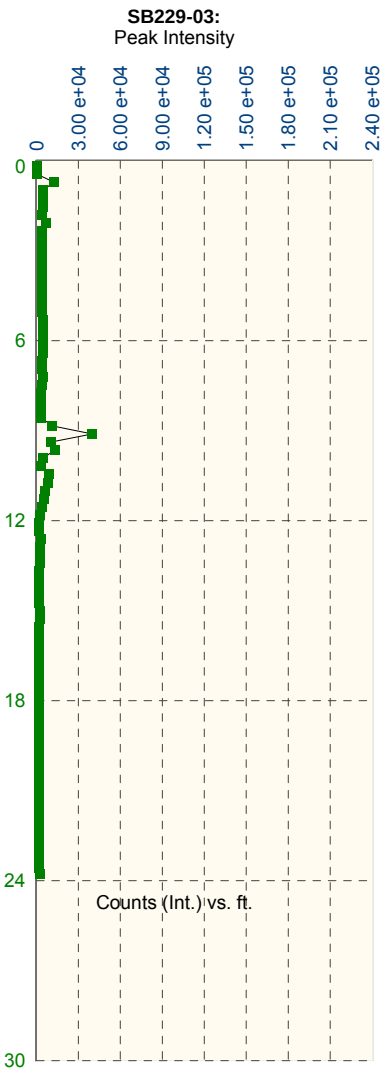

SB229-02:
Qc
0 50 100 150 200 250 300 350 400
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-02:
Qs
0 2 4 6 8 10
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-02:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0 6 12 18 24 30
Soil Class vs. ft.
SB229-02:
Wavelength @ Peak
420 435 450 465 480 495 510 525 540
0 6 12 18 24 30
Wavelength vs. ft.
SB229-02:
Peak Intensity
0 3.00 e+04 6.00 e+04 9.00 e+04 1.20 e+05 1.50 e+05 1.80 e+05 2.10 e+05 2.40 e+05
0 6 12 18 24 30
Counts (Int.) vs. ft.

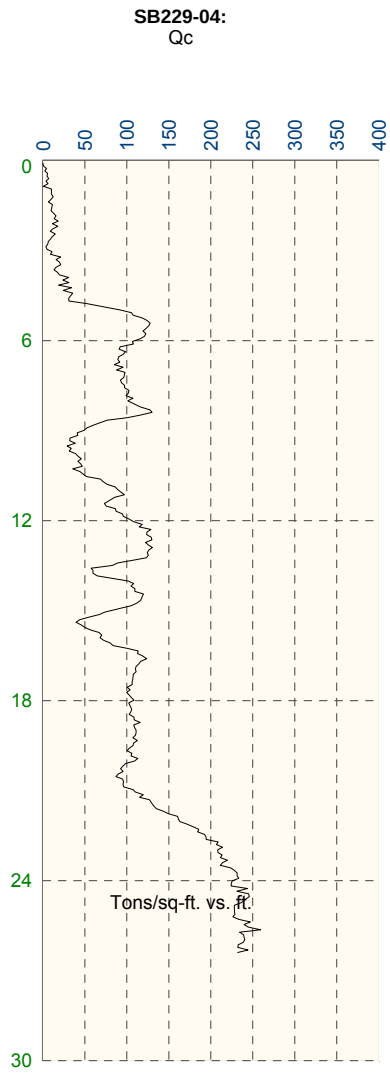

SB229-03:
Qc
0
50
100
150
200
250
300
350
400
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

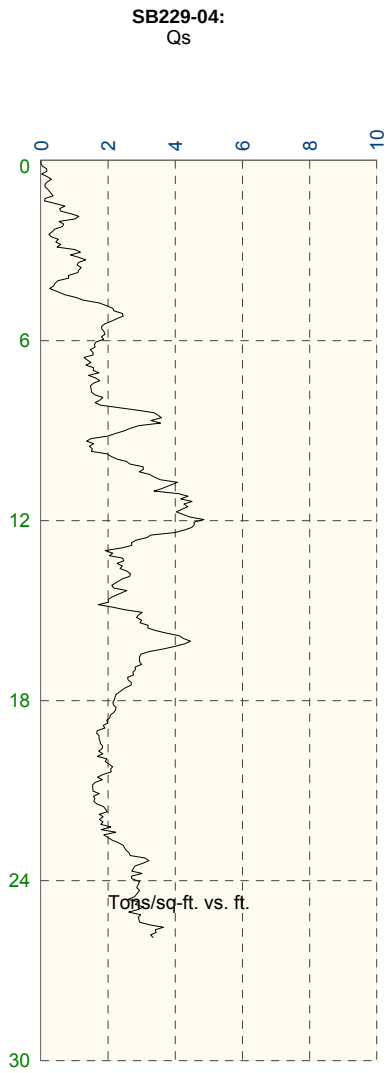

SB229-03:
Qs
0
2
4
6
8
10
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

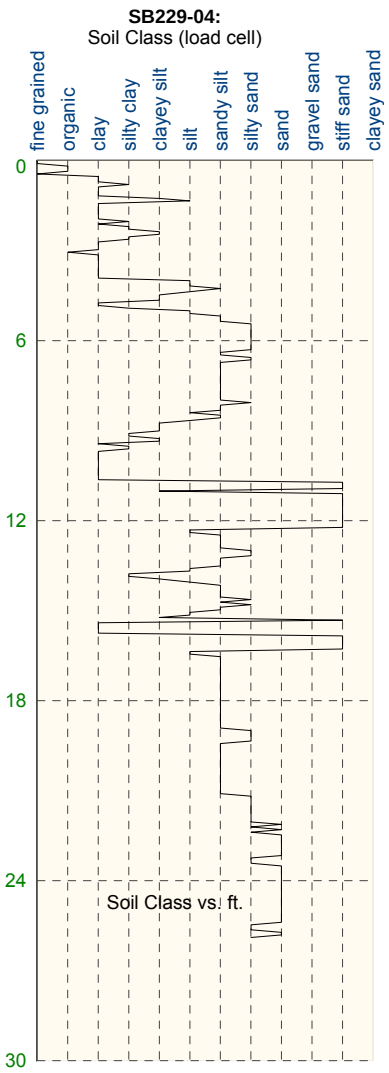

SB229-03:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
6
12
18
24
30
Soil Class vs. ft.

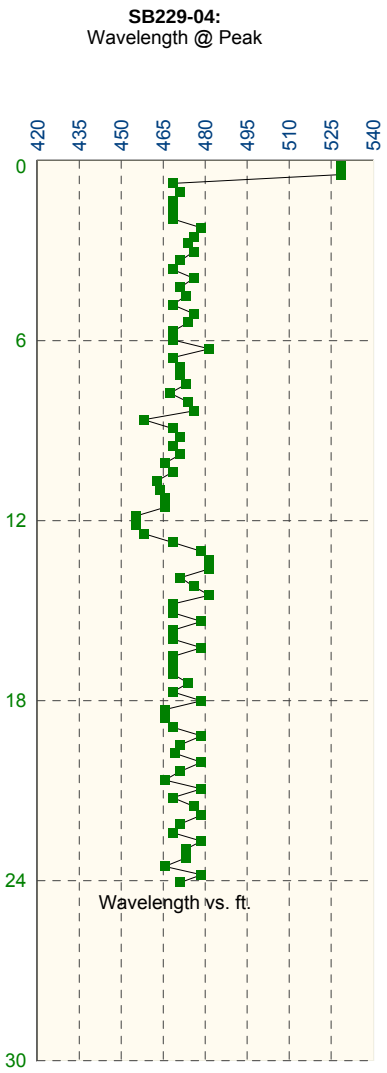

SB229-03:
Wavelength @ Peak
420
435
450
465
480
495
510
525
540
0
6
12
18
24
30
Wavelength vs. ft.

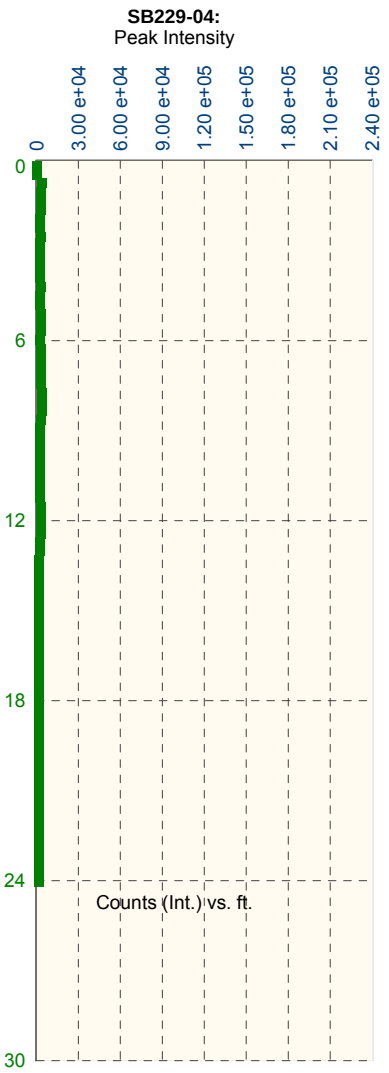

SB229-03:
Peak Intensity
0
3.00 e+04
6.00 e+04
9.00 e+04
1.20 e+05
1.50 e+05
1.80 e+05
2.10 e+05
2.40 e+05
0
6
12
18
24
30
Counts (Int.) vs. ft.

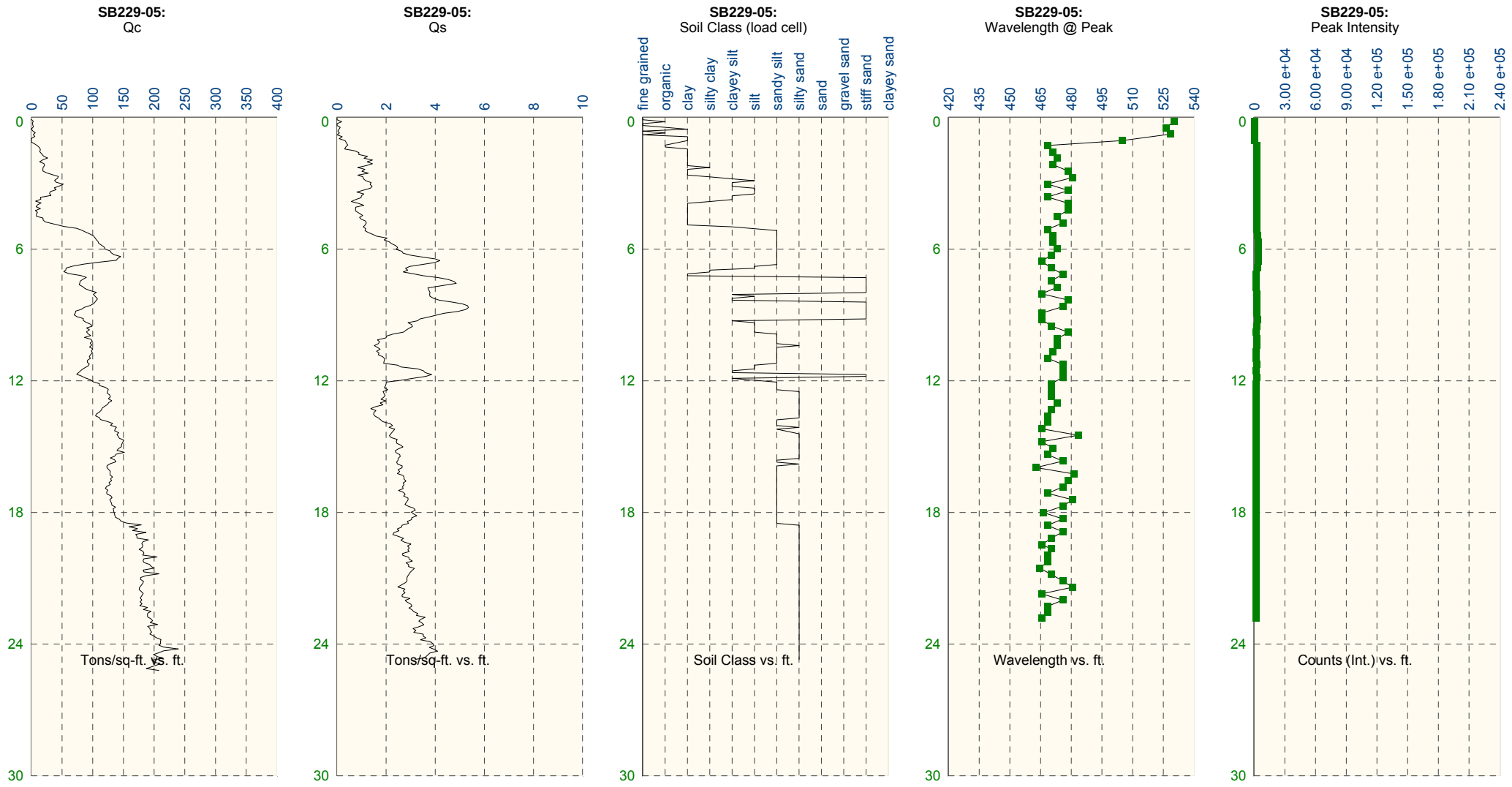

SB229-04:
Qc
0
50
100
150
200
250
300
350
400
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

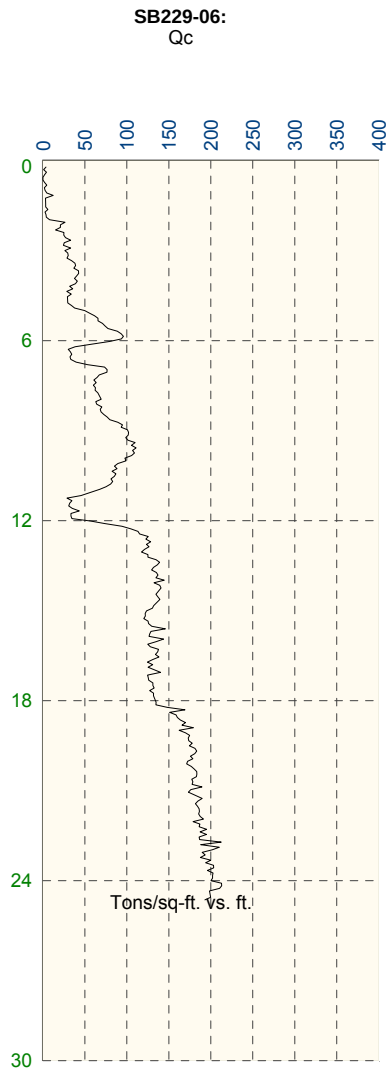

SB229-04:
Qs
0
2
4
6
8
10
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

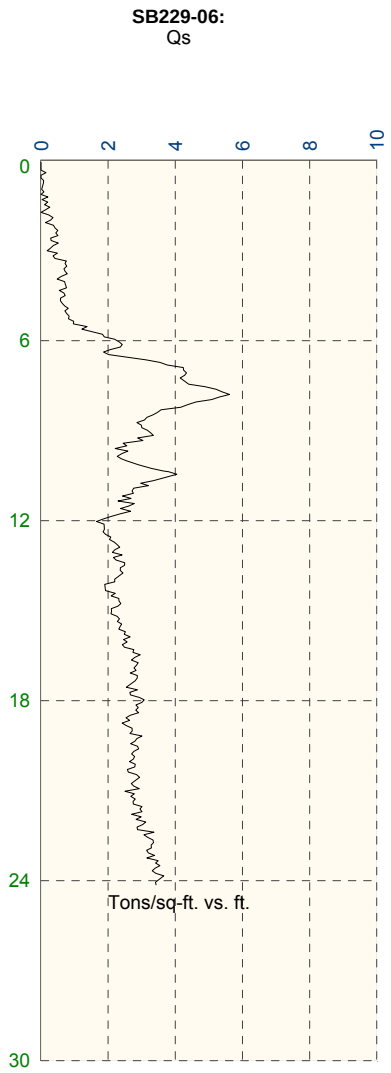

SB229-04:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
6
12
18
24
30
Soil Class vs. ft.

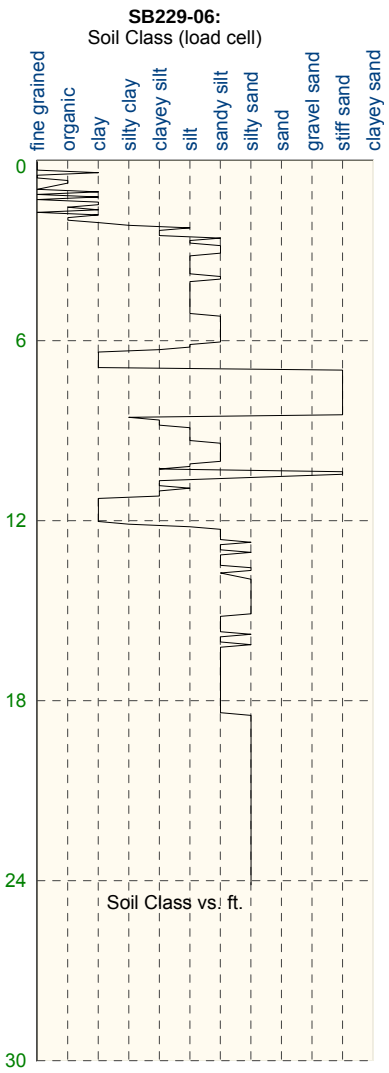

SB229-04:
Wavelength @ Peak
420
435
450
465
480
495
510
525
540
0
6
12
18
24
30
Wavelength vs. ft.

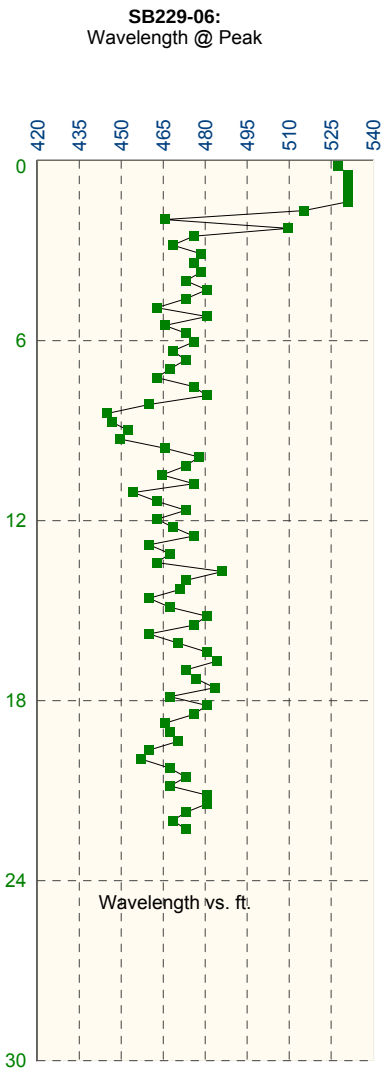

SB229-04:
Peak Intensity
0
3.00 e+04
6.00 e+04
9.00 e+04
1.20 e+05
1.50 e+05
1.80 e+05
2.10 e+05
2.40 e+05
0
6
12
18
24
30
Counts (Int.) vs. ft.

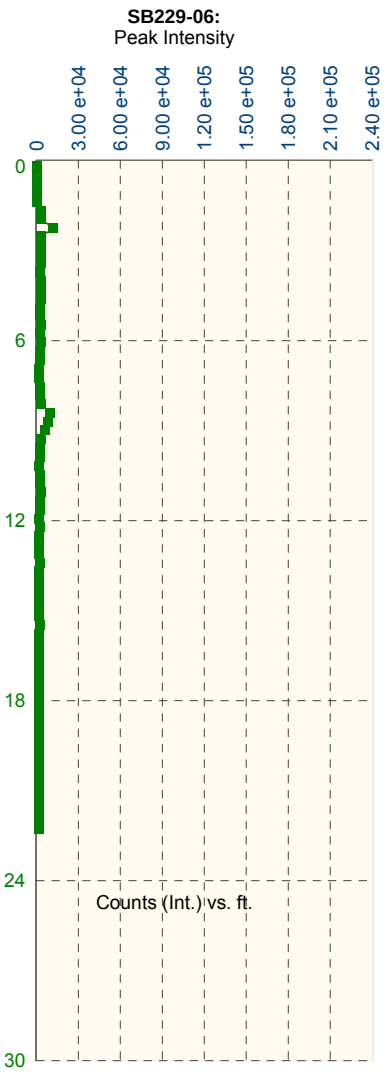

SB229-05:
Qc
0 50 100 150 200 250 300 350 400
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-05:
Qs
0 2 4 6 8 10
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-05:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0 6 12 18 24 30
Soil Class vs. ft.
SB229-05:
Wavelength @ Peak
420 435 450 465 480 495 510 525 540
0 6 12 18 24 30
Wavelength vs. ft.
SB229-05:
Peak Intensity
0 3.00 e+04 6.00 e+04 9.00 e+04 1.20 e+05 1.50 e+05 1.80 e+05 2.10 e+05 2.40 e+05
0 6 12 18 24 30
Counts (Int.) vs. ft.

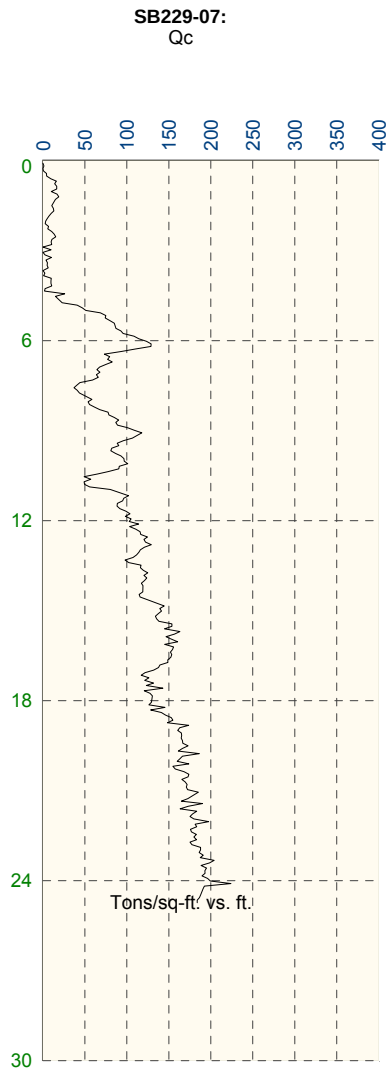

SB229-06:
Qc
0
50
100
150
200
250
300
350
400
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

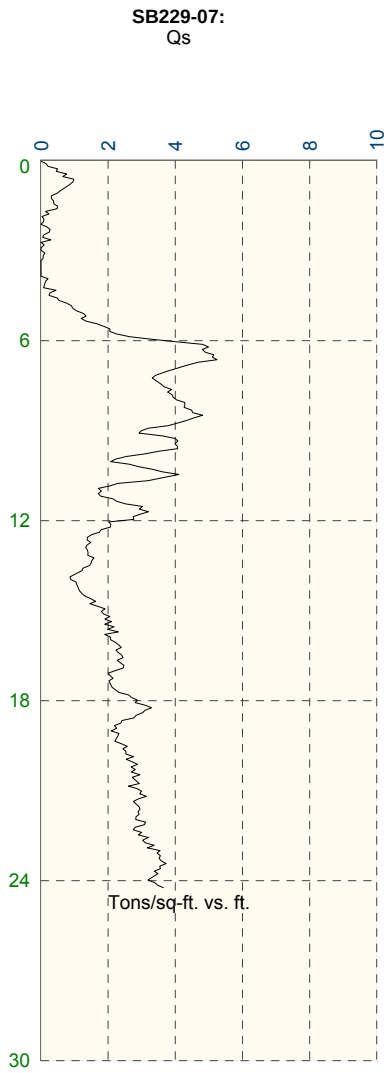

SB229-06:
Qs
0
2
4
6
8
10
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

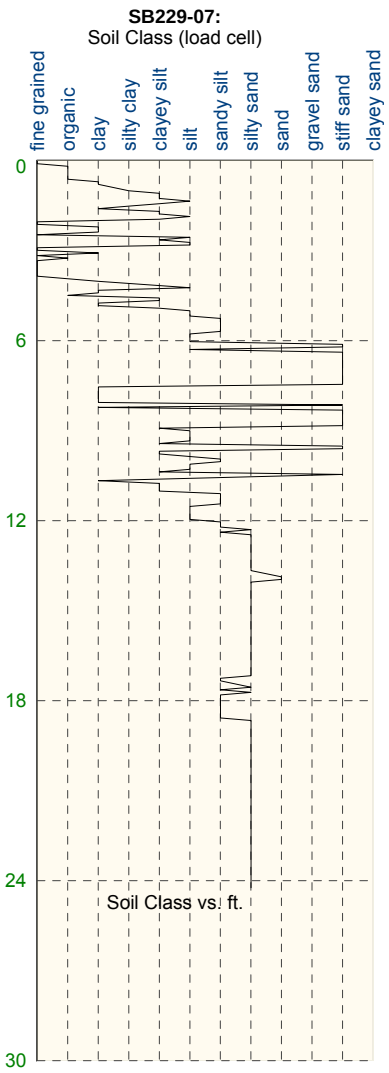

SB229-06:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
6
12
18
24
30
Soil Class vs. ft.

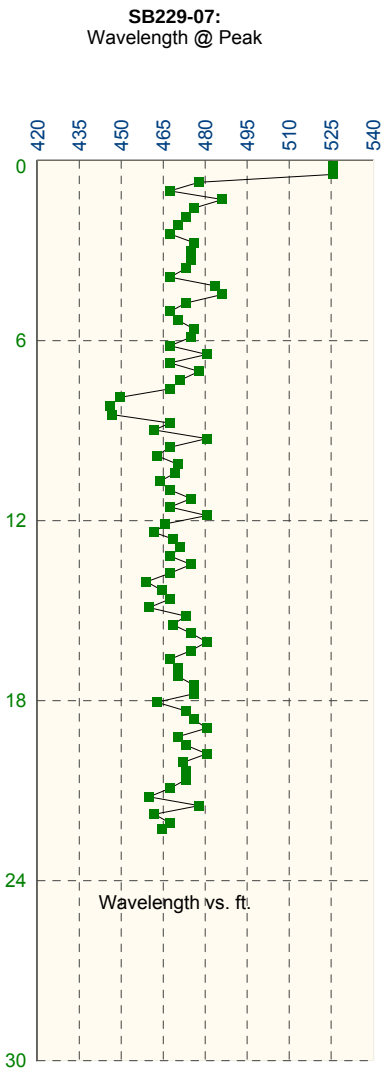

SB229-06:
Wavelength @ Peak
420
435
450
465
480
495
510
525
540
0
6
12
18
24
30
Wavelength vs. ft.

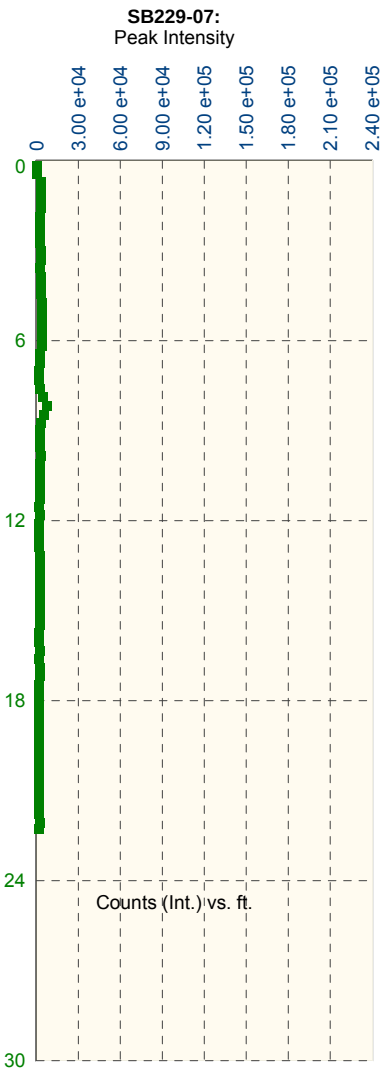

SB229-06:
Peak Intensity
0
3.00 e+04
6.00 e+04
9.00 e+04
1.20 e+05
1.50 e+05
1.80 e+05
2.10 e+05
2.40 e+05
0
6
12
18
24
30
Counts (Int.) vs. ft.

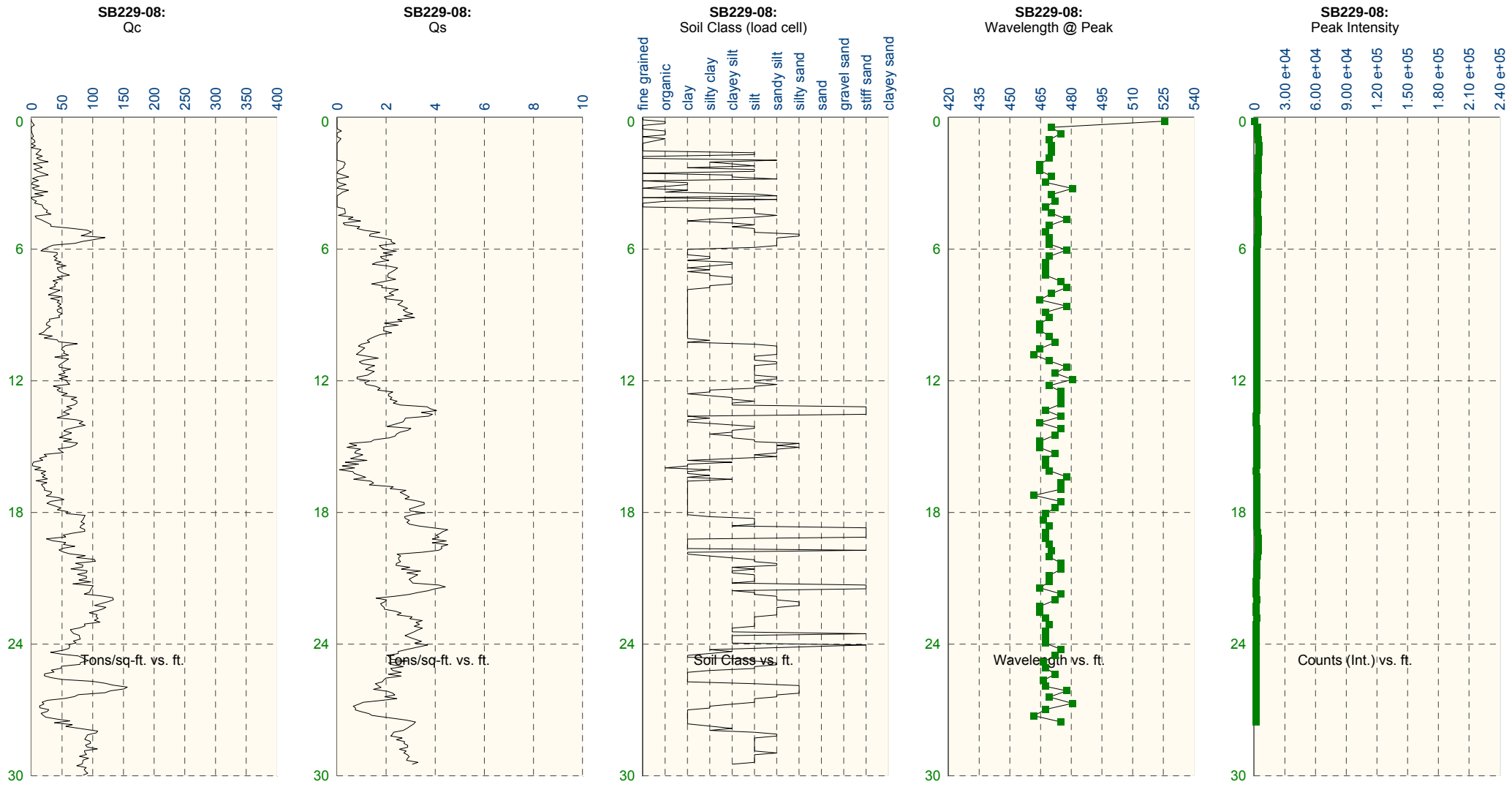

SB229-07:
Qc
0
50
100
150
200
250
300
350
400
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

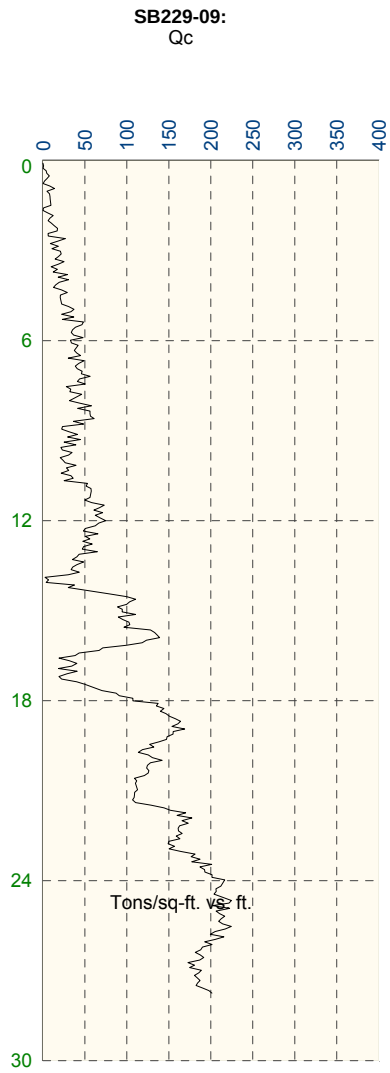

SB229-07:
Qs
0
2
4
6
8
10
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

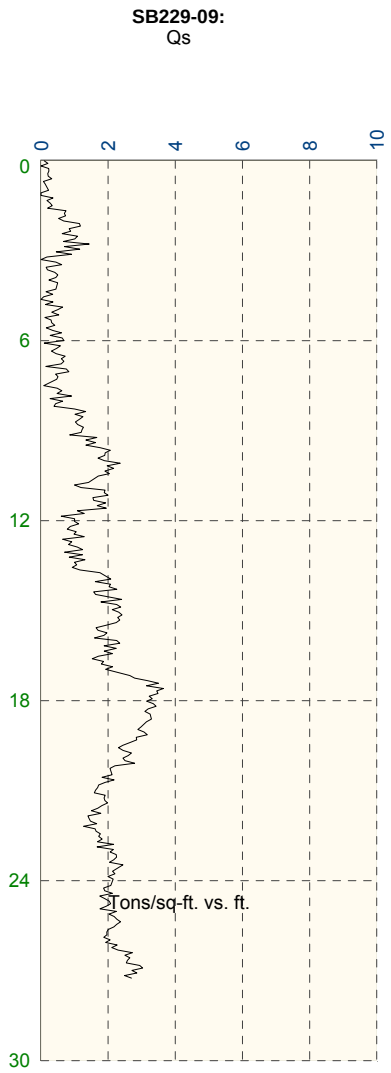

SB229-07:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
6
12
18
24
30
Soil Class vs. ft.

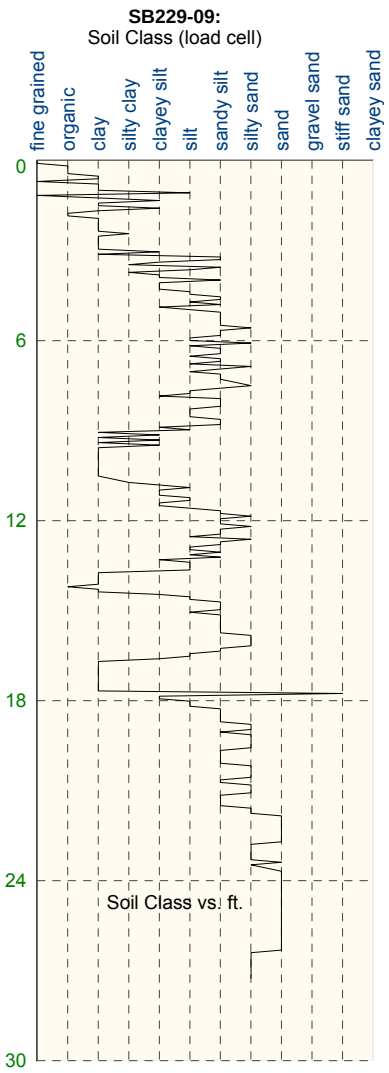

SB229-07:
Wavelength @ Peak
420
435
450
465
480
495
510
525
540
0
6
12
18
24
30
Wavelength vs. ft.

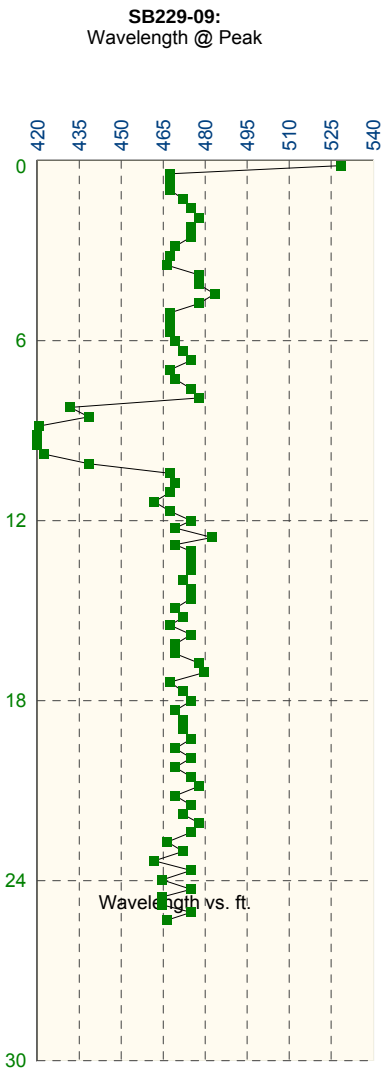

SB229-07:
Peak Intensity
0
3.00 e+04
6.00 e+04
9.00 e+04
1.20 e+05
1.50 e+05
1.80 e+05
2.10 e+05
2.40 e+05
0
6
12
18
24
30
Counts (Int.) vs. ft.

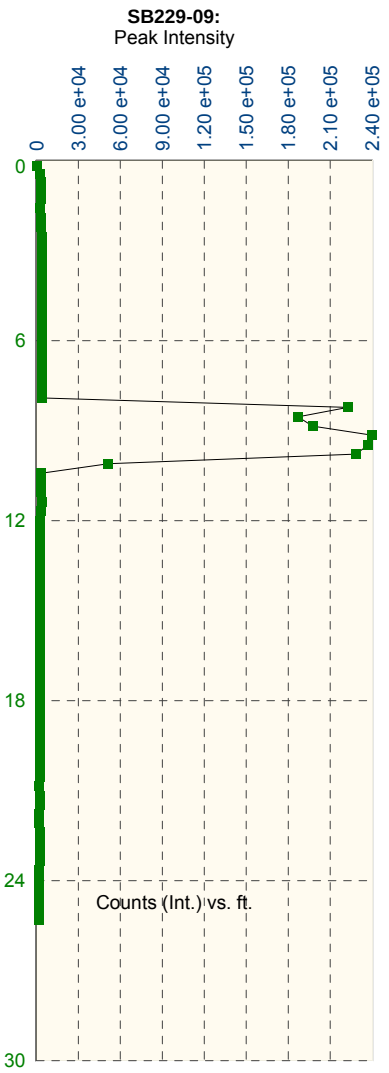

SB229-08:
Qc
0 50 100 150 200 250 300 350 400
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-08:
Qs
0 2 4 6 8 10
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-08:
Soil Class (load cell)
fine grained organic clay silty clay clayey silt silt sandy silt silty sand sand gravel sand stiff sand clayey sand
0 6 12 18 24 30
Soil Class vs. ft.
SB229-08:
Wavelength @ Peak
420 435 450 465 480 495 510 525 540
0 6 12 18 24 30
Wavelength vs. ft.
SB229-08:
Peak Intensity
0 3.00 e+04 6.00 e+04 9.00 e+04 1.20 e+05 1.50 e+05 1.80 e+05 2.10 e+05 2.40 e+05
0 6 12 18 24 30
Counts (Int.) vs. ft.

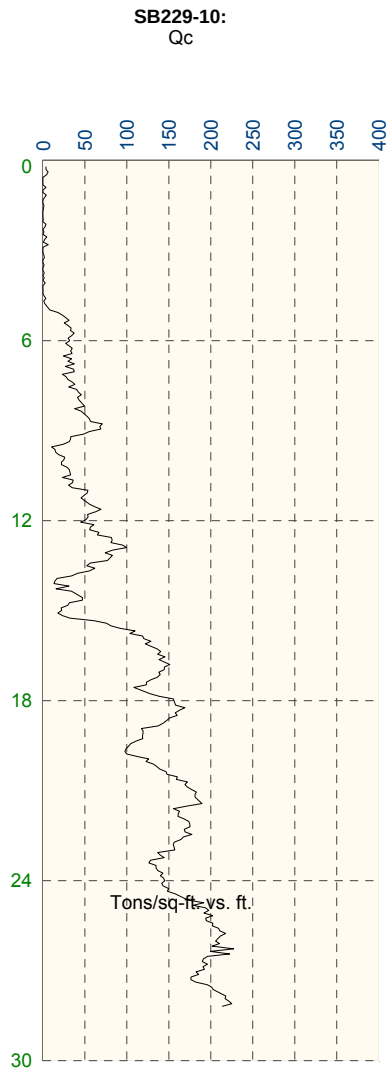

SB229-09:
Qc
0
50
100
150
200
250
300
350
400
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

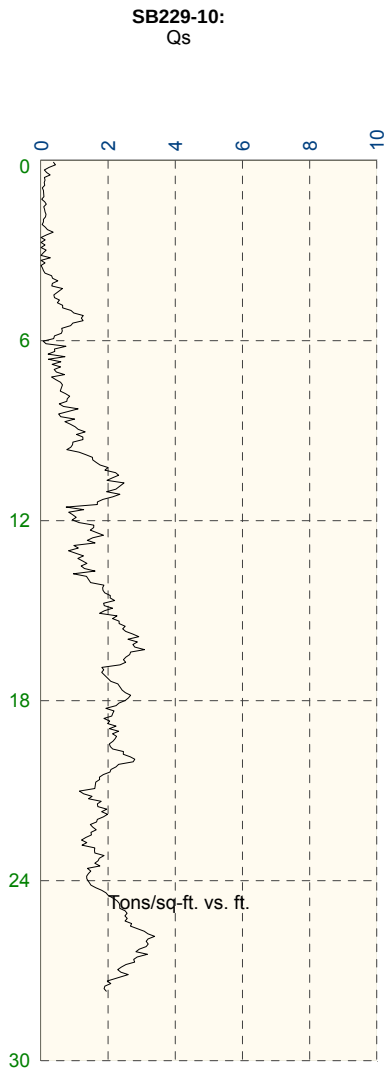

SB229-09:
Qs
0
2
4
6
8
10
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

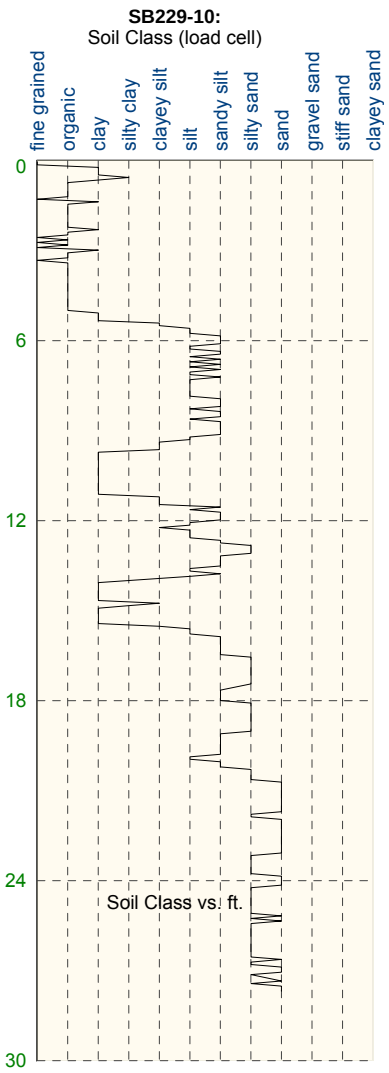

SB229-09:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
6
12
18
24
30
Soil Class vs. ft.

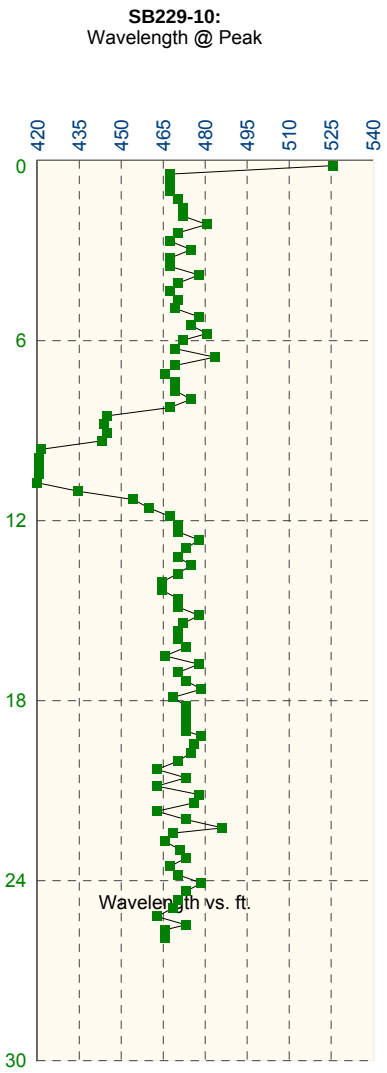

SB229-09:
Wavelength @ Peak
420
435
450
465
480
495
510
525
540
0
6
12
18
24
30
Wavelength vs. ft.

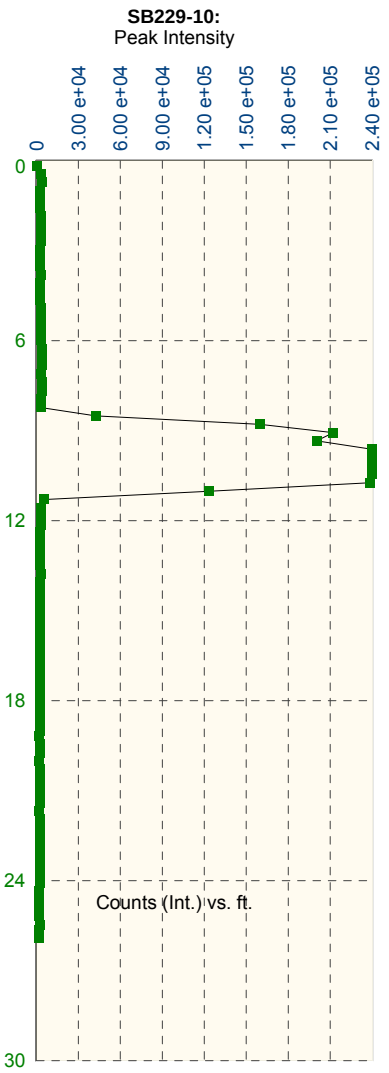

SB229-09:
Peak Intensity
0
3.00 e+04
6.00 e+04
9.00 e+04
1.20 e+05
1.50 e+05
1.80 e+05
2.10 e+05
2.40 e+05
0
6
12
18
24
30
Counts (Int.) vs. ft.

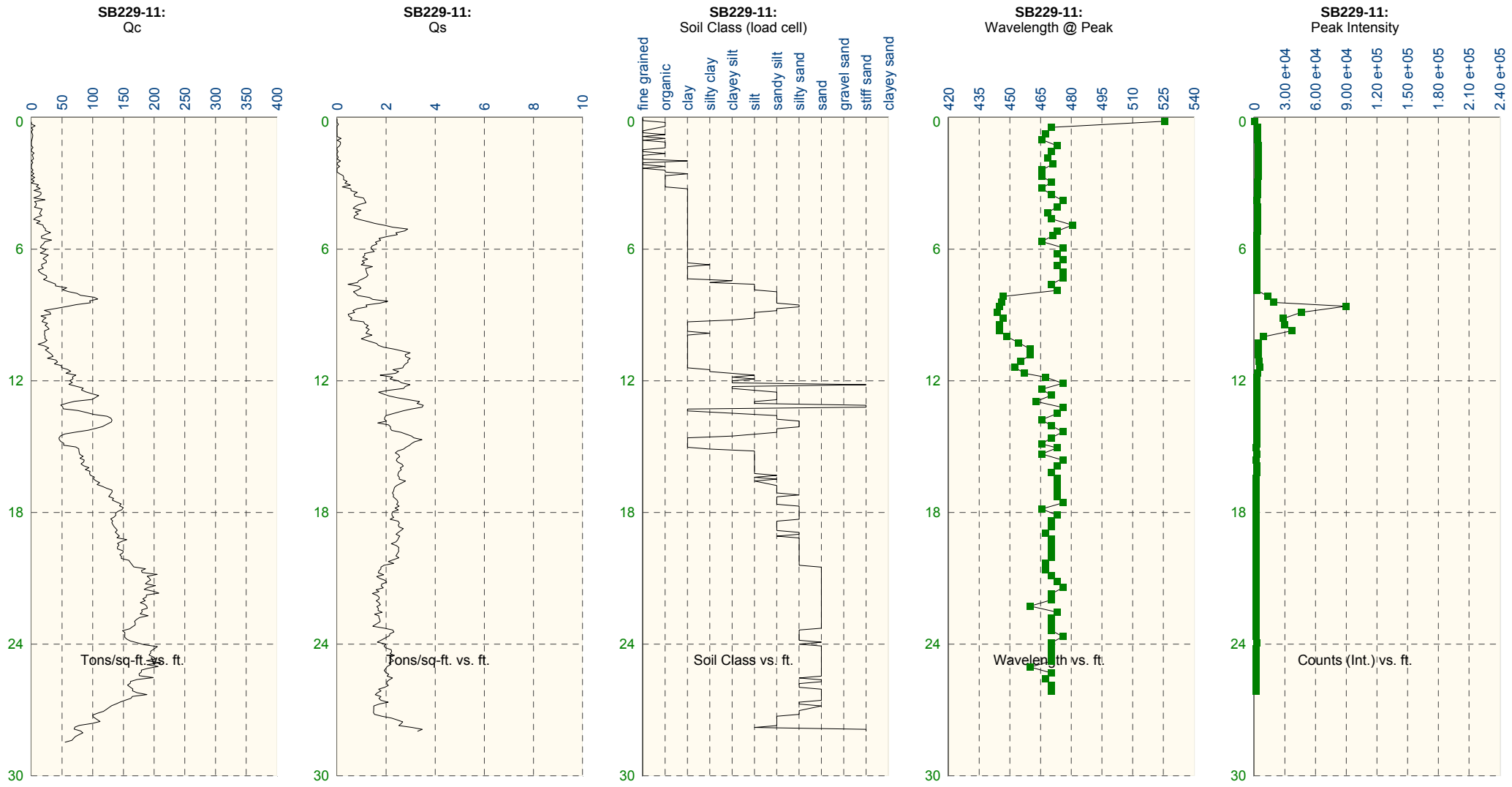

SB229-10:
Qc
0
50
100
150
200
250
300
350
400
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

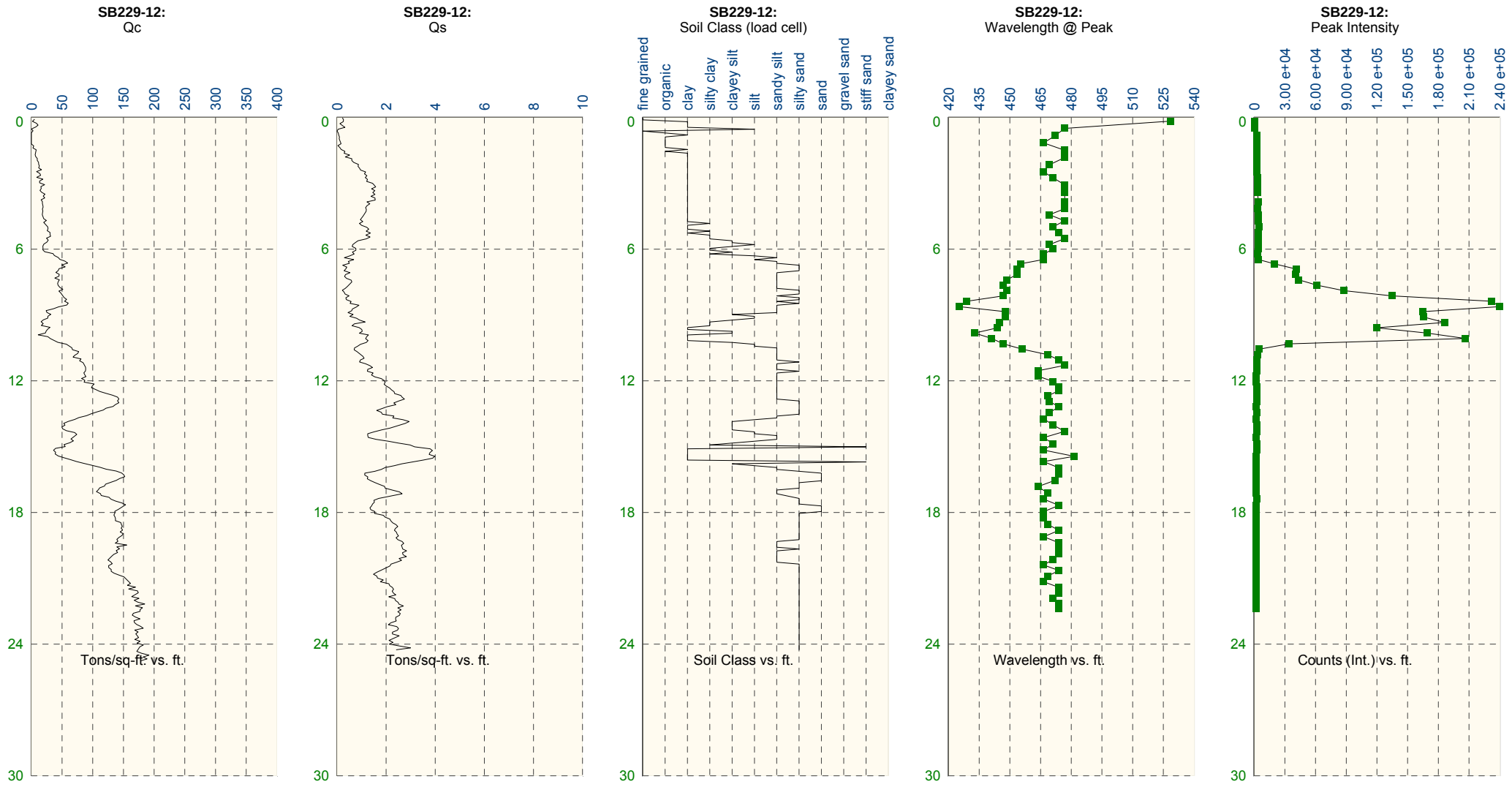

SB229-10:
Qs
0
2
4
6
8
10
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

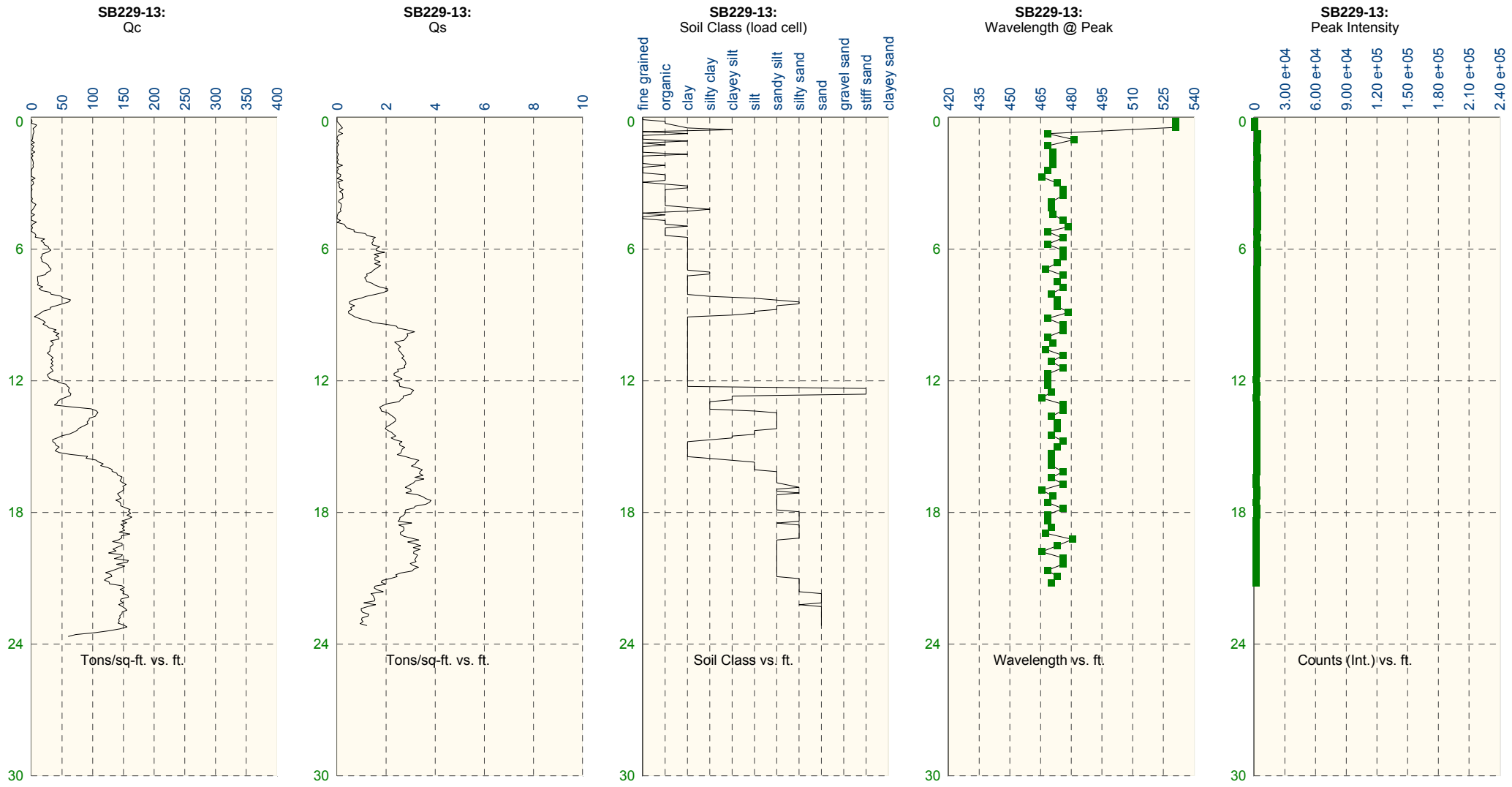

SB229-10:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
6
12
18
24
30
Soil Class vs. ft.

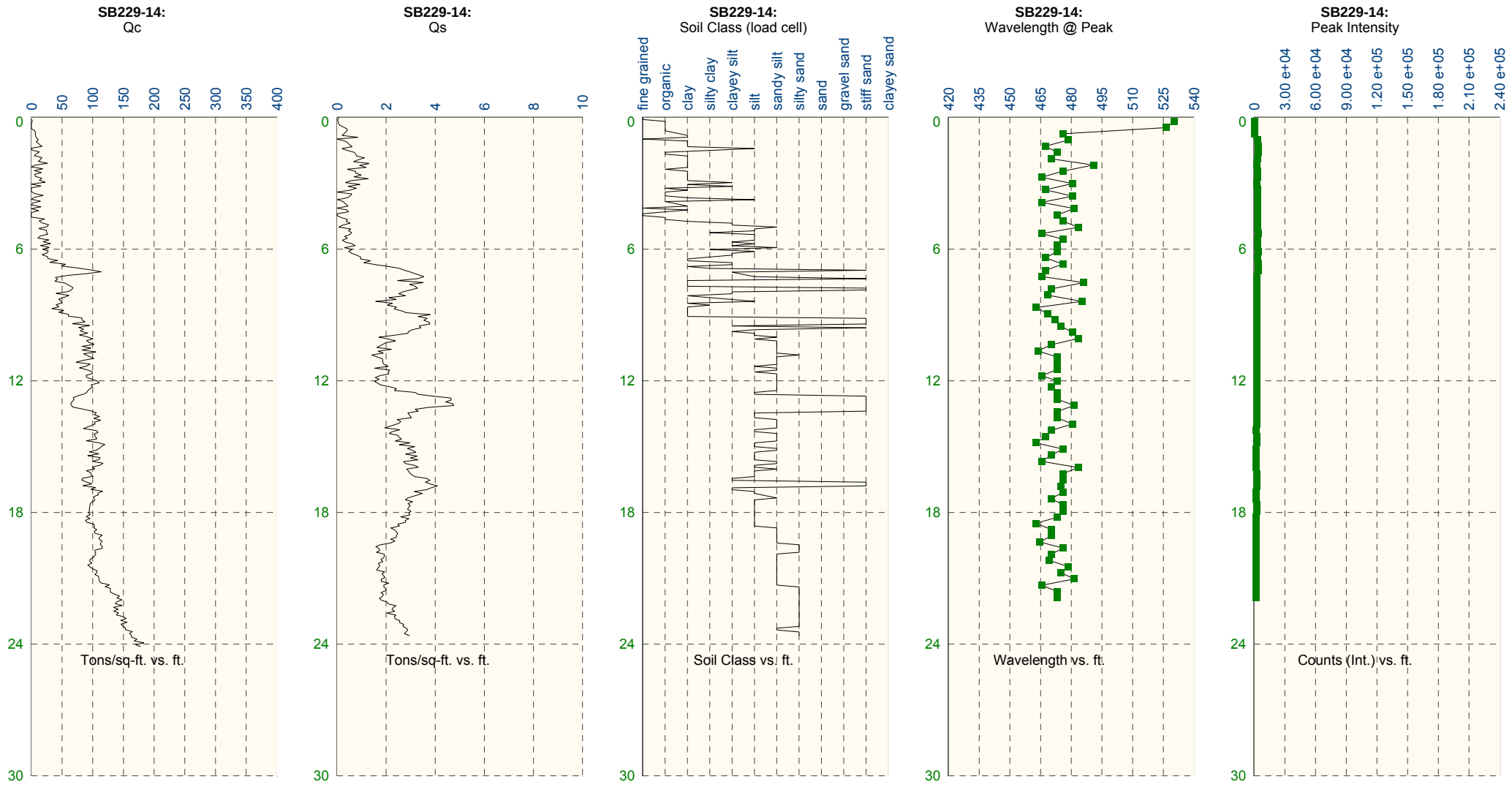

SB229-10:
Wavelength @ Peak
420
435
450
465
480
495
510
525
540
0
6
12
18
24
30
Wavelength vs. ft.

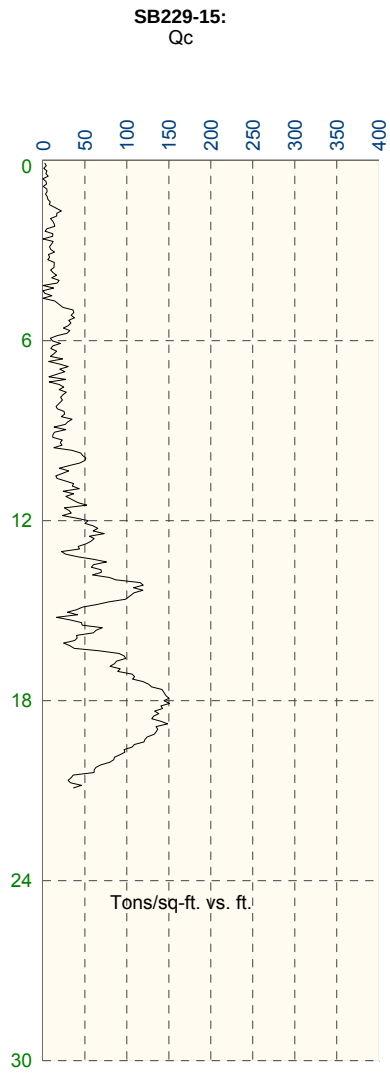

SB229-10:
Peak Intensity
0
3.00 e+04
6.00 e+04
9.00 e+04
1.20 e+05
1.50 e+05
1.80 e+05
2.10 e+05
2.40 e+05
0
6
12
18
24
30
Counts (Int.) vs. ft.

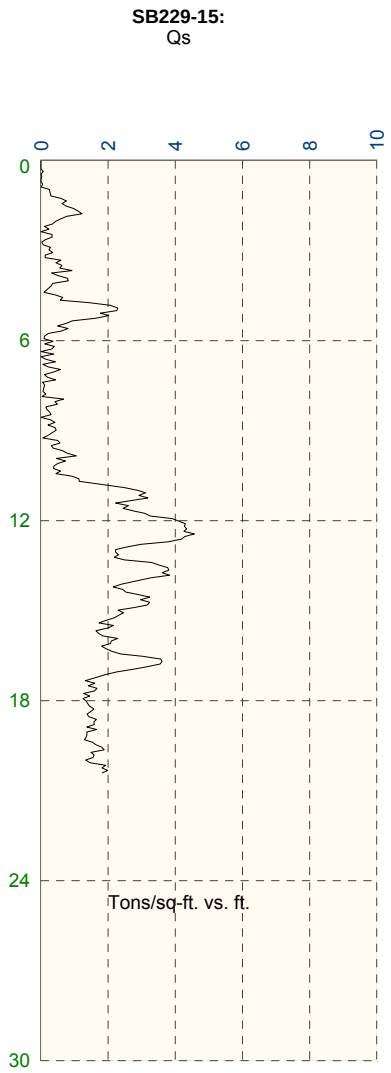

SB229-11:
Qc
0 50 100 150 200 250 300 350 400
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-11:
Qs
0 2 4 6 8 10
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-11:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0 6 12 18 24 30
Soil Class vs. ft.
SB229-11:
Wavelength @ Peak
420 435 450 465 480 495 510 525 540
0 6 12 18 24 30
Wavelength vs. ft.
SB229-11:
Peak Intensity
0 3.00 e+04 6.00 e+04 9.00 e+04 1.20 e+05 1.50 e+05 1.80 e+05 2.10 e+05 2.40 e+05
0 6 12 18 24 30
Counts (Int.) vs. ft.

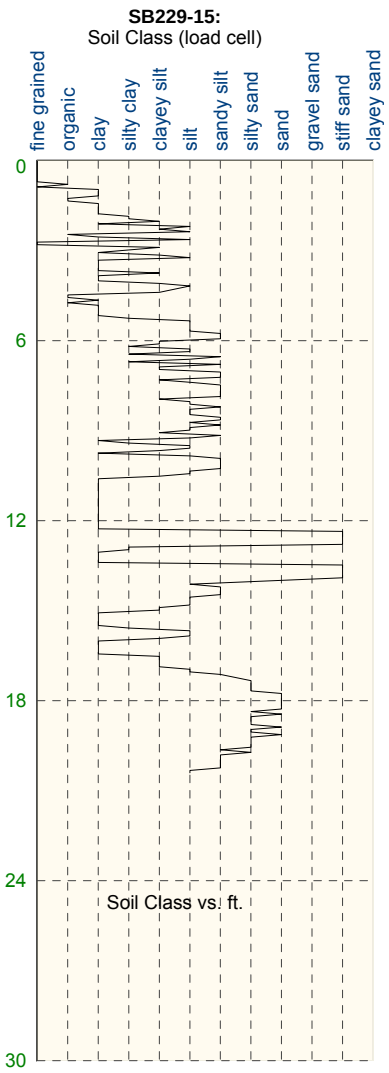

SB229-12:
Qc
0 50 100 150 200 250 300 350 400
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-12:
Qs
0 2 4 6 8 10
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-12:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0 6 12 18 24 30
Soil Class vs. ft.
SB229-12:
Wavelength @ Peak
420 435 450 465 480 495 510 525 540
0 6 12 18 24 30
Wavelength vs. ft.
SB229-12:
Peak Intensity
0 3.00 e+04 6.00 e+04 9.00 e+04 1.20 e+05 1.50 e+05 1.80 e+05 2.10 e+05 2.40 e+05
0 6 12 18 24 30
Counts (Int.) vs. ft.

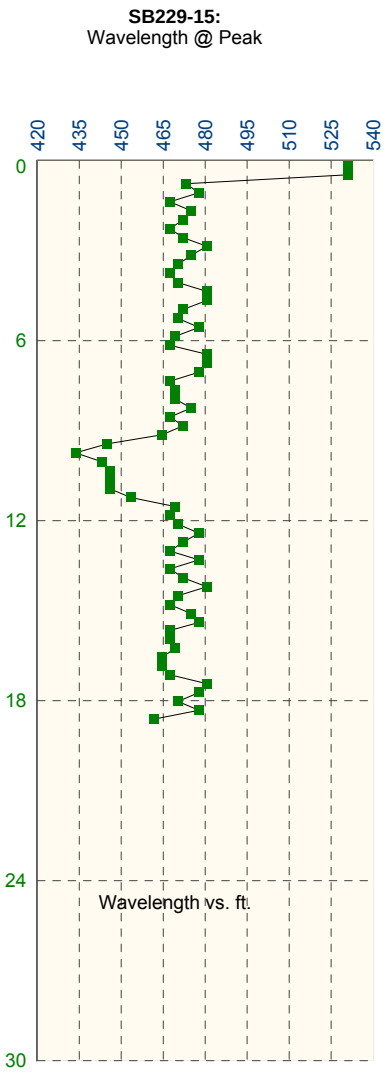

SB229-13:
Qc
0 50 100 150 200 250 300 350 400
Tons/sq-ft. vs. ft.
SB229-13:
Qs
0 2 4 6 8 10
Tons/sq-ft. vs. ft.
SB229-13:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
Soil Class vs. ft.
SB229-13:
Wavelength @ Peak
420 435 450 465 480 495 510 525 540
Wavelength vs. ft.
SB229-13:
Peak Intensity
0 3.00 e+04 6.00 e+04 9.00 e+04 1.20 e+05 1.50 e+05 1.80 e+05 2.10 e+05 2.40 e+05
Counts (Int.) vs. ft.
0 6 12 18 24 30

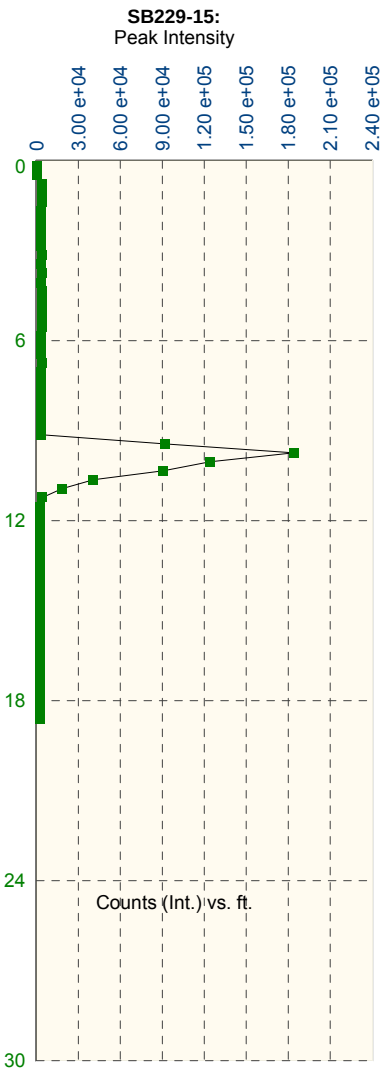

SB229-14:
Qc
0 50 100 150 200 250 300 350 400
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-14:
Qs
0 2 4 6 8 10
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-14:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0 6 12 18 24 30
Soil Class vs. ft.
SB229-14:
Wavelength @ Peak
420 435 450 465 480 495 510 525 540
0 6 12 18 24 30
Wavelength vs. ft.
SB229-14:
Peak Intensity
0 3.00 e+04 6.00 e+04 9.00 e+04 1.20 e+05 1.50 e+05 1.80 e+05 2.10 e+05 2.40 e+05
0 6 12 18 24 30
Counts (Int.) vs. ft.

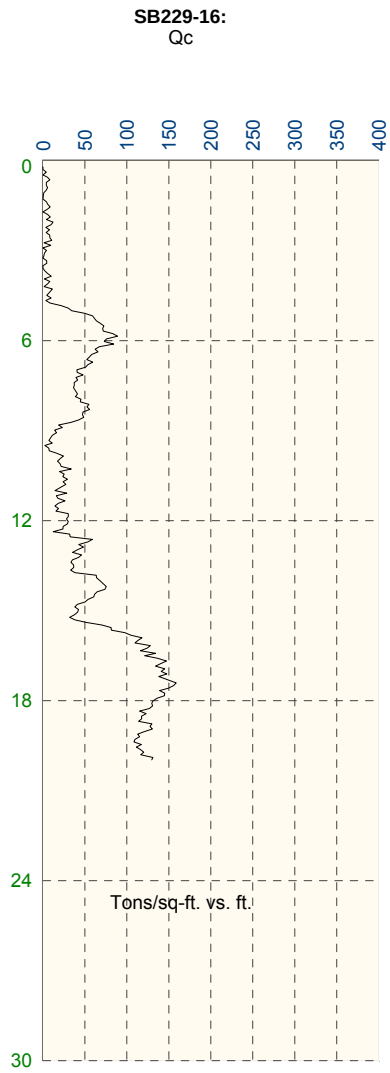

SB229-15:
Qc
0
50
100
150
200
250
300
350
400
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

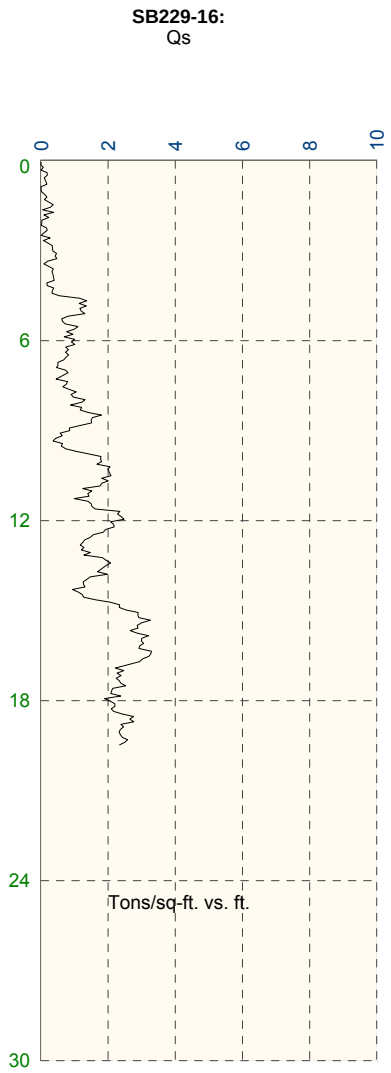

SB229-15:
Qs
0
2
4
6
8
10
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

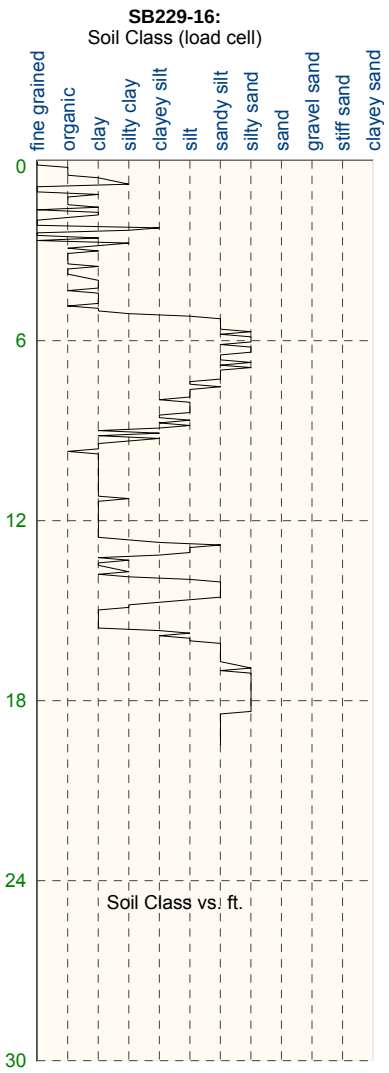

SB229-15:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
6
12
18
24
30
Soil Class vs. ft.

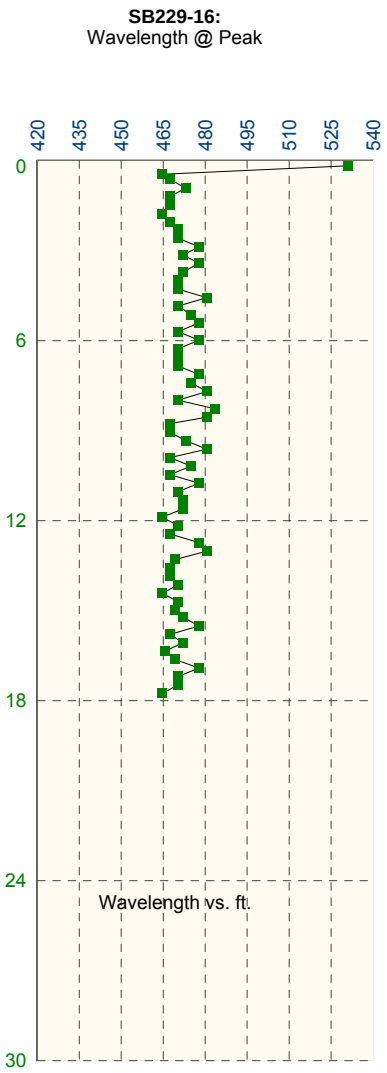

SB229-15:
Wavelength @ Peak
420
435
450
465
480
495
510
525
540
0
6
12
18
24
30
Wavelength vs. ft.

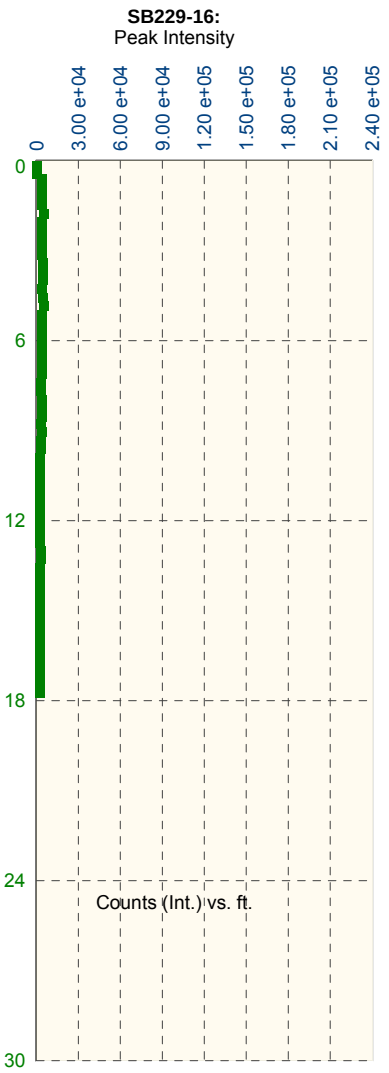

SB229-15:
Peak Intensity
0
3.00 e+04
6.00 e+04
9.00 e+04
1.20 e+05
1.50 e+05
1.80 e+05
2.10 e+05
2.40 e+05
0
6
12
18
24
30
Counts (Int.) vs. ft.

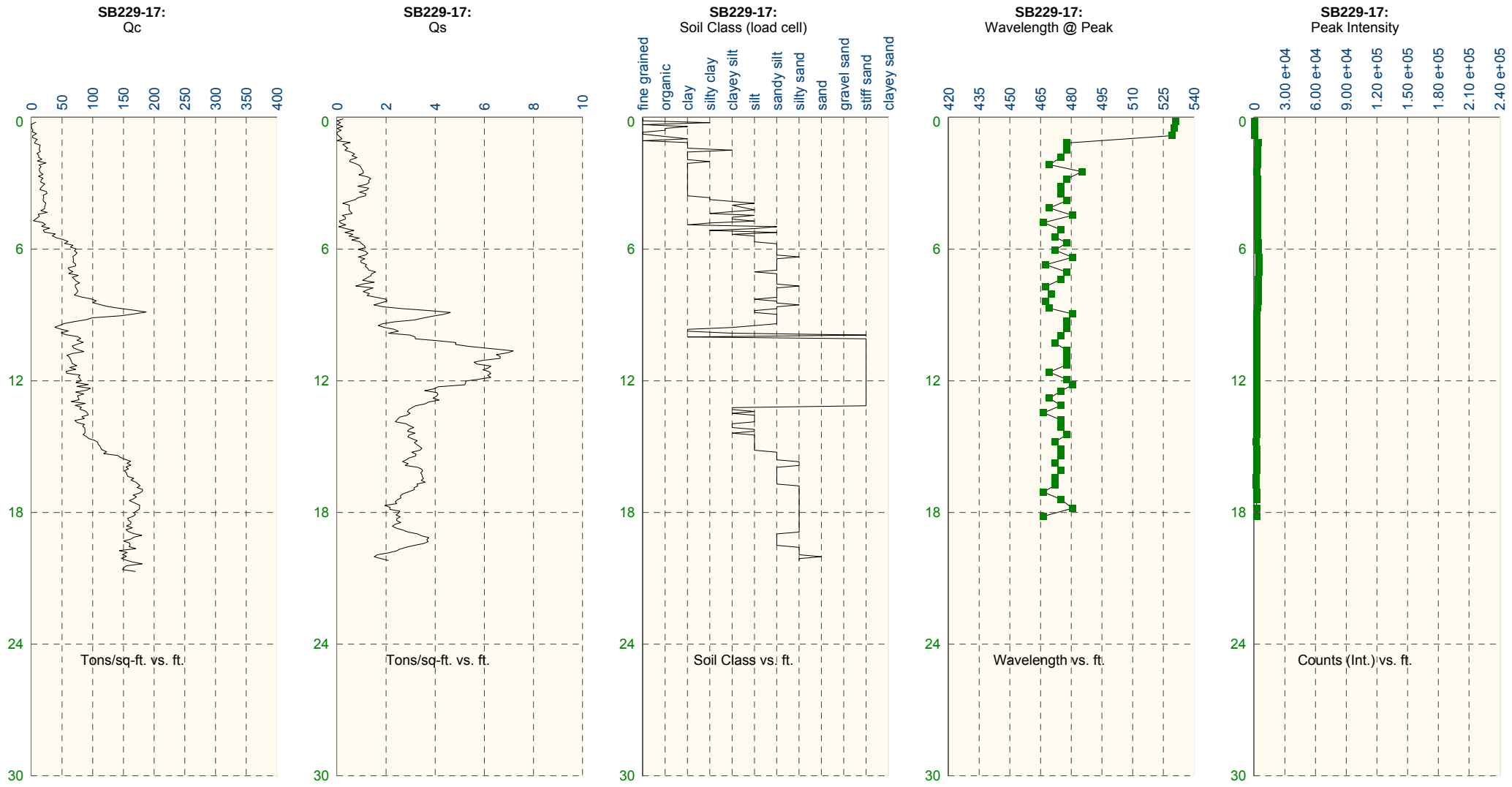

SB229-16:
Qc
0
50
100
150
200
250
300
350
400
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

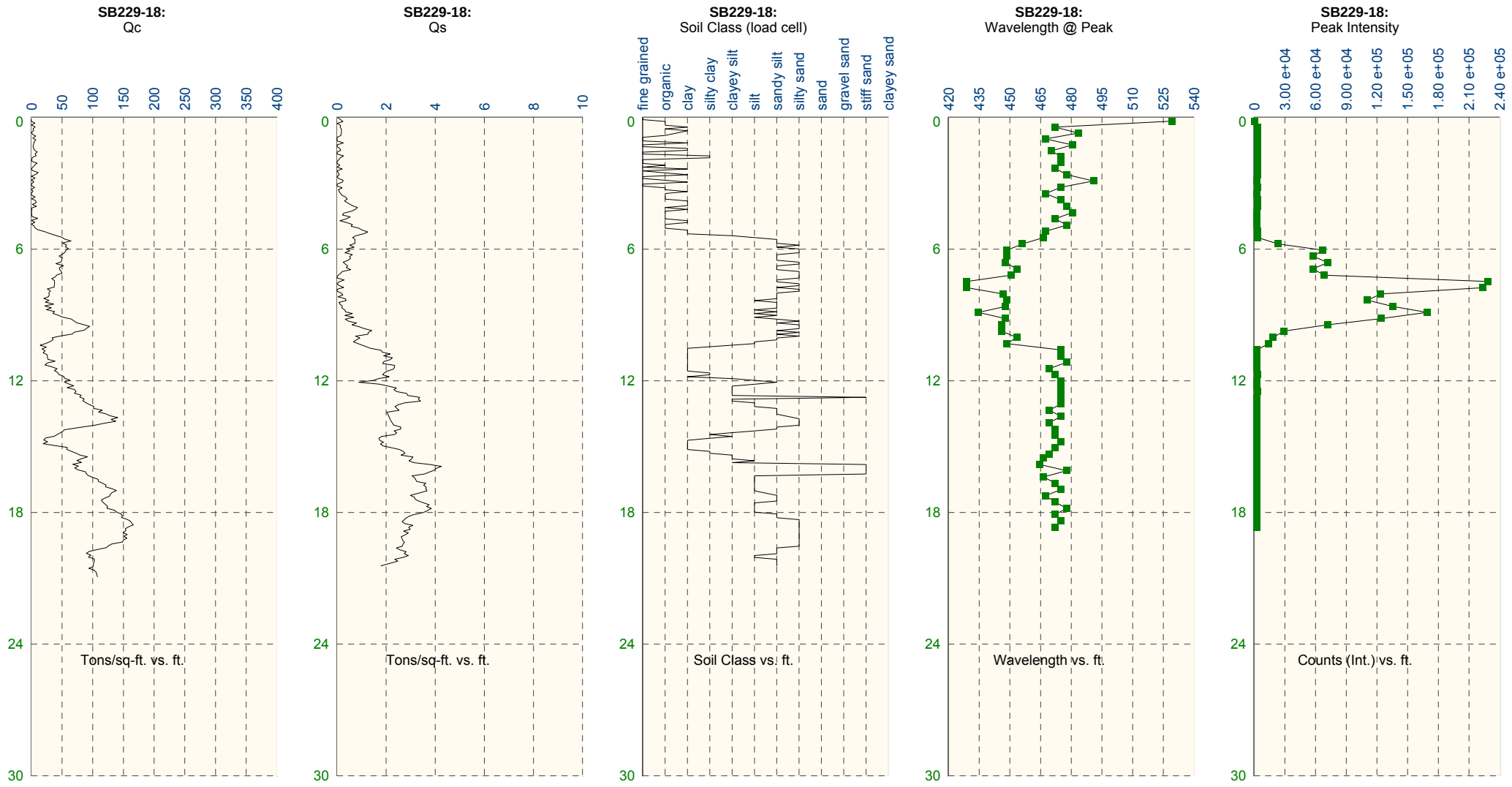

SB229-16:
Qs
0
2
4
6
8
10
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

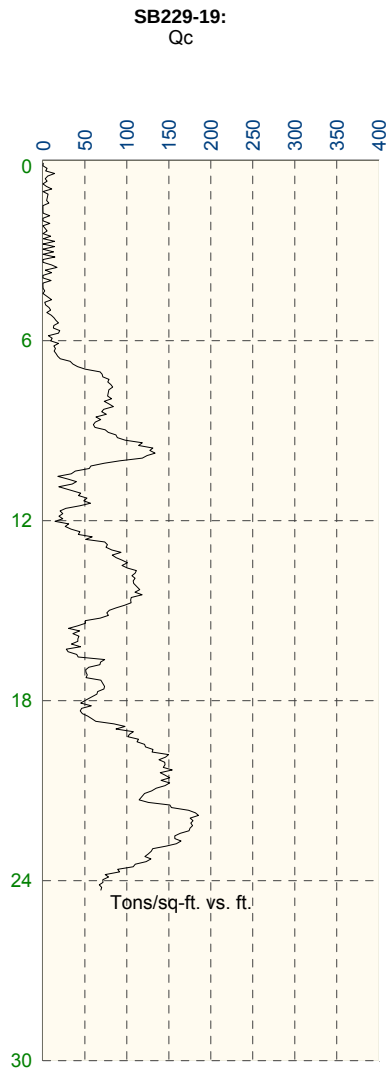

SB229-16:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
6
12
18
24
30
Soil Class vs. ft.

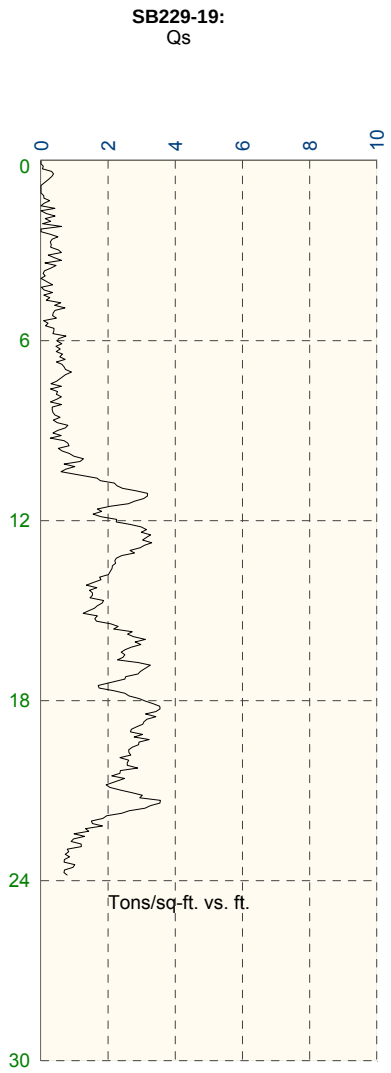

SB229-16:
Wavelength @ Peak
420
435
450
465
480
495
510
525
540
0
6
12
18
24
30
Wavelength vs. ft.

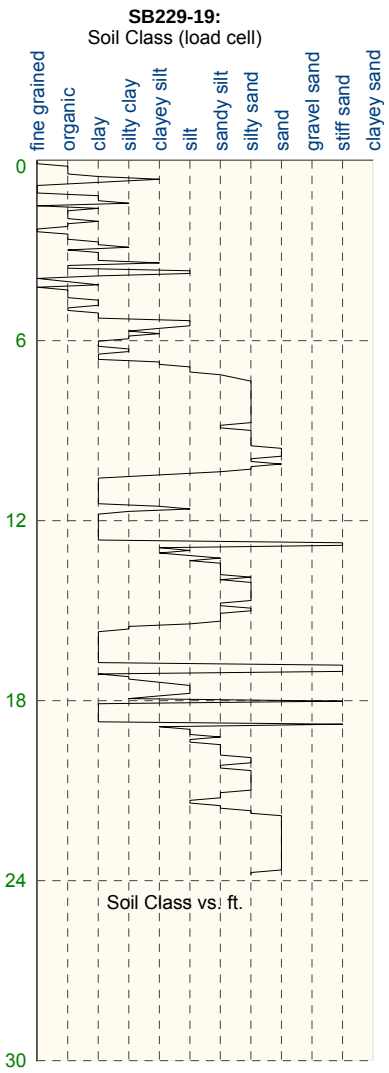

SB229-16:
Peak Intensity
0
3.00 e+04
6.00 e+04
9.00 e+04
1.20 e+05
1.50 e+05
1.80 e+05
2.10 e+05
2.40 e+05
0
6
12
18
24
30
Counts (Int.) vs. ft.

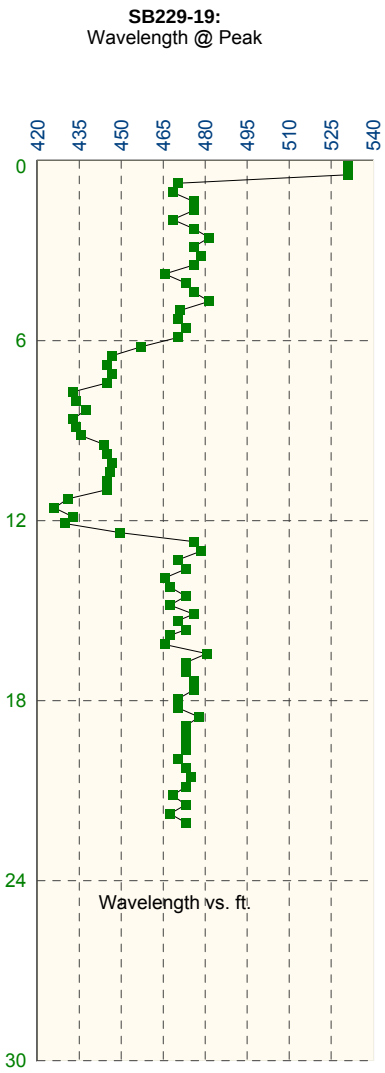

SB229-17:
Qc
0 50 100 150 200 250 300 350 400
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-17:
Qs
0 2 4 6 8 10
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-17:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0 6 12 18 24 30
Soil Class vs. ft.
SB229-17:
Wavelength @ Peak
420 435 450 465 480 495 510 525 540
0 6 12 18 24 30
Wavelength vs. ft.
SB229-17:
Peak Intensity
0 3.00 e+04 6.00 e+04 9.00 e+04 1.20 e+05 1.50 e+05 1.80 e+05 2.10 e+05 2.40 e+05
0 6 12 18 24 30
Counts (Int.) vs. ft.

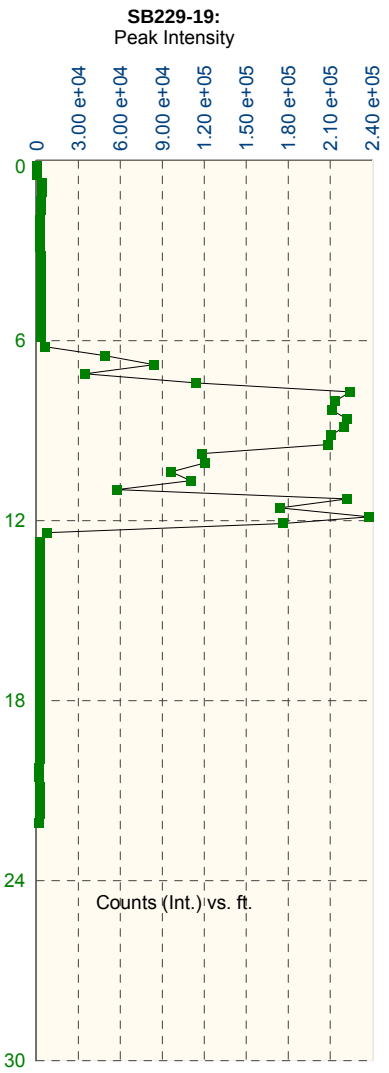

SB229-18:
Qc
0 50 100 150 200 250 300 350 400
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-18:
Qs
0 2 4 6 8 10
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-18:
Soil Class (load cell)
fine grained organic clay silty clay clayey silt silt sandy silt silty sand sand gravel sand stiff sand clayey sand
0 6 12 18 24 30
Soil Class vs. ft.
SB229-18:
Wavelength @ Peak
420 435 450 465 480 495 510 525 540
0 6 12 18 24 30
Wavelength vs. ft.
SB229-18:
Peak Intensity
0 3.00 e+04 6.00 e+04 9.00 e+04 1.20 e+05 1.50 e+05 1.80 e+05 2.10 e+05 2.40 e+05
0 6 12 18 24 30
Counts (Int.) vs. ft.

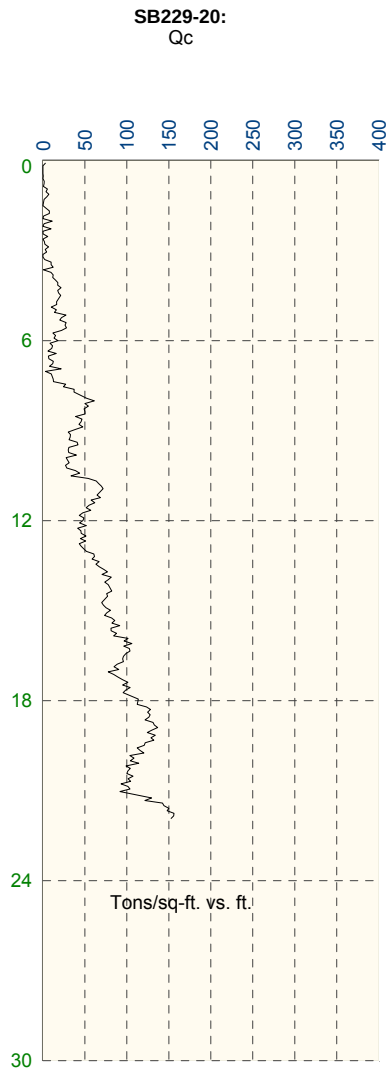

SB229-19:
Qc
0
50
100
150
200
250
300
350
400
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

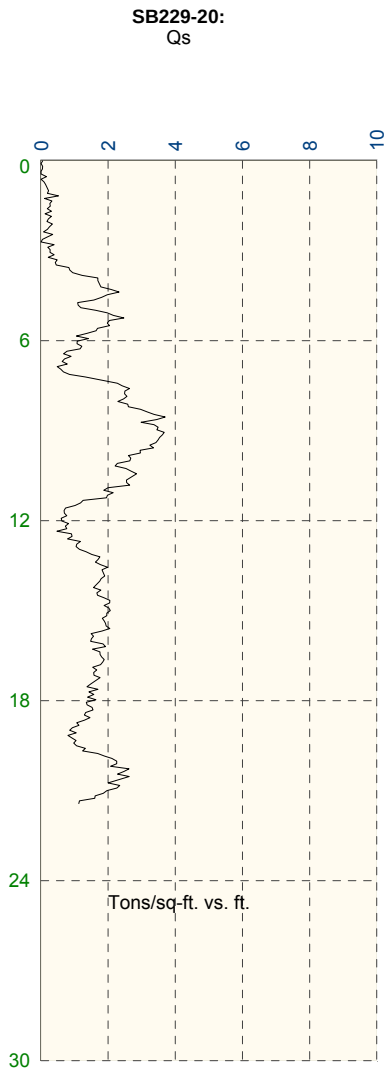

SB229-19:
Qs
0
2
4
6
8
10
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

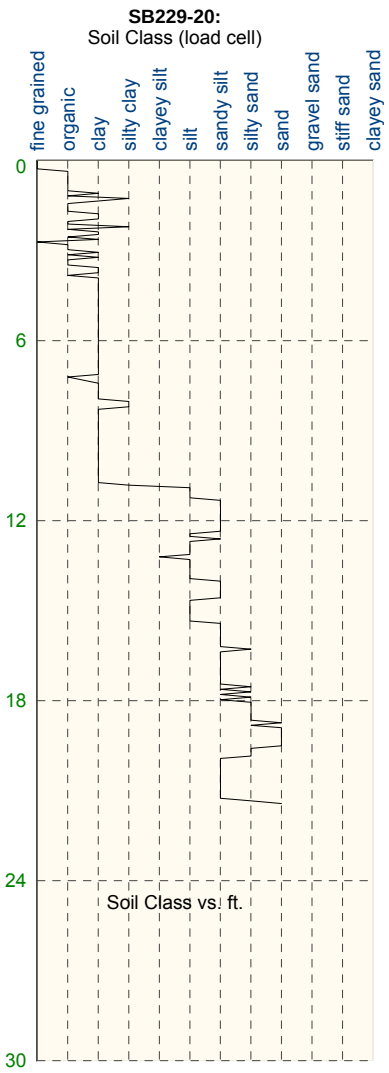

SB229-19:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
6
12
18
24
30
Soil Class vs. ft.

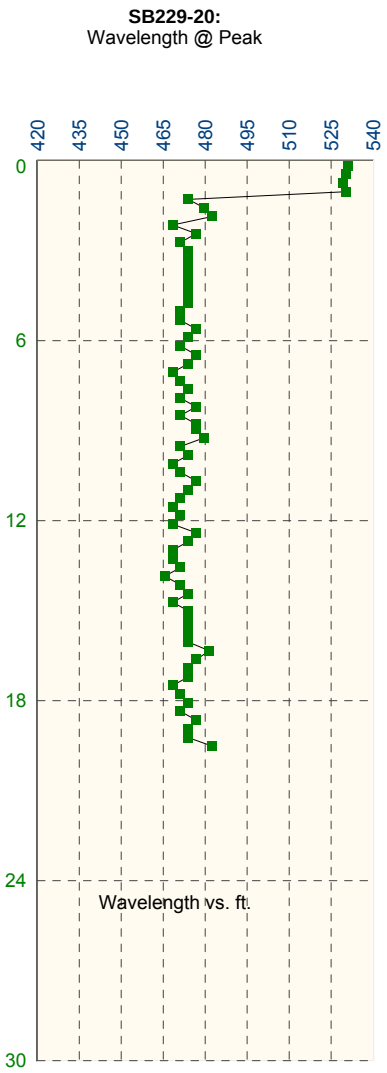

SB229-19:
Wavelength @ Peak
420
435
450
465
480
495
510
525
540
0
6
12
18
24
30
Wavelength vs. ft.

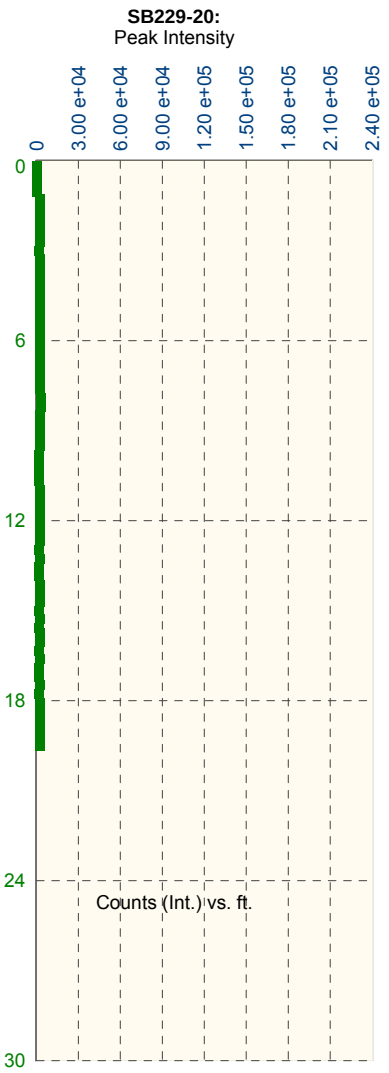

SB229-19:
Peak Intensity
0
3.00 e+04
6.00 e+04
9.00 e+04
1.20 e+05
1.50 e+05
1.80 e+05
2.10 e+05
2.40 e+05
0
6
12
18
24
30
Counts (Int.) vs. ft.

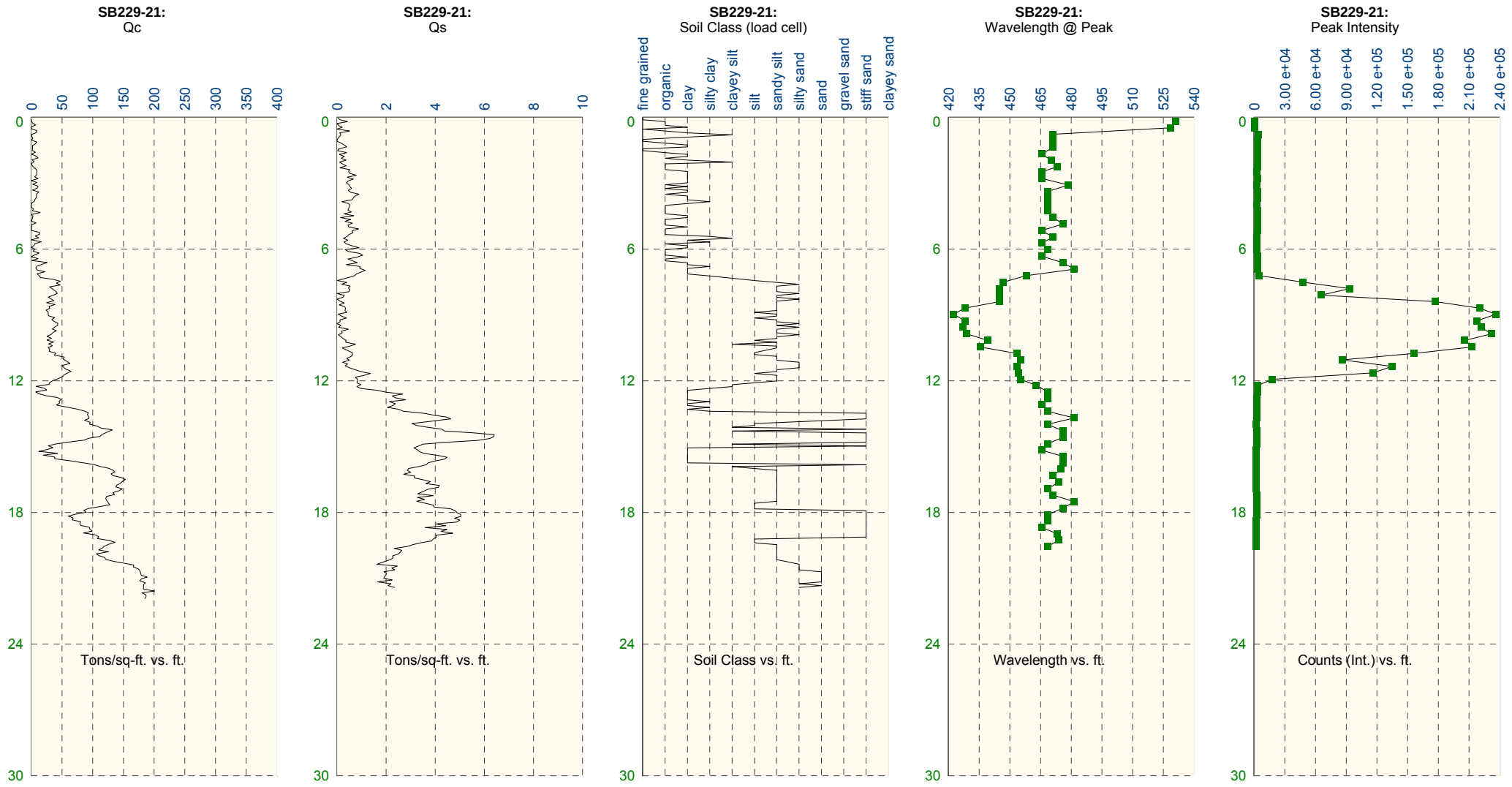

SB229-20:
Qc
0
50
100
150
200
250
300
350
400
0
6
12
18
24
30
Tons/sq-ft. vs. ft.

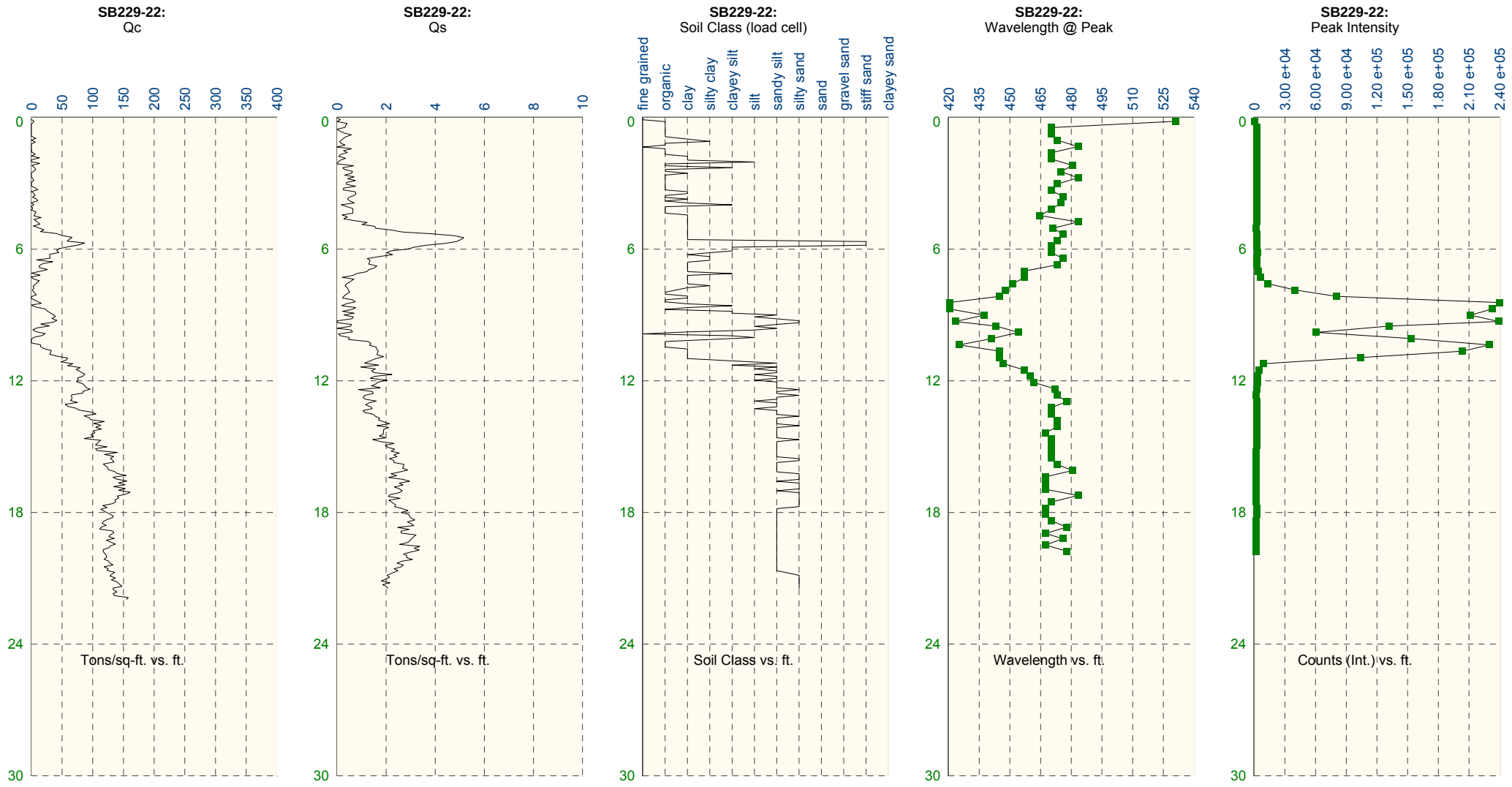

SB229-20:
Qs
0
2
4
6
8
10
0
6
12
18
24
30
Tons/sq-ft. vs. ft.


SB229-20:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
6
12
18
24
30
Soil Class vs. ft.


SB229-20:
Wavelength @ Peak
420
435
450
465
480
495
510
525
540
0
6
12
18
24
30
Wavelength vs. ft.


SB229-20:
Peak Intensity
0
3.00 e+04
6.00 e+04
9.00 e+04
1.20 e+05
1.50 e+05
1.80 e+05
2.10 e+05
2.40 e+05
0
6
12
18
24
30
Counts (Int.) vs. ft.


SB229-21:
Qc
0 50 100 150 200 250 300 350 400
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-21:
Qs
0 2 4 6 8 10
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-21:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0 6 12 18 24 30
Soil Class vs. ft.
SB229-21:
Wavelength @ Peak
420 435 450 465 480 495 510 525 540
0 6 12 18 24 30
Wavelength vs. ft.
SB229-21:
Peak Intensity
0 3.00 e+04 6.00 e+04 9.00 e+04 1.20 e+05 1.50 e+05 1.80 e+05 2.10 e+05 2.40 e+05
0 6 12 18 24 30
Counts (Int.) vs. ft.

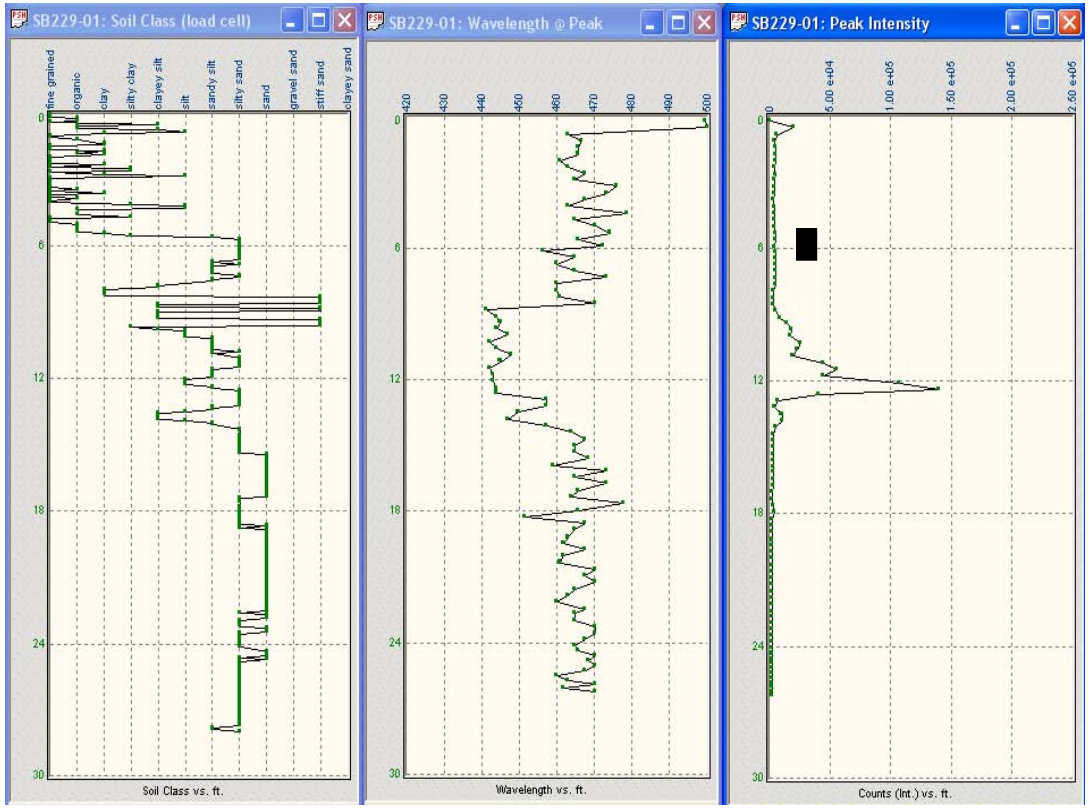

SB229-22:
Qc
0 50 100 150 200 250 300 350 400
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-22:
Qs
0 2 4 6 8 10
0 6 12 18 24 30
Tons/sq-ft. vs. ft.
SB229-22:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0 6 12 18 24 30
Soil Class vs. ft.
SB229-22:
Wavelength @ Peak
420 435 450 465 480 495 510 525 540
0 6 12 18 24 30
Wavelength vs. ft.
SB229-22:
Peak Intensity
0 3.00 e+04 6.00 e+04 9.00 e+04 1.20 e+05 1.50 e+05 1.80 e+05 2.10 e+05 2.40 e+05
0 6 12 18 24 30
Counts (Int.) vs. ft.

Appendix B

SCAPS Soil Sample Logs

SCAPS Soil Sample Log
Former UST Site 229
NWS Seal Beach, California

Sample ID: **SB229-01-S-01**	Sample Date: **04-29-09**	Logged By: **H. Butler**
Sample Interval: **5.0-6.5'**	Percent Recovery: **66**	



Description of Data and Sampling Rational–
The sample was collected from a depth interval of background fluorescence intensity that did not show a wavelength typical of fuel contamination. The sample was analyzed for TPH as diesel, VOCs, SVOCs, and PAHs.

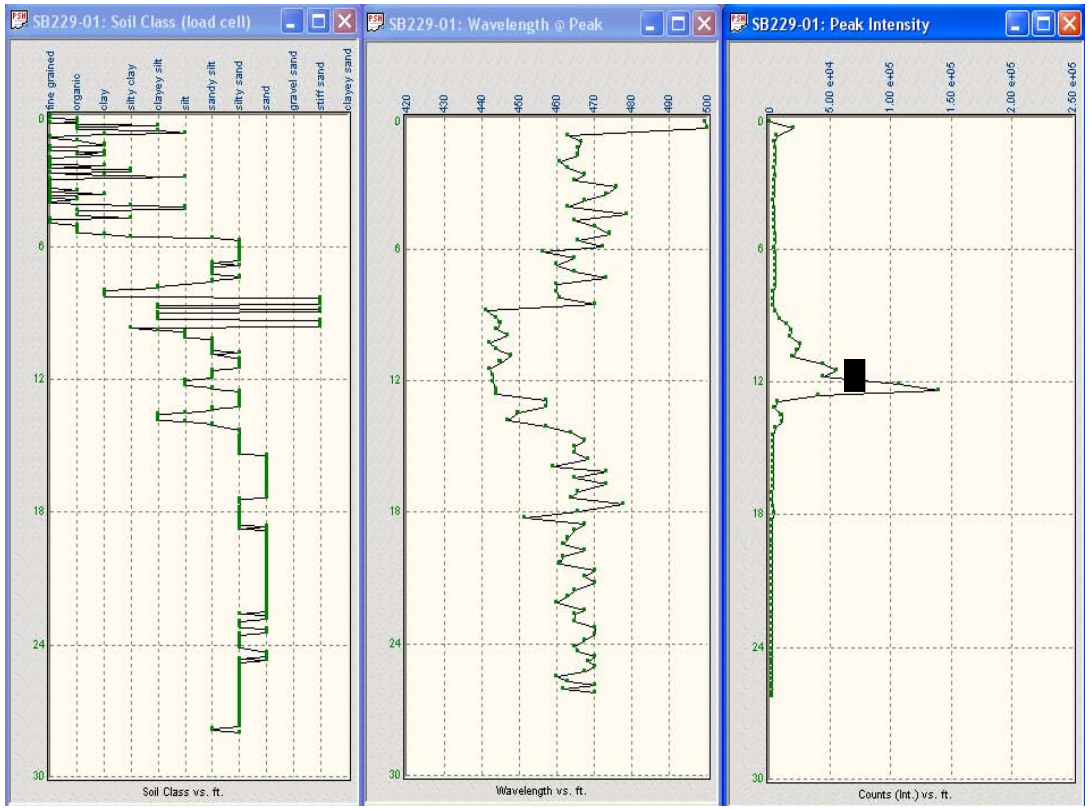
Sample Description –
SAND (SW) coarse to very fine grained; poorly sorted; lt. yellow brown (2.5Y 6/4); quartz, spars, mafics, micas; loose; damp; no stains; no odor.

Analytical Results	
All ND	0.0 mg/kg

Discussion of Results –
The CPT log indicates Silty Sand throughout the sample interval. Analytical results were not detected for all constituents consistent with LIF data.

SCAPS Soil Sample Log
Former UST Site 229
NWS Seal Beach, California

Sample ID: **SB229-01-S-02**	Sample Date: **04-29-09**	Logged By: **H. Butler**
Sample Interval: **11.0-12.5'**	Percent Recovery: **66**	



Description of Data and Sampling Rational–
The sample targeted an elevated fluorescence intensity response that showed a wavelength typical of fuel contamination. The sample was analyzed for TPH as diesel, VOC's, SVOC's, and PAH's.

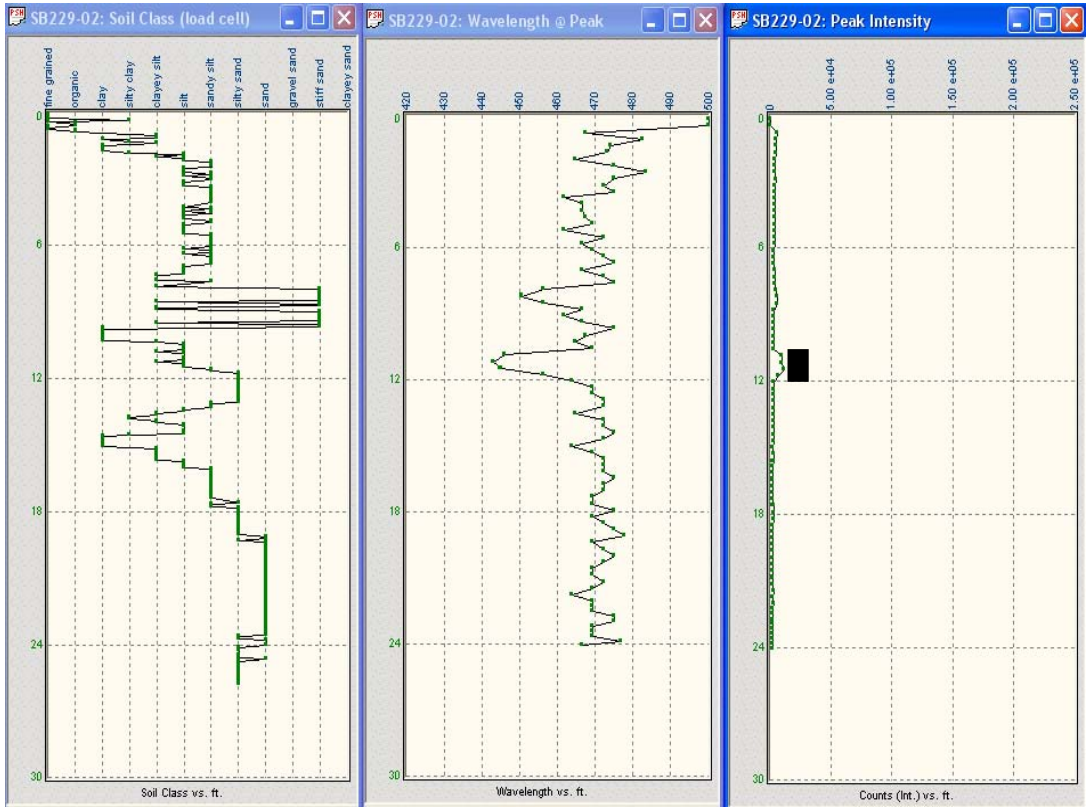
Sample Description –
SAND (SP); fine to very fine grained; well sorted; dark greenish gray (5GY 4/1); loose, compactable; wet; green/gray staining; weathered fuel odor.

Analytical Results	
TPH-d	1800.0 mg/kg
Benzene	6.7 µg/kg
Ethylbenzene	6.8 µg/kg
Acenaphthene	59.0 µg/kg
Acenaphthylene	27.0J µg/kg
Anthracene	26.0J µg/kg
Naphthalene	17.0 µg/kg
Pyrene	15.0J µg/kg

Discussion of Results –
The CPT log indicates Silty Sand throughout the sample interval. Analytical results indicate the presence of diesel range petroleum hydrocarbons, consistent with LIF data.

SCAPS Soil Sample Log
Former UST Site 229
NWS Seal Beach, California

Sample ID: **SB229-02-S-01**	Sample Date: **04-29-09**	Logged By: **H. Butler**
Sample Interval: **10.5-12.0'**	Percent Recovery: **66**	



Description of Data and Sampling Rational–
The sample targeted an interval of slightly elevated fluorescence intensity response that showed a wavelength typical of fuel contamination. The sample was analyzed for TPH as diesel, VOC's, SVOC's, and PAH's.

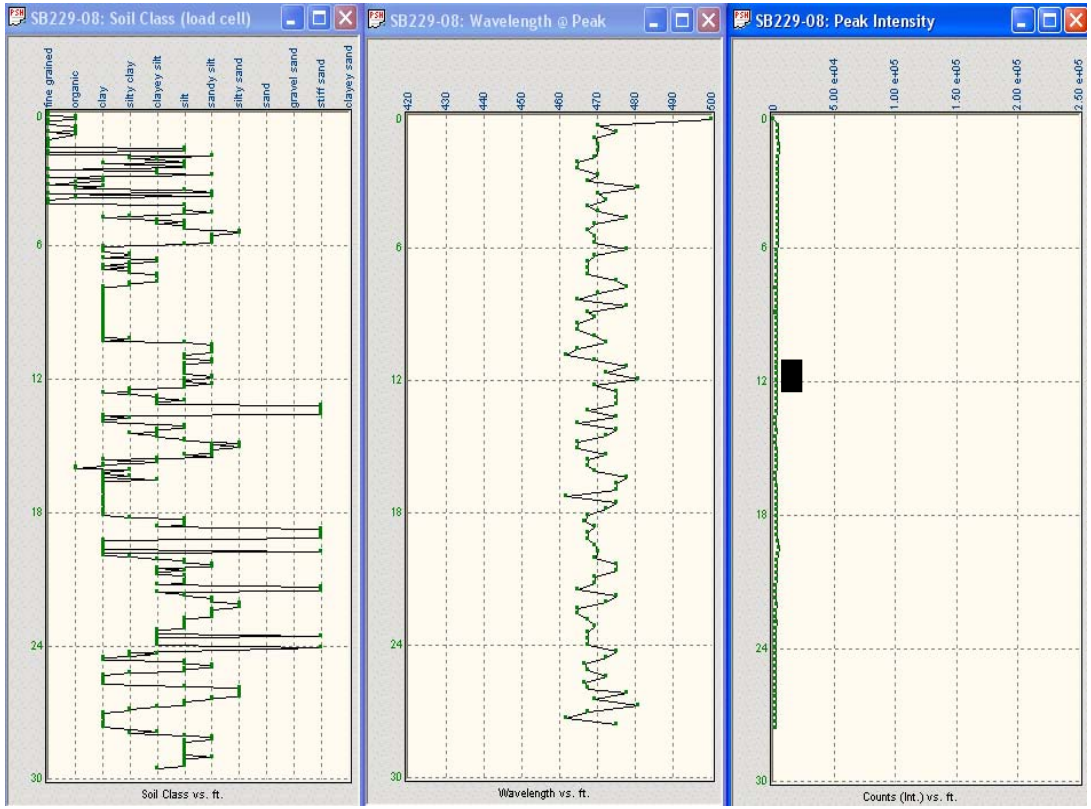
Sample Description –
SAND (SP); fine to very fine grained; moderately well sorted; dark greenish gray (5GY 4/1); micaceous; loose, compactable; wet; green/gray staining; diesel fuel odor.

Analytical Results	
TPH-d	2800.0 mg/kg
Benzene	7.0 µg/kg
Ethylbenzene	38.0 µg/kg
Naphthalene	21.0 µg/kg
O-Xylene	2.7J µg/kg
Pyrene	58.0 µg/kg

Discussion of Results –
The CPT log indicates Silty Sand throughout the sample interval. Analytical results indicate the presence of diesel range petroleum hydrocarbons, consistent with LIF data.

SCAPS Soil Sample Log
Former UST Site 229
NWS Seal Beach, California

Sample ID: **SB229-08-S-01**	Sample Date: **04-29-09**	Logged By: **H. Butler**
Sample Interval: **11.0-12.5'**	Percent Recovery: **50**	



Description of Data and Sampling Rational–
The sample was collected from a depth interval of background fluorescence intensity that did not show a wavelength typical of fuel contamination. The sample was analyzed for TPH as diesel, VOC's, SVOC's, and PAH's.

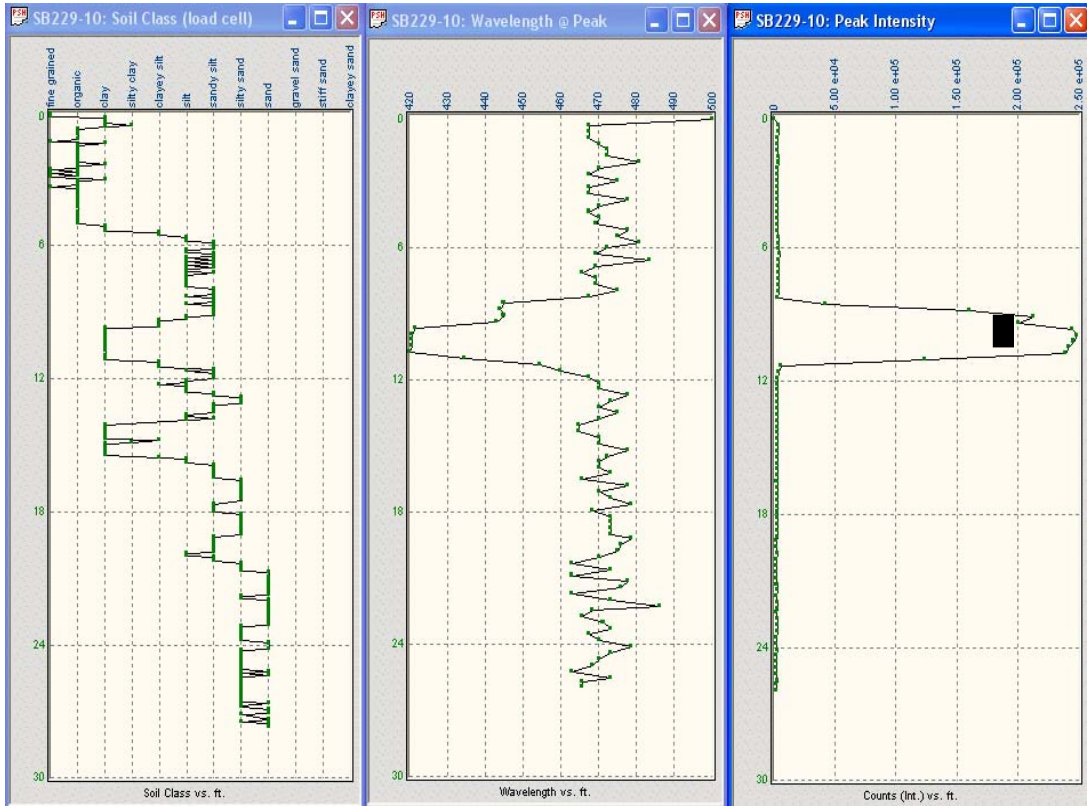
Sample Description –
SAND (SP); fine to very fine grained; trace fines; well sorted; olive gray (5Y 5/2); micaceous; loose, compactable; moist/wet; no stains; no odor.

Analytical Results	
All ND	0.0 mg/kg

Discussion of Results –
The CPT log indicates predominately Silt interbedded with Sandy Silt throughout the sample interval. Analytical results were not detected for all constituents, consistent with the LIF data.

SCAPS Soil Sample Log
Former UST Site 229
NWS Seal Beach, California

Sample ID: **SB229-10-S-01**	Sample Date: **04-29-09**	Logged By: **H. Butler**
Sample Interval: **9.0-10.5'**	Percent Recovery: **100**	



Description of Data and Sampling Rational–
The sample targeted an interval of elevated fluorescence intensity response that showed a wavelength typical of fuel contamination. The sample was analyzed for TPH as diesel, VOC's, SVOC's, and PAH's.

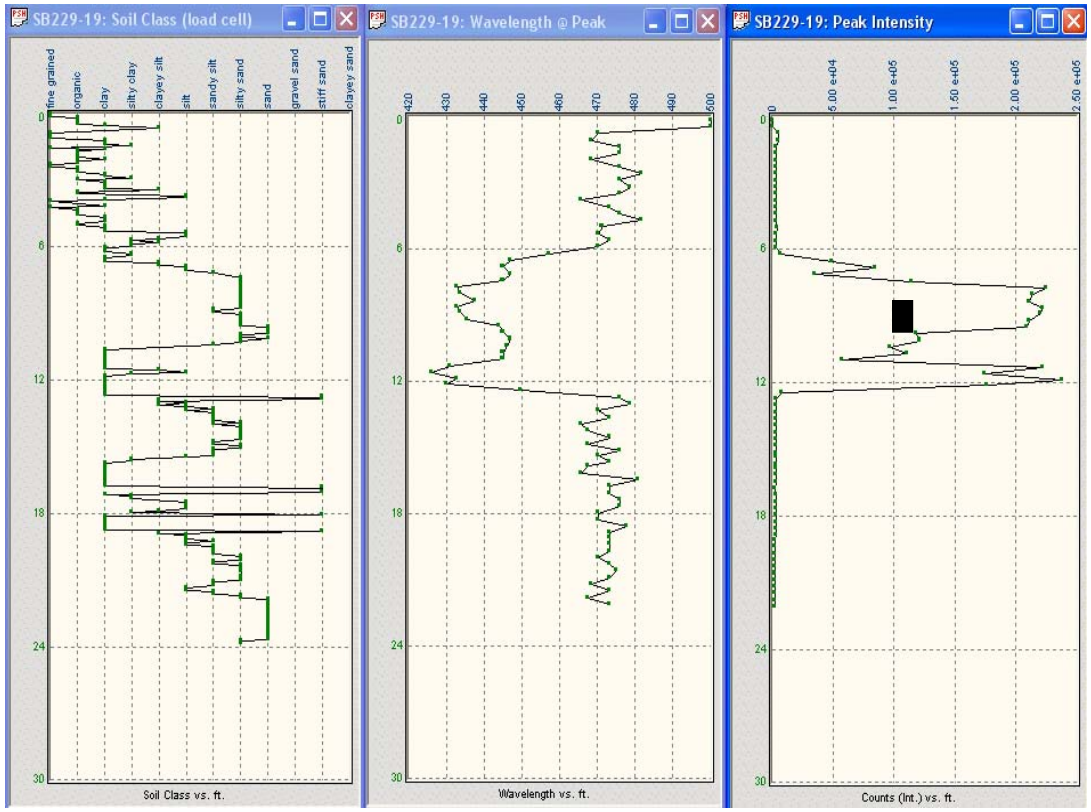
Sample Description –
Multiple soil contacts over sampling interval.
9.0-9.5: SAND (SW); medium to very fine grained; trace coarse sand; poorly sorted; dark olive gray (5Y 3/2); loose, compactable; wet/saturated; diesel fuel odor.
9.5-10.0: SILT (ML); trace fine sand; firm; plastic; dark greenish gray (5GY 4/1); moist; diesel fuel odor.
10.0-10.5: SAND w/ fines (SM); medium to very fine grained; little fines; moderately sorted; dark yellow brown (10YR 3/4); loose, compactable; wet; no stains; slight fuel odor.

Discussion of Results –
The CPT log and visual sample observations indicate heterogeneous soils consisting of interbedded Sandy Silt grading to Clay through the sample interval. LIF results indicate fuel fluorescence. Laboratory analytical results of the bottom of the 10 – 10.5 bgs sample tube indicate a very low estimated detection of diesel range petroleum hydrocarbons, suggesting heterogeneous distribution of fuel impact consistent with the visual and olfactory observations. All other constituents were not detected.

Analytical Results	
TPH-d	10.0J mg/kg
VOC's	ND
SVOC's	ND

SCAPS Soil Sample Log
Former UST Site 229
NWS Seal Beach, California

Sample ID: **SB229-19-S-01**	Sample Date: **04-29-09**	Logged By: **H. Butler**
Sample Interval: **8.5-10.0'**	Percent Recovery: **50**	



Description of Data and Sampling Rational–
The sample targeted an elevated fluorescence intensity response that showed a wavelength typical of fuel contamination. The sample was analyzed for TPH as diesel, VOC's, SVOC's, and PAH's.

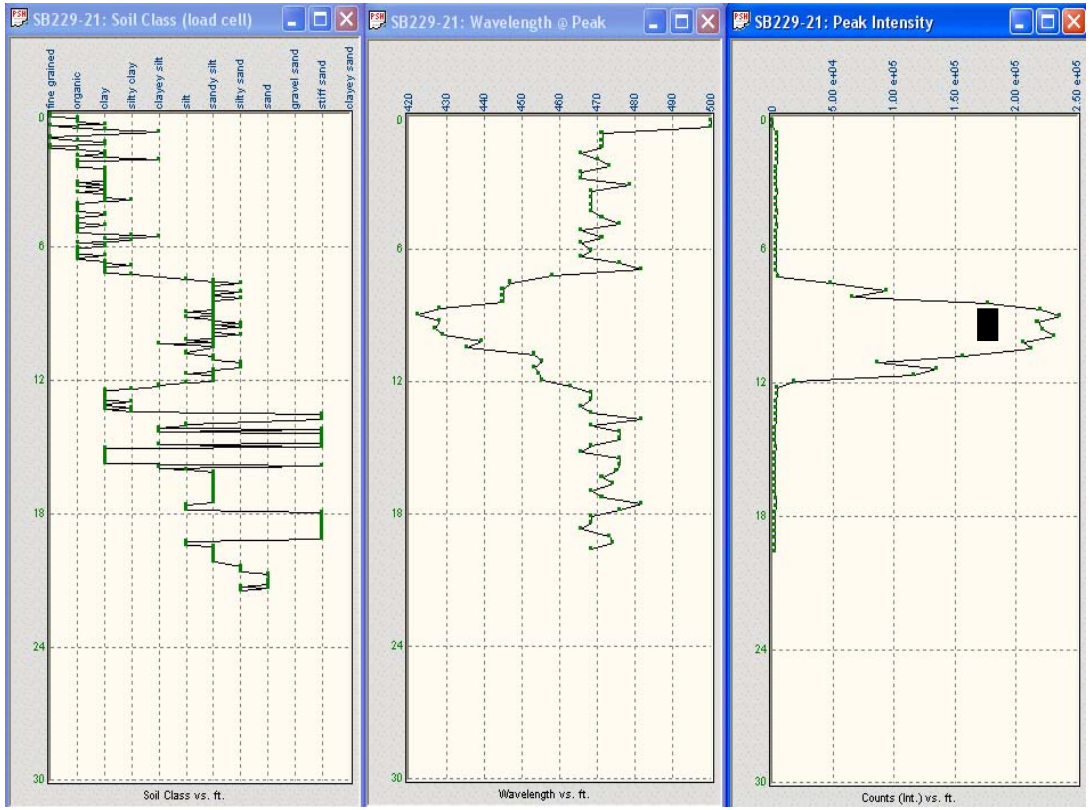
Sample Description –
GRAVELLY SAND (SW); very coarse to fine grained; trace fine gravels to 5 mm; very poorly sorted; gray (5Y 5/1); quartz, spars, little mafics; loose, compactable; saturated; gray staining; diesel fuel odor.

Analytical Results	
TPH-d	1800.0 mg/kg
Ethylbenzene	190.0J µg/kg
M/P Xylenes	300.0J µg/kg
O Xylenes	20.0J µg/kg
Toluene	5.0J µg/kg
Acenaphthene	250.0 µg/kg
Anthracene	77.0 µg/kg
Fluorene	660.0 µg/kg
Naphthalene	1900.0 µg/kg
Phenanthrene	900.0 µg/kg
Pyrene	49.0 µg/kg

Discussion of Results –
The CPT log indicates Sandy Silt interbedded with Sand throughout the sample interval. Analytical results indicate the presence of diesel range petroleum hydrocarbons, consistent with the LIF data.

SCAPS Soil Sample Log
Former UST Site 229
NWS Seal Beach, California

Sample ID: **SB229-21-S-01**	Sample Date: **04-29-09**	Logged By: **H. Butler**
Sample Interval: **8.5-10.0'**	Percent Recovery: **100**	



Description of Data and Sampling Rational–
The sample targeted a fluorescence intensity response that showed a wavelength typical of fuel contamination. The sample was analyzed for TPH as diesel, VOC's, SVOC's, and PAH's.

Sample Description –
SAND (SW); course to fine grained; trace very coarse sand; poorly sorted; gray (5Y 5/1); quartz, spars, little mafics; loose, compactable; saturated; gray staining; fuel odor.

Analytical Results	
TPH-d	12000 mg/kg
Benzene	43000 µg/kg
Ethylbenzene	48000 µg/kg
M/P Xylenes	63000 µg/kg
O Xylenes	2500 µg/kg
Toluene	2200 µg/kg
Acenaphthene	1200 µg/kg
Anthracene	330J µg/kg
Benzo(A)Anthracene	55 µg/kg
Benzo(G,H,I)Perylene	12J µg/kg
Fluoranthene	84 µg/kg
Fluorene	2100 µg/kg
Naphthalene	63000 µg/kg
Phenanthrene	3700 µg/kg
Pyrene	270 µg/kg

Discussion of Results –
The CPT log indicates interbedded Sandy Silt and Silty Sand throughout the sample interval. Analytical results indicate the presence of fuel range hydrocarbons.

Appendix C

Analytical Laboratory Data

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Richard Brady & Associates
3710 Ruffin Road
San Diego, CA 92123
ATTN: Mr. Jesse MacNeill

June 19, 2009

SUBJECT: NWS Seal Beach, UST Site 229, Data Validation

Dear Mr. MacNiell,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on June 3, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 20899:

SDG #	Fraction
09D293	Volatiles, Polynuclear Aromatic Hydrocarbons, TPH as Diesel

The data validation was performed under EPA Level III and Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

ERauto

Erlinda T. Rauto
Operations Manager/Senior Chemist

V:\LOGIN\RBA\Seal\20899COV.wpd

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC# 20899

Volatiles

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS Seal Beach, UST Site 229

Collection Date: April 29, 2009

LDC Report Date: June 17, 2009

Matrix: Soil\Water

Parameters: Volatiles

Validation Level: NFESC Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 09D293

Sample Identification

SB229-08-W-01
SB229-08-S-01
SB229-01-S-01**
SB229-01-S-02
SB229-02-S-01
SB229-02-W-01
SB229-02-W-02
SB229-10-S-01
SB229-21-S-01
SB229-21-S-01DL
SB229-19-S-01
SB229-19-S-01DL
SB229-08-S-01MS
SB229-08-S-01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 11 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent a NFESC Level IV review. A NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds were within method and validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

The percent difference (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were within method and validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Sample SB229-08-W-01 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample SB229-02-W-01 was identified as an equipment blank. No volatile contaminants were found in this blank.

Sample SB229-02-W-02 was identified as a field blank. No volatile contaminants were found in this blank.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
SB229-19-S-01	Bromofluorobenzene	384 (70-150)	Benzene Toluene Ethylbenzene m,p-Xylenes o-Xylene Naphthalene	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a NFESC Level IV review was performed with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
SB229-21-S-01	Benzene Ethylbenzene m,p-Xylenes Naphthalene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects) J (all detects)	A
SB229-19-S-01	Naphthalene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
SB229-21-S-01	Benzene Ethylbenzene m,p-Xylenes Naphthalene	R R R R	A

Sample	Compound	Flag	A or P
SB229-21-S-01DL	All TCL compounds except Benzene Ethylbenzene m,p-Xylenes Naphthalene	R	A
SB229-19-S-01	Naphthalene	R	A
SB229-19-S-01DL	All TCL compounds Naphthalene	R	A

Data flags have been summarized at the end of the report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

NAWS Seal Beach, UST Site 229
Volatiles - Data Qualification Summary - SDG 09D293

SDG	Sample	Compound	Flag	A or P	Reason
09D293	SB229-19-S-01	Benzene Toluene Ethylbenzene m,p-Xylenes o-Xylene Naphthalene	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A	Surrogate spikes (%R)
09D293	SB229-21-S-01	Benzene Ethylbenzene m,p-Xylenes Naphthalene	J (all detects) J (all detects) J (all detects) J (all detects)	A	Compound quantitation and CRQLs
09D293	SB229-19-S-01	Naphthalene	J (all detects)	A	Compound quantitation and CRQLs
09D293	SB229-21-S-01	Benzene Ethylbenzene m,p-Xylenes Naphthalene	R R R R	A	Overall assessment of data
09D293	SB229-21-S-01DL	All TCL compounds except Benzene Ethylbenzene m,p-Xylenes Naphthalene	R	A	Overall assessment of data
09D293	SB229-19-S-01	Naphthalene	R	A	Overall assessment of data
09D293	SB229-19-S-01DL	All TCL compounds Naphthalene	R	A	Overall assessment of data

NAWS Seal Beach, UST Site 229
Volatiles - Laboratory Blank Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Volatiles - Field Blank Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 04:14
Sample ID:	SB229-08-W-01	Date Analyzed:	05/01/09 04:14
Lab Samp ID:	D293-01	Dilution Factor:	1
Lab File ID:	RDQ919	Matrix :	WATER
Ext Btch ID:	V005D40	% Moisture :	NA
Calib. Ref.:	RDQ115	Instrument ID :	T-005

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
BENZENE	ND U	1.0	0.20
ETHYLBENZENE	ND	1.0	0.20
M/P-XYLENES	ND	2.0	0.50
NAPHTHALENE	ND	2.0	0.50
O-XYLENE	ND	1.0	0.20
TOLUENE	ND	1.0	0.20

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	92	70-140
4-BROMOFLUOROBENZENE	99	70-130
TOLUENE-D8	97	70-140

6-18-09

2004

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 14:03
Sample ID:	SB229-08-S-01	Date Analyzed:	05/01/09 14:03
Lab Samp ID:	D293-02	Dilution Factor:	0.91
Lab File ID:	REB012	Matrix :	SOIL
Ext Btch ID:	V003E02	% Moisture :	22.8
Calib. Ref.:	RDB577	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	ND U	5.9	2.4
ETHYLBENZENE	ND	5.9	2.4
M/P-XYLENES	ND	12	2.4
NAPHTHALENE	ND	5.9	2.4
O-XYLENE	ND	5.9	2.4
TOLUENE	ND	5.9	2.4

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	97	60-160
4-BROMOFLUOROBENZENE	100	70-150
TOLUENE-D8	98	70-140

6-18-09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 15:34
Sample ID:	S8229-01-S-01	Date Analyzed:	05/01/09 15:34
Lab Samp ID:	D293-03	Dilution Factor:	1.1
Lab File ID:	REB015	Matrix :	SOIL
Ext Btch ID:	V003E02	% Moisture :	2.2
Calib. Ref.:	RDB577	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	ND U	5.6	2.2
ETHYLBENZENE	ND	5.6	2.2
M/P-XYLENES	ND	11	2.2
NAPHTHALENE	ND	5.6	2.2
O-XYLENE	ND	5.6	2.2
TOLUENE	ND	5.6	2.2

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	101	60-160
4-BROMOFLUOROBENZENE	97	70-150
TOLUENE-D8	97	70-140

KJ 6-18-09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 18:08
Sample ID:	SB229-01-S-02	Date Analyzed:	05/01/09 18:08
Lab Samp ID:	D293-04	Dilution Factor:	0.91
Lab File ID:	REB020	Matrix :	SOIL
Ext Btch ID:	V003E02	% Moisture :	19.0
Calib. Ref.:	RDB577	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	6.7	5.6	2.2
ETHYLBENZENE	6.8	5.6	2.2
M/P-XYLENES	ND U	11	2.2
NAPHTHALENE	17	5.6	2.2
O-XYLENE	ND U	5.6	2.2
TOLUENE	ND U	5.6	2.2

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	98	60-160
4-BROMOFLUOROBENZENE	100	70-150
TOLUENE-D8	96	70-140

6-18-09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 090293	Date Extracted:	05/04/09 14:55
Sample ID:	SB229-02-S-01	Date Analyzed:	05/04/09 14:55
Lab Samp ID:	D293-05R	Dilution Factor:	0.94
Lab File ID:	REB062	Matrix :	SOIL
Ext Btch ID:	V003E04	% Moisture :	17.6
Calib. Ref.:	RDB577	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	7.0	5.7	2.3
ETHYLBENZENE	38	5.7	2.3
M/P-XYLENES	ND U	11	2.3
NAPHTHALENE	21	5.7	2.3
O-XYLENE	2.7J	5.7	2.3
TOLUENE	ND U	5.7	2.3

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	99	60-160
4-BROMOFLUOROBENZENE	134	70-150
TOLUENE-D8	98	70-140

6-18-09

METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 04:43
Sample ID:	SB229-02-W-01	Date Analyzed:	05/01/09 04:43
Lab Samp ID:	D293-06	Dilution Factor:	1
Lab File ID:	RDQ920	Matrix	: WATER
Ext Btch ID:	VOO5D40	% Moisture	: NA
Calib. Ref.:	RDQ115	Instrument ID	: T-005

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
BENZENE	ND U	1.0	0.20
ETHYLBENZENE	ND	1.0	0.20
M/P-XYLENES	ND	2.0	0.50
NAPHTHALENE	ND	2.0	0.50
O-XYLENE	ND	1.0	0.20
TOLUENE	ND	1.0	0.20

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	90	70-140
4-BROMOFLUOROBENZENE	100	70-130
TOLUENE-D8	98	70-140

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2008

METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 05:12
Sample ID:	SB229-02-W-02	Date Analyzed:	05/01/09 05:12
Lab Samp ID:	D293-07	Dilution Factor:	1
Lab File ID:	RDQ921	Matrix :	WATER
Ext Btch ID:	VOO5D40	% Moisture :	NA
Calib. Ref.:	RDQ115	Instrument ID :	T-005

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
BENZENE	ND U	1.0	0.20
ETHYLBENZENE	ND	1.0	0.20
M/P-XYLENES	ND	2.0	0.50
NAPHTHALENE	ND	2.0	0.50
O-XYLENE	ND	1.0	0.20
TOLUENE	ND	1.0	0.20

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	91	70-140
4-BROMOFLUOROBENZENE	99	70-130
TOLUENE-D8	97	70-140

JG 6-18-09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 16:05
Sample ID:	SB229-10-S-01	Date Analyzed:	05/01/09 16:05
Lab Samp ID:	D293-08	Dilution Factor:	0.83
Lab File ID:	REB016	Matrix :	SOIL
Ext Btch ID:	V003E02	% Moisture :	20.8
Calib. Ref.:	RDB577	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	ND U	5.2	2.1
ETHYLBENZENE	ND	5.2	2.1
M/P-XYLENES	ND	10	2.1
NAPHTHALENE	ND	5.2	2.1
O-XYLENE	ND	5.2	2.1
TOLUENE	ND	5.2	2.1

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	103	60-160
4-BROMOFLUOROBENZENE	96	70-150
TOLUENE-D8	94	70-140

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METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/05/09 00:08
Sample ID:	SB229-21-S-01	Date Analyzed:	05/05/09 00:08
Lab Samp ID:	D293-09T	Dilution Factor:	48
Lab File ID:	REB080	Matrix :	SOIL
Ext Btch ID:	V003E05	% Moisture :	15.6
Calib. Ref.:	RDB605	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)		RL (ug/kg)	MDL (ug/kg)
BENZENE	36000E	R	280	110
ETHYLBENZENE	30000E		280	110
M/P-XYLENES	39000E		570	110
NAPHTHALENE	17000E		280	110
O-XYLENE	2500		280	110
TOLUENE	2200		280	110

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	111	60-160
4-BROMOFLUOROBENZENE	130	70-150
TOLUENE-D8	106	70-140

Methanol Extraction Date: 05/04/09 12:20

6/19/09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 23:37
Sample ID:	SB229-21-S-01DL	Date Analyzed:	05/04/09 23:37
Lab Samp ID:	D293-09I	Dilution Factor:	480
Lab File ID:	REB079	Matrix :	SOIL
Ext Btch ID:	V003E05	% Moisture :	15.6
Calib. Ref.:	RDB605	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	43000	2800	1100
ETHYLBENZENE	48000	2800	1100
M/P-XYLENES	63000	5700	1100
NAPHTHALENE	20000	2800	1100
O-XYLENE	2200J	2800	1100
TOLUENE	2000J	2800	1100

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	113	60-160
4-BROMOFLUOROBENZENE	126	70-150
TOLUENE-D8	95	70-140

Methanol Extraction Date: 05/04/09 12:20

6-18-09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 19:10
Sample ID:	SB229-19-S-01	Date Analyzed:	05/01/09 19:10
Lab Samp ID:	D293-10	Dilution Factor:	1.0
Lab File ID:	REB022	Matrix :	SOIL
Ext Btch ID:	V003E02	% Moisture :	14.6
Calib. Ref.:	RDB577	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	ND	5.9	2.3
ETHYLBENZENE	190	5.9	2.3
M/P-XYLENES	300	12	2.3
NAPHTHALENE	400E	5.9	2.3
O-XYLENE	20	5.9	2.3
TOLUENE	5.0J	5.9	2.3

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	101	60-160
4-BROMOFLUOROBENZENE	384*	70-150
TOLUENE-D8	102	70-140

RJ 6-18-09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 23:06
Sample ID:	SB229-19-S-01DL	Date Analyzed:	05/04/09 23:06
Lab Samp ID:	D293-10T	Dilution Factor:	48
Lab File ID:	REB078	Matrix :	SOIL
Ext Btch ID:	V003E05	% Moisture :	14.6
Calib. Ref.:	RDB605	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	ND U R	280	110
ETHYLBENZENE	390	280	110
M/P-XYLENES	560	560	110
NAPHTHALENE	920	280	110
O-XYLENE	ND U R	280	110
TOLUENE	ND U	280	110

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	109	60-160
4-BROMOFLUOROBENZENE	122	70-150
TOLUENE-D8	103	70-140

Methanol Extraction Date: 05/04/09 12:20

6-18-09

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC# 20899

Polynuclear Aromatic Hydrocarbons

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS Seal Beach, UST Site 229

Collection Date: April 29, 2009

LDC Report Date: June 17, 2009

Matrix: Soil/Water

Parameters: Polynuclear Aromatic Hydrocarbons

Validation Level: NFESC Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 09D293

Sample Identification

SB229-08-S-01
SB229-01-S-01**
SB229-01-S-02
SB229-02-S-01
SB229-02-W-01
SB229-02-W-02
SB229-10-S-01
SB229-21-S-01
SB229-21-S-01DL
SB229-19-S-01
SB229-08-S-01MS
SB229-08-S-01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 10 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per a modification of EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent a NFESC Level IV review. A NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r^2) was greater than or equal to 0.990 .

Average relative response factors (RRF) for all target compounds and system monitoring compounds were within validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% .

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks.

Sample SB229-02-W-01was identified as an equipment blank. No polynuclear aromatic hydrocarbon contaminants were found in this blank.

Sample SB229-02-W-02 was identified a field blank. No polynuclear aromatic hydrocarbon contaminants were found in this blank.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a NFESC Level IV review was performed with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
SB229-21-S-01	Naphthalene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
SB229-21-S-01	Naphthalene	R	A
SB229-21-S-01DL	All TCL compounds except Naphthalene	R	A

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 09D293

SDG	Sample	Compound	Flag	A or P	Reason
09D293	SB229-21-S-01	Naphthalene	J (all detects)	A	Compound quantitation and CRQLs
09D293	SB229-21-S-01	Naphthalene	R	A	Overall assessment of data
09D293	SB229-21-S-01DL	All TCL compounds except Naphthalene	R	A	Overall assessment of data

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 10:45
Sample ID:	SB229-08-S-01	Date Analyzed:	05/05/09 15:16
Lab Samp ID:	D293-02	Dilution Factor:	1
Lab File ID:	REJ111	Matrix :	SOIL
Ext Btch ID:	SVE002S	% Moisture :	22.8
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	ND U	39	13
ACENAPHTHYLENE	ND	39	13
ANTHRACENE	ND	39	13
BENZO(A)ANTHRACENE	ND	39	13
BENZO(A)PYRENE	ND	39	13
BENZO(B)FLUORANTHENE	ND	39	13
BENZO(K)FLUORANTHENE	ND	39	13
BENZO(G,H,I)PERYLENE	ND	39	13
CHRYSENE	ND	39	13
DIBENZO(A,H)ANTHRACENE	ND	39	13
FLUORANTHENE	ND	39	13
FLUORENE	ND	39	13
INDENO(1,2,3-CD)PYRENE	ND	39	13
NAPHTHALENE	ND	39	13
PHENANTHRENE	ND	39	13
PYRENE	ND	39	13

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	90	40-130

JG 6-18-09

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 04/29/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 04/29/09
Batch No. : 09D293	Date Extracted: 05/04/09 10:45
Sample ID: SB229-01-S-01	Date Analyzed: 05/05/09 16:11
Lab Samp ID: D293-03	Dilution Factor: 1
Lab File ID: REJ114	Matrix : SOIL
Ext Btch ID: SVE002S	% Moisture : 2.2
Calib. Ref.: RDJ227	Instrument ID : T-0E4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	ND	31	10
ACENAPHTHYLENE	ND	31	10
ANTHRACENE	ND	31	10
BENZO(A)ANTHRACENE	ND	31	10
BENZO(A)PYRENE	ND	31	10
BENZO(B)FLUORANTHENE	ND	31	10
BENZO(K)FLUORANTHENE	ND	31	10
BENZO(G,H,I)PERYLENE	ND	31	10
CHRYSENE	ND	31	10
DIBENZO(A,H)ANTHRACENE	ND	31	10
FLUORANTHENE	ND	31	10
FLUORENE	ND	31	10
INDENO(1,2,3-CD)PYRENE	ND	31	10
NAPHTHALENE	ND	31	10
PHENANTHRENE	ND	31	10
PYRENE	ND	31	10

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	87	40-130

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METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 10:45
Sample ID:	SB229-01-S-02	Date Analyzed:	05/05/09 16:30
Lab Samp ID:	D293-04	Dilution Factor:	1
Lab File ID:	REJ115	Matrix :	SOIL
Ext Btch ID:	SVE002S	% Moisture :	19.0
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	59	37	12
ACENAPHTHYLENE	27J J	37	12
ANTHRACENE	26J J	37	12
BENZO(A)ANTHRACENE	ND U	37	12
BENZO(A)PYRENE	ND	37	12
BENZO(B)FLUORANTHENE	ND	37	12
BENZO(K)FLUORANTHENE	ND	37	12
BENZO(G,H,I)PERYLENE	ND	37	12
CHRYSENE	ND	37	12
DIBENZO(A,H)ANTHRACENE	ND	37	12
FLUORANTHENE	ND	37	12
FLUORENE	ND	37	12
INDENO(1,2,3-CD)PYRENE	ND	37	12
NAPHTHALENE	ND	37	12
PHENANTHRENE	ND	37	12
PYRENE	15J J	37	12

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	92	40-130

6-18-09

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 04/29/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 04/29/09
Batch No. : 09D293	Date Extracted: 05/04/09 10:45
Sample ID: SB229-02-S-01	Date Analyzed: 05/05/09 16:48
Lab Samp ID: D293-05	Dilution Factor: 1
Lab File ID: REJ116	Matrix : SOIL
Ext Btch ID: SVE002S	% Moisture : 17.6
Calib. Ref.: RDJ227	Instrument ID : T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	ND U	36	12
ACENAPHTHYLENE	ND	36	12
ANTHRACENE	ND	36	12
BENZO(A)ANTHRACENE	ND	36	12
BENZO(A)PYRENE	ND	36	12
BENZO(B)FLUORANTHENE	ND	36	12
BENZO(K)FLUORANTHENE	ND	36	12
BENZO(G,H,I)PERYLENE	ND	36	12
CHRYSENE	ND	36	12
DIBENZO(A,H)ANTHRACENE	ND	36	12
FLUORANTHENE	ND	36	12
FLUORENE	ND	36	12
INDENO(1,2,3-CD)PYRENE	ND	36	12
NAPHTHALENE	ND	36	12
PHENANTHRENE	ND	36	12
PYRENE	58	36	12

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	99	40-130

6+18-09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 15:30
Sample ID:	SB229-02-W-01	Date Analyzed:	05/07/09 15:22
Lab Samp ID:	D293-06	Dilution Factor:	.95
Lab File ID:	REJ191	Matrix :	WATER
Ext Btch ID:	SVE003W	% Moisture :	NA
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.95	0.19
ACENAPHTHYLENE	ND	0.95	0.19
ANTHRACENE	ND	0.95	0.19
BENZO(A)ANTHRACENE	ND	0.95	0.19
BENZO(A)PYRENE	ND	0.95	0.19
BENZO(B)FLUORANTHENE	ND	0.95	0.19
BENZO(K)FLUORANTHENE	ND	0.95	0.19
BENZO(G,H,I)PERYLENE	ND	0.95	0.19
CHRYSENE	ND	0.95	0.19
DIBENZO(A,H)ANTHRACENE	ND	0.95	0.19
FLUORANTHENE	ND	0.95	0.19
FLUORENE	ND	0.95	0.19
INDENO(1,2,3-CD)PYRENE	ND	0.95	0.19
NAPHTHALENE	ND	0.95	0.19
PHENANTHRENE	ND	0.95	0.19
PYRENE	ND	0.95	0.19

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	79	30-130

6-18-09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 15:30
Sample ID:	SB229-02-W-02	Date Analyzed:	05/07/09 15:40
Lab Samp ID:	D293-07	Dilution Factor:	.95
Lab File ID:	REJ192	Matrix :	WATER
Ext Btch ID:	SVE003W	% Moisture :	NA
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.95	0.19
ACENAPHTHYLENE	ND	0.95	0.19
ANTHRACENE	ND	0.95	0.19
BENZO(A)ANTHRACENE	ND	0.95	0.19
BENZO(A)PYRENE	ND	0.95	0.19
BENZO(B)FLUORANTHENE	ND	0.95	0.19
BENZO(K)FLUORANTHENE	ND	0.95	0.19
BENZO(G,H,I)PERYLENE	ND	0.95	0.19
CHRYSENE	ND	0.95	0.19
DIBENZO(A,H)ANTHRACENE	ND	0.95	0.19
FLUORANTHENE	ND	0.95	0.19
FLUORENE	ND	0.95	0.19
INDENO(1,2,3-CD)PYRENE	ND	0.95	0.19
NAPHTHALENE	ND	0.95	0.19
PHENANTHRENE	ND	0.95	0.19
PYRENE	ND	0.95	0.19

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	80	30-130

6-18-09

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 10:45
Sample ID:	SB229-10-S-01	Date Analyzed:	05/05/09 17:07
Lab Samp ID:	D293-08	Dilution Factor:	1
Lab File ID:	REJ117	Matrix :	SOIL
Ext Btch ID:	SVE002S	% Moisture :	20.8
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	ND U	38	13
ACENAPHTHYLENE	ND	38	13
ANTHRACENE	ND	38	13
BENZO(A)ANTHRACENE	ND	38	13
BENZO(A)PYRENE	ND	38	13
BENZO(B)FLUORANTHENE	ND	38	13
BENZO(K)FLUORANTHENE	ND	38	13
BENZO(G,H,I)PERYLENE	ND	38	13
CHRYSENE	ND	38	13
DIBENZO(A,H)ANTHRACENE	ND	38	13
FLUORANTHENE	ND	38	13
FLUORENE	ND	38	13
INDENO(1,2,3-CD)PYRENE	ND	38	13
NAPHTHALENE	ND	38	13
PHENANTHRENE	ND	38	13
PYRENE	ND	38	13

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	90	40-130

6-18-09

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 10:45
Sample ID:	SB229-21-S-01	Date Analyzed:	05/05/09 17:25
Lab Samp ID:	D293-09	Dilution Factor:	1
Lab File ID:	REJ118	Matrix :	SOIL
Ext Btch ID:	SVE002S	% Moisture :	15.6
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	1100	36	12
ACENAPHTHYLENE	ND U	36	12
ANTHRACENE	320	36	12
BENZO(A)ANTHRACENE	55	36	12
BENZO(A)PYRENE	ND U	36	12
BENZO(B)FLUORANTHENE	ND	36	12
BENZO(K)FLUORANTHENE	ND	36	12
BENZO(G,H,I)PERYLENE	12J J	36	12
CHRYSENE	ND U	36	12
DIBENZO(A,H)ANTHRACENE	ND	36	12
FLUORANTHENE	84	36	12
FLUORENE	2100	36	12
INDENO(1,2,3-CD)PYRENE	ND U	36	12
NAPHTHALENE	54000E ~~E~~ R	36	12
PHENANTHRENE	3700	36	12
PYRENE	270	36	12

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	104	40-130

BJ 6-18-09

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 04/29/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 04/29/09
Batch No. : 09D293	Date Extracted: 05/04/09 10:45
Sample ID: SB229-21-S-01DL	Date Analyzed: 05/06/09 22:30
Lab Samp ID: D293-09T	Dilution Factor: 10
Lab File ID: REJ172	Matrix : SOIL
Ext Btch ID: SVE002S	% Moisture : 15.6
Calib. Ref.: RDJ227	Instrument ID : T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	1200	360	120
ACENAPHTHYLENE	ND	360	120
ANTHRACENE	330J	360	120
BENZO(A)ANTHRACENE	ND	360	120
BENZO(A)PYRENE	ND	360	120
BENZO(B)FLUORANTHENE	ND	360	120
BENZO(K)FLUORANTHENE	ND	360	120
BENZO(G,H,I)PERYLENE	ND	360	120
CHRYSENE	ND	360	120
DIBENZO(A,H)ANTHRACENE	ND	360	120
FLUORANTHENE	ND	360	120
FLUORENE	2100	360	120
INDENO(1,2,3-CD)PYRENE	ND	360	120
NAPHTHALENE	63000	360	120
PHENANTHRENE	3700	360	120
PYRENE	260J	360	120

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	DO	40-130

DO : Diluted Out

6-18-09

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 04/29/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 04/29/09
Batch No. : 09D293	Date Extracted: 05/04/09 10:45
Sample ID: SB229-19-S-01	Date Analyzed: 05/05/09 17:44
Lab Samp ID: D293-10	Dilution Factor: 1
Lab File ID: REJ119	Matrix : SOIL
Ext Btch ID: SVE002S	% Moisture : 14.6
Calib. Ref.: RDJ227	Instrument ID : T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	250	35	12
ACENAPHTHYLENE	ND U	35	12
ANTHRACENE	77	35	12
BENZO(A)ANTHRACENE	ND U	35	12
BENZO(A)PYRENE	ND	35	12
BENZO(B)FLUORANTHENE	ND	35	12
BENZO(K)FLUORANTHENE	ND	35	12
BENZO(G,H,I)PERYLENE	ND	35	12
CHRYSENE	ND	35	12
DIBENZO(A,H)ANTHRACENE	ND	35	12
FLUORANTHENE	ND	35	12
FLUORENE	660	35	12
INDENO(1,2,3-CD)PYRENE	ND U	35	12
NAPHTHALENE	1900	35	12
PHENANTHRENE	900	35	12
PYRENE	49	35	12

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	99	40-130

6-18-09

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC# 20899

TPH as Diesel

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS Seal Beach, UST Site 229

Collection Date: April 29, 2009

LDC Report Date: June 18, 2009

Matrix: Soil/Water

Parameters: Total Petroleum Hydrocarbons as Diesel

Validation Level: NFESC Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 09D293

Sample Identification

SB229-08-S-01
SB229-01-S-01**
SB229-01-S-02
SB229-02-S-01
SB229-02-W-01
SB229-02-W-02
SB229-10-S-01
SB229-21-S-01
SB229-19-S-01
SB229-08-S-01MS
SB229-08-S-01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 9 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Diesel.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent NFESC Level IV review. NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as diesel contaminants were found in the method blanks.

Sample SB229-02-W-01 was identified as an equipment blank. No total petroleum hydrocarbons as diesel contaminants were found in this blank.

Sample SB229-02-W-02 was identified as a field blank. No total petroleum hydrocarbons as diesel contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for sample SB229-21-S-01. Since the sample was diluted out, no data were qualified.

b. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags have been summarized at the end of this report if data has been qualified.

IX. Field Duplicates

No field duplicates were identified in this SDG.

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Laboratory Blank Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Field Blank Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-08-S-01	Date Analyzed:	05/01/09 22:13
Lab Samp ID:	D293-02	Dilution Factor:	1
Lab File ID:	LE01037A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	22.8
Calib. Ref.:	LE01028A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	ND U	26	6.5

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	70	40-160
HEXACOSANE	90	70-160

Parameter	H-C Range
Diesel	C10-C24

6-18-09

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-01-S-01	Date Analyzed:	05/01/09 23:51
Lab Samp ID:	D293-03	Dilution Factor:	1
Lab File ID:	LE01043A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	2.2
Calib. Ref.:	LE01041A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	ND U	20	5.1

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	76	40-160
HEXACOSANE	97	70-160

Parameter	H-C Range
Diesel	C10-C24

6-18-09

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-01-S-02	Date Analyzed:	05/02/09 00:08
Lab Samp ID:	D293-04	Dilution Factor:	1
Lab File ID:	LE01044A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	19.0
Calib. Ref.:	LE01041A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	1800	25	6.2

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	72	40-160
HEXACOSANE	100	70-160

Parameter	H-C Range
Diesel	C10-C24

6-18-09

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-02-S-01	Date Analyzed:	05/02/09 00:24
Lab Samp ID:	D293-05	Dilution Factor:	1
Lab File ID:	LE01045A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	17.6
Calib. Ref.:	LE01041A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	2800	24	6.1

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	67	40-160
HEXACOSANE	109	70-160

Parameter	H-C Range
Diesel	C10-C24

6-18-09

5010

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 13:00
Sample ID:	SB229-02-W-01	Date Analyzed:	05/06/09 01:59
Lab Samp ID:	D293-06	Dilution Factor:	0.96
Lab File ID:	LE05051A	Matrix :	WATER
Ext Btch ID:	DSE003W	% Moisture :	NA
Calib. Ref.:	LE05049A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.48	0.096

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	96	50-130
HEXACOSANE	115	70-140

Parameter	H-C Range
Diesel	C10-C24

BJ 6-18-09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 090293	Date Extracted:	05/04/09 13:00
Sample ID:	SB229-02-W-02	Date Analyzed:	05/06/09 02:15
Lab Samp ID:	D293-07	Dilution Factor:	0.96
Lab File ID:	LE05052A	Matrix :	WATER
Ext Btch ID:	DSE003W	% Moisture :	NA
Calib. Ref.:	LE05049A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.48	0.096

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	92	50-130
HEXACOSANE	115	70-140

Parameter	H-C Range
Diesel	C10-C24

fy 6-18-09

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-10-S-01	Date Analyzed:	05/02/09 00:41
Lab Samp ID:	D293-08	Dilution Factor:	1
Lab File ID:	LE01046A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	20.8
Calib. Ref.:	LE01041A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	10J J	25	6.3

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	62	40-160
HEXACOSANE	90	70-160

Parameter	H-C Range
Diesel	C10-C24

JG 6-18-09

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-21-S-01	Date Analyzed:	05/04/09 19:11
Lab Samp ID:	D293-09T	Dilution Factor:	10
Lab File ID:	LE04012A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	15.6
Calib. Ref.:	LE04002A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	12000	240	59

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	DO	40-160
HEXACOSANE	DO	70-160

Parameter	H-C Range
Diesel	C10-C24

DO: Diluted Out

JG 6-18-09

5018

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-19-S-01	Date Analyzed:	05/02/09 01:13
Lab Samp ID:	D293-10	Dilution Factor:	1
Lab File ID:	LE01048A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	14.6
Calib. Ref.:	LE01041A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	1800	23	5.9

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	86	40-160
HEXACOSANE	107	70-160

Parameter	H-C Range
Diesel	C10-C24

BJ 6-18-09

Appendix B

Boring Permit and Well Logs

Richard Brady & Associates
Engineers and Constructors

March 25, 2009

Mr. Dan Matsui, REHS
Health Care Agency
Environmental Health
1241 E. Dyer Road, Suite 120
Santa Ana, California 92705-5611

Subject: Notification of Well Construction
Former Underground Storage Tank Site 229
Naval Weapons Station, Seal Beach, California

Dear Mr. Matsui:

On March 30, 2009 through May 31, 2009, fifty (50) Site Characterization and Analysis Penetrometer System (SCAPS) cone penetrometer test/laser induced fluorescence (CPT/LIF) pushes will be advanced, six (6) temporary SCAPS microwells, and four (4) permanent groundwater monitoring wells will be installed by Richard Brady & Associates (RBA) for Naval Facilities Engineering Command Southwest, under contract #N68711-03-D-4302. Proposed field activities will be conducted at Naval Weapons Station Seal Beach, Former Underground Storage Tank (UST) Site 229, 800 Seal Beach Boulevard, Seal Beach, California, as part of the Navy's UST Program.

The proposed investigation will include data acquisition from the instrumented LIF probe, soil sampling, and data collection from monitoring wells. No vapor or water extraction is planned and in accordance with the land use controls (LUCs) provided in the Remedial Design Report for the Site 70 Research, Testing, and Evaluation Area, the investigation activities will have no effect on the VOC plume located at Site 70. For reference, a map showing the location of the former UST 229 in relation to the Site 70 buffer zones is attached.

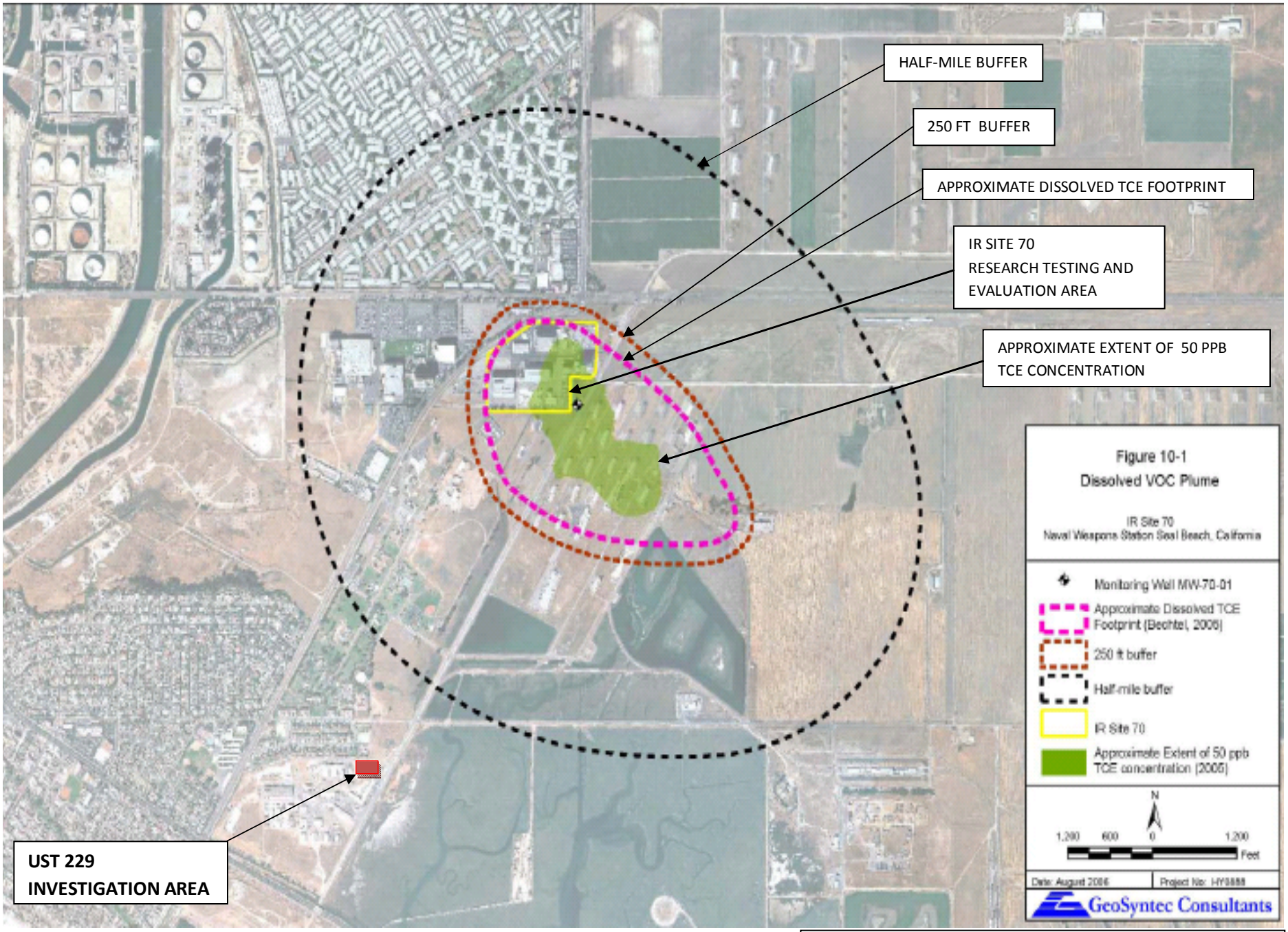
An Application for Well Construction Permit; including a facility location map, proposed well locations figure, Site 70 location including buffer areas, typical SCAPS microwell construction diagram, and groundwater monitoring well construction diagram, are attached.

If you have any questions, please contact Mr. Fred Essig at (858) 496-0500.

Sincerely,

Fred Essig
Senior Environmental Geologist,
P.G. #8407

3710 Ruffin Road • San Diego, California 92123
Tel (858) 496-0500 Fax (858) 496-0505



UST SITE 229 AND IR SITE 70 BUFFER

Richard Brady & Associates
Engineers and Constructors

March 24, 2009

Ms. Patricia Henshaw
County of Orange Health Care Agency
Environmental Health
1241 E. Dyer Road, Suite 120
Santa Ana, California 92705-5611

Subject: Notification of Well Construction
Former Underground Storage Tank Site 229
Naval Weapons Station, Seal Beach, California

Dear Ms. Henshaw:

On March 30, 2009 through May 31, 2009, fifty (50) Site Characterization and Analysis Penetrometer System (SCAPS) cone penetrometer test/laser induced fluoresence (CPT/LIF) pushes will be advanced, and six (6) temporary SCAPS microwells and four (4) permanent groundwater monitoring wells will be installed by Richard Brady & Associates (RBA) for Naval Facilities Engineering Command Southwest, under contract #N68711-03-D-4302. Proposed field activities will be conducted at Naval Weapons Station Seal Beach, Former Underground Storage Tank (UST) Site 229, 800 Seal Beach Boulevard, Seal Beach, California, as part of the Navy's UST Program.

An Application for Well Construction Permit; including a facility location map, proposed well locations figure, typical SCAPS microwell construction diagram, and groundwater monitoring well construction diagram, are attached.

If you have any questions, please contact Mr. Fred Essig at (858) 496-0500.

Sincerely,

Fred Essig
Senior Environmental Geologist,
P.G. #8407

3710 Ruffin Road • San Diego, California 92123
Tel (858) 496-0500 Fax (858) 496-0505

APPLICATION FOR WELL CONSTRUCTION PERMIT

ORANGE COUNTY HEALTH CARE AGENCY
ENVIRONMENTAL HEALTH DIVISION
1241 E. DYER ROAD, SUITE 120
SANTA ANA, CA 92705-4720
(714) 433-6000
FAX: (714) 433-6481

WELL PERMIT NUMBER

CITY: Seal Beach

DATE: March 24, 2009

WELL LOCATION (ADDRESS IF AVAILABLE): Naval Weapons Station Seal Beach UST Site 229

NAME OF WELL OWNER: NAVWPNSTA Seal Beach/ care of Pei-Fen Tamashiro

ADDRESS: 800 Seal Beach Blvd. Bldg. #110

CITY: Seal Beach | ZIP: 90740 | TELEPHONE: 562-626-7897

NAME OF CONSULTING FIRM: Richard Brady & Associates

BUSINESS ADDRESS: 3710 Ruffin Road

CITY: San Deigo | ZIP: 92123 | TELEPHONE: 858-496-0500

NAME OF DRILLING CO.: NAVFAC Southwest - SCAPS

C-57 LICENSE NO.: Exempt - US Navy

CITY: San Diego | ZIP: 92132 | TELEPHONE: 619-532-3176

TYPE OF WELL *(CHECK)*

- PRIVATE DOMESTIC ☐
- PUBLIC DOMESTIC ☐
- IRRIGATION ☐
- CATHODIC ☐
- PROBE SURVEY ☐
- MONITORING ☐
- SOIL BORING ☐
- OTHER See Below ☐
- TOTAL NUMBER 60

NOTE: 50 CPT/LIF, 6 Temp Wells, 4 Permanent Wells

A. WELLS – SUBMIT A WELL CONSTRUCTION DIAGRAM (INCLUDE DIMENSIONS)

B. SOIL BORINGS AND PROBES –
TOTAL DEPTH 30' bgs
SEALING MATERIAL Cement & Bentonite

C. PROPOSED START DATE March 30, 2009

DIAGRAM OF WELL SITE *(Use additional sheets and/or attachments)*

☒ SITE PLAN ATTACHED

I hereby agree to comply in every respect with all requirements of the Health Care Agency and with all ordinances and laws of the County of Orange and of the State of California pertaining to well construction, reconstruction and destruction, including the requirements to maintain the integrity of all significant confining zones.

APPLICANT'S SIGNATURE: [signature] DATE: 3/24/09

PRINT NAME: Fred Essig

PHONE NUMBER: 619-571-2389 FAX NUMBER: 858-496-0505

FOR ACCOUNTING USE ONLY:

HSO NO. _____ CHECK NO. _____

DATE _____ AMOUNT _____

INTL. _____

APPROVAL BY OTHER AGENCIES:

JURISDICTION _____

REMARKS _____

AUTHORIZED SIGNATURE _____ DATE _____

DISPOSITION OF PERMIT (DO NOT FILL IN):

☐ **APPROVED** SUBJECT TO THE FOLLOWING CONDITIONS:

A. NOTIFY THIS AGENCY AT LEAST **48 HOURS**

☐ PRIOR TO START.

☐ PRIOR TO SEALING THE ANNULAR SPACE OR FILLING OF THE CONDUCTOR CASING.

B. ☐ SUBMIT TO THE AGENCY WITHIN 30 DAYS AFTER COMPLETION OF WORK, A WELL COMPLETION REPORT AND/OR DRILLING LOGS. PLEASE REFERENCE PERMIT NO.

C. ☐ SECURE ALL MONITORING WELLS TO PREVENT TAMPERING.

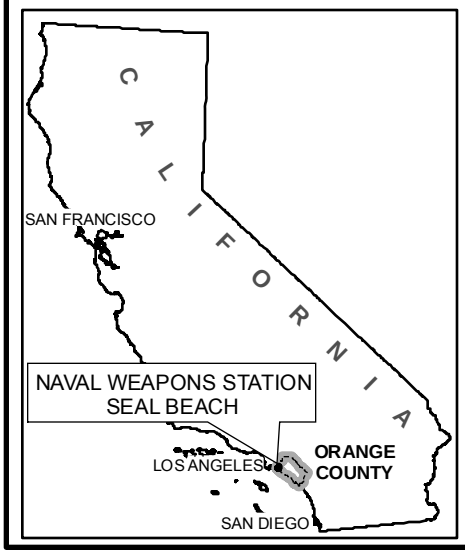
D. ☐ OTHER _____

☐ **DENIED** _____

PERMIT ISSUED BY _____ DATE _____

PRINT NAME _____ PHONE NUMBER _____

WHEN SIGNED BY ORANGE COUNTY HEALTH CARE AGENCY REPRESENTATIVE, THIS APPLICATION IS A PERMIT.



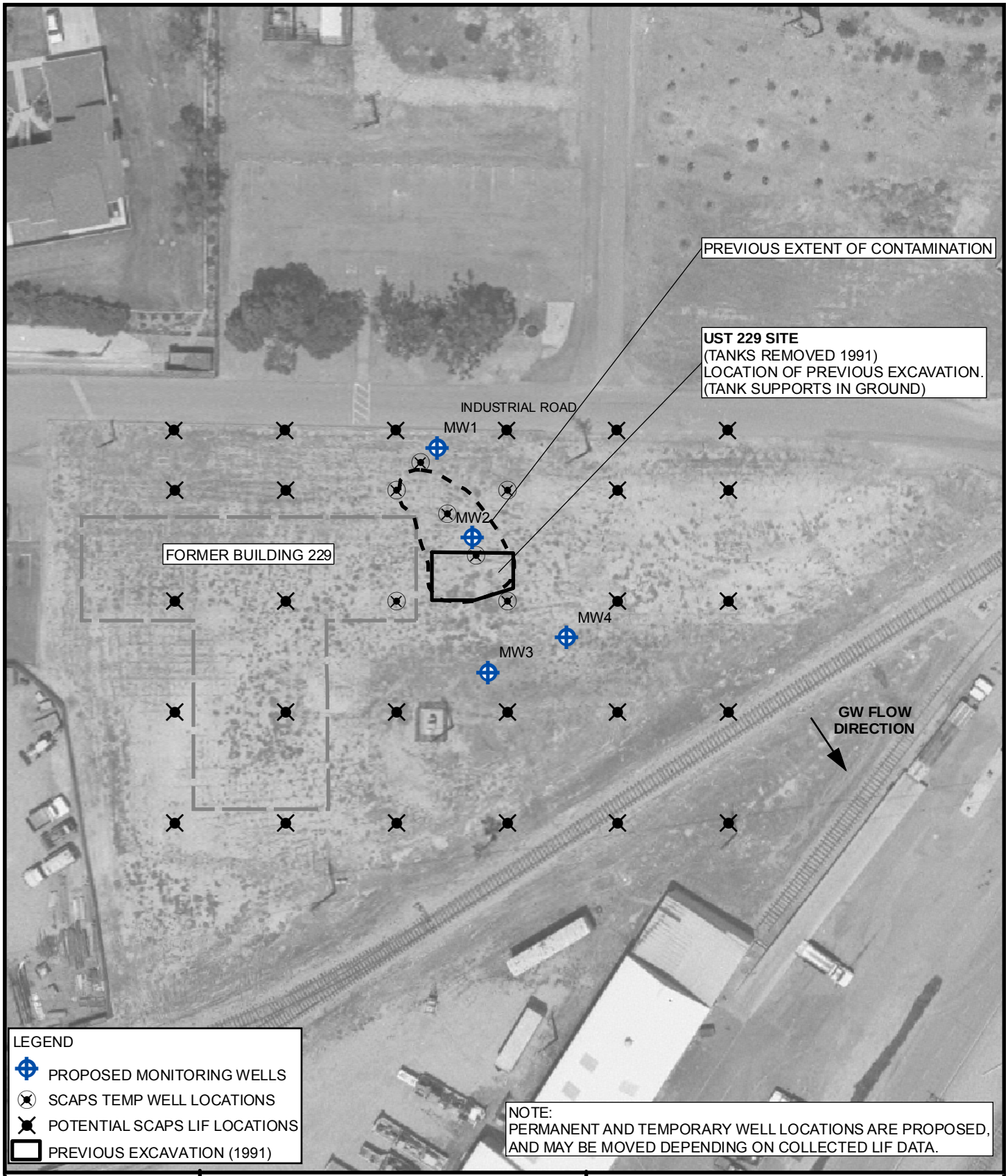
FACILITY LOCATION MAP

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

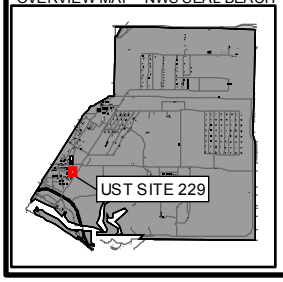
Richard Brady and Associates
Engineering and Construction
3710 Ruffin Road
San Diego California 92123
Telephone 858.496.0500 Fax 858.496.0505

DATE: Oct 29, 2008
FILE: SealBch FacLocMap

FIGURE: 1



OVERVIEW MAP - NWS SEAL BEACH



N

0 60 120

FEET

MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 6, SURVEY FEET

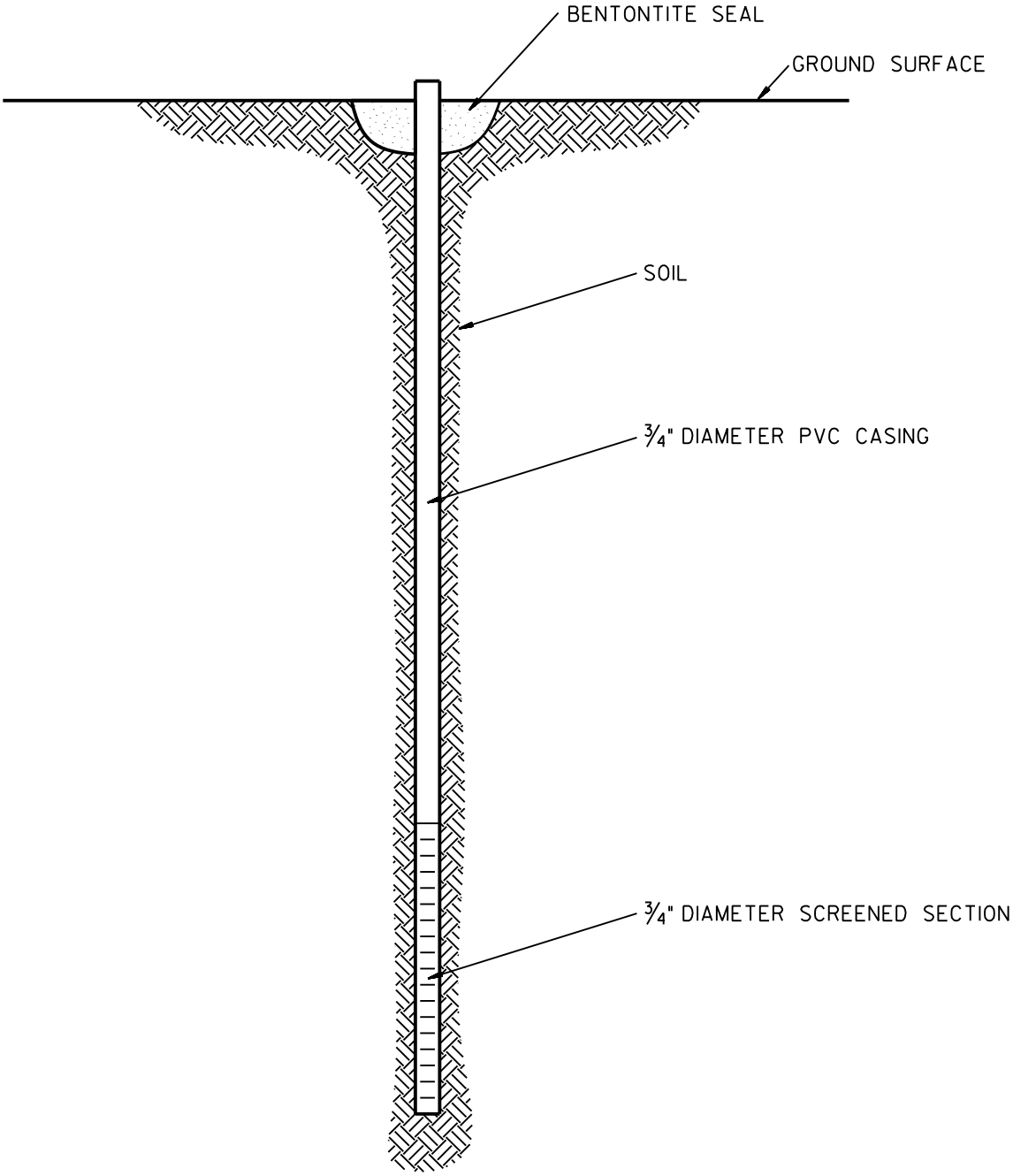
PROPOSED WELL LOCATIONS

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CALIFORNIA

Richard Brady and Associates
Engineering and Construction
3710 Ruffin Road
San Diego California 92123
Telephone 858.496.0500 Fax 858.496.0505

DATE: Jan 23, 2009
FILE: Permit2_UstSite229_PropLoc_090123

FIGURE: 2



"DRAWING NOT TO SCALE"

TYPICAL SCAPS MICROWELL
CONSTRUCTION DIAGRAM

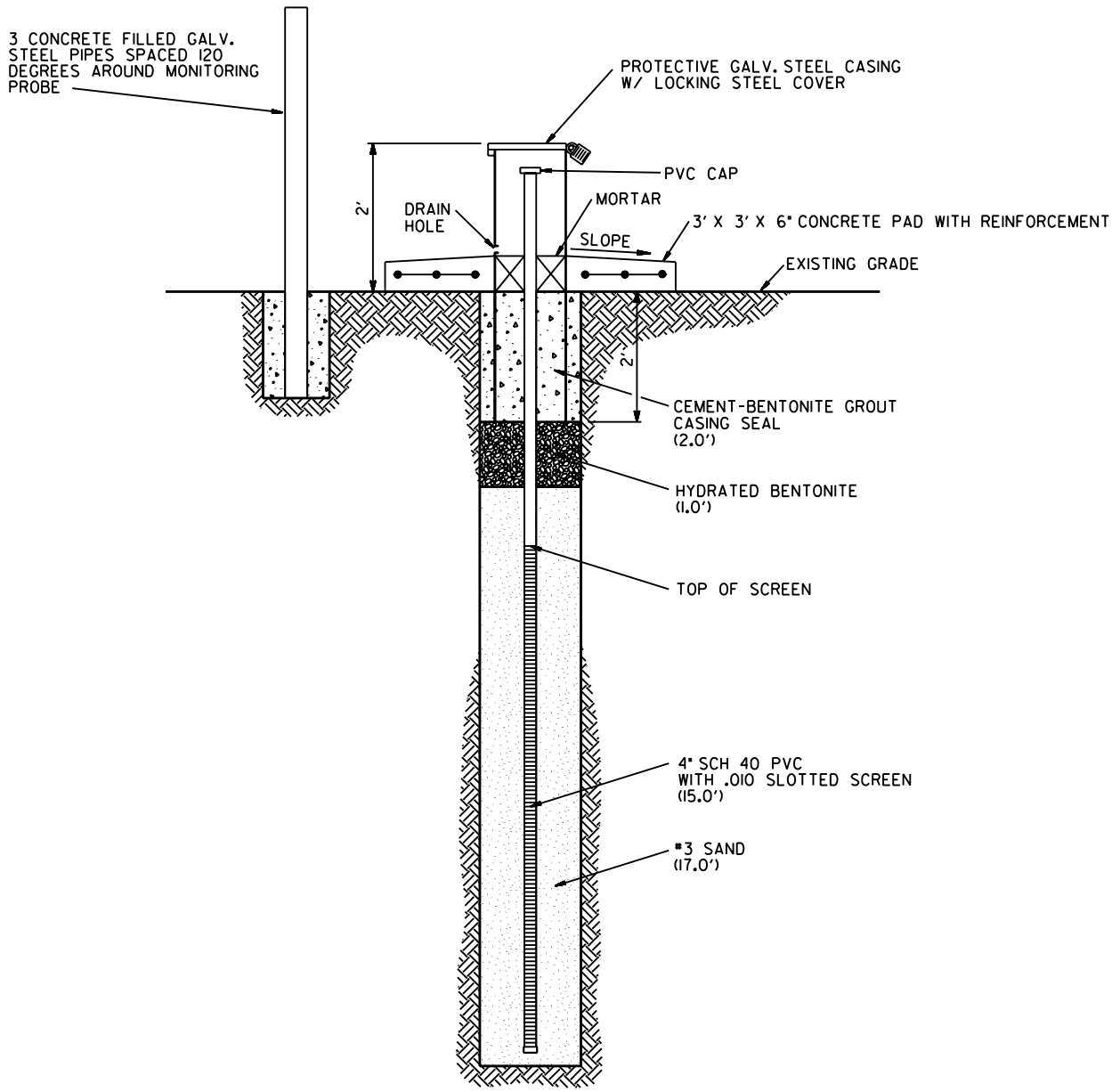
UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CA

Richard Brady & Associates
Engineering and Construction
3710 Ruffin Road
San Diego California 92123

Date: 1/23/09
File No. SCAPS_Microwell

FIGURE 3

"DRAWING NOT TO SCALE"



GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM

UST SITE 229
NAVAL WEAPONS STATION SEAL BEACH
SEAL BEACH, CA

Richard Brady & Associates
Engineering and Construction
3710 Ruffin Road
San Diego California 92123

Date: 1/23/09
File No. Permit4_ Monitoring Well

FIGURE 4

BRADY

June 22, 2010

Dan Yokoyama,
Orange County Environmental Health
241 East Dyer Road Suite 120
City of Santa Ana, CA 92705-5611

RE: Wells installed at Naval Weapons Station Seal Beach Site 229.

Dear Mr. Yokoyama,

On July 21 and 30, 2009, as part of an environmental investigation, four groundwater monitoring wells were installed at Site 229 on Naval Weapons Station Seal Beach. The two-inch diameter groundwater monitoring wells were installed to depths ranging from approximately 14.5 to 16 feet bgs.

Soil samples were collected for soil description purposes only and chemical analysis was not performed. Well construction details and lithologic descriptions are included on the attached well drilling logs.

If you have further questions, please contact me at 619-571-2389.

Sincerely,

Fred Essig
Senior Environmental Geologist
BRADY

BOREHOLE AND WELL LOG LEGEND	NWS SEAL BEACH UST 229	*Richard Brady & Associates* *Engineering and Construction*

GENERAL SYMBOLS

Depth to water below top of well casing

Split-spoon soil sample interval

LITHOLOGIC SYMBOLS:

SW	Well-graded sand
SP	Poorly-graded sand
SM	Silty sand
ML	Silt (slight plasticity)
MH	Silt (inorganic, high plasticity)
SP/SM	Silty sand to poorly-graded sand

MONITORING WELL SYMBOLS:

Casing, 2-inch diameter schedule 40 PVC

Screen, 0.010-inch slotted, 2-inch diameter schedule 40 PVC

Filter pack, #2/16 sand

Grout seal, medium bentonite chips (hydrated)

Surface seal, concrete

LOG OF MONITORING WELL

NWS SEAL BEACH
UST 229

Richard Brady & Associates
Engineering and Construction

		DATUM: NAVD 1988 / NAD 1983	DATE FINISHED: 21-Jul-09
BORING/WELL LOCATION:	SB229-MW01	CASING ELEVATION (ft msl): 12.199	SURFACE ELEV. (ft msl): 12.398
DRILLING CONTRACTOR:	TEST AMERICA	NORTHING: 2219079.38	EASTING: 6003027.76
DRILLING METHOD:	HOLLOW STEM AUGER	WELL DEPTH (ft bgs): 15.8	SCREEN INTERVAL (ft bgs): 5.8 to 15.8
SAMPLING METHOD:	CUTTINGS AND SPLIT SPOON	LOGGED BY: HUNTER BUTLER, PG	CHECKED BY: SHANE DEGROSS, PG

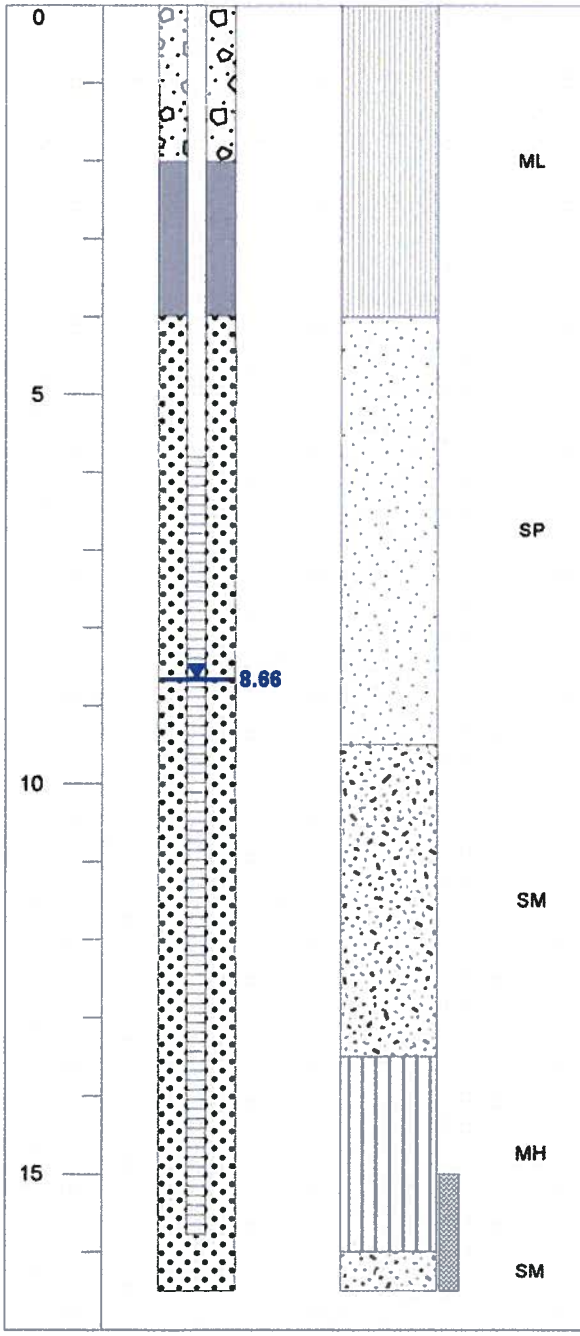
Depth to water in feet below top of casing on 8/6/09

Split-spoon soil sample interval

Note: refer to legend cover sheet for lithologic and well construction symbol descriptions

WELL CONSTRUCTION DETAILS:
Casing: 2-inch diameter Sch. 40 PVC, screen with 0.010 inch slots, end cap
Surface Seal: Concrete
Grout Seal: Medium bentonite chips (hydrated)
Filter Pack: #2/16 sand

Surface completion consists of a flush-mounted 12-inch well box set in a 2x2 foot concrete pad



DEPTH IN FEET (BGS)	USCS CODE	DESCRIPTION
0	ML	Sandy SILT: dark yellowish brown (10YR4/6); medium to very fine sand, trace coarse sand, fine gravel to 7mm, loose, damp, no odor (PID = 0 ppm)
5	SP	SAND: dark yellowish brown (10YR4/6); fine to very fine grained, well sorted, trace fines, loose, compactable, moist, no odor (PID = 0 ppm)
		SAND: dark yellowish brown (10YR3/6); medium to very fine grained, moderately sorted, trace coarse sand, trace fines, compactable, moist, slight odor (PID = 0 ppm)
10	SM	SILTY SAND: olive (5Y4/3); fine to very fine grained, well sorted, some fines, slightly plastic, soft, moist to wet, moderately weathered fuel odor (PID = 10 ppm)
		SILTY SAND: dark greenish gray (5GY4/1); very fine sand, very well sorted, some fines, slightly plastic, wet to saturated, weathered fuel odor (PID = 80 ppm)
15	MH	Sandy SILT: dark greenish gray (5GY4/1); some very fine sand, moderately plastic, soft, wet to saturated, weathered fuel odor (PID = 25 ppm); split spoon sample for lithologic description only collected at 15 to 16.5 feet (blow counts: 35-41-44)
	SM	SILTY SAND: dark yellowish brown (10YR4/4); medium to very fine grained, some fines, firm, slightly plastic, moist, no odor (PID = 0 ppm)

LOG OF MONITORING WELL

NWS SEAL BEACH
UST 229

Richard Brady & Associates
Engineering and Construction

		DATUM: NAVD 1988 / NAD 1983	DATE FINISHED: 21-Jul-09
BORING/WELL LOCATION:	SB229-MW02	CASING ELEVATION (ft msl): 12.539	SURFACE ELEV. (ft msl): 12.829
DRILLING CONTRACTOR:	TEST AMERICA	NORTHING: 2219056.78	EASTING: 6002991.22
DRILLING METHOD:	HOLLOW STEM AUGER	WELL DEPTH (ft bgs): 15	SCREEN INTERVAL (ft bgs): 5 to 15
SAMPLING METHOD:	CUTTINGS AND SPLIT SPOON	LOGGED BY: HUNTER BUTLER, PG	CHECKED BY: SHANE DEGROSS, PG

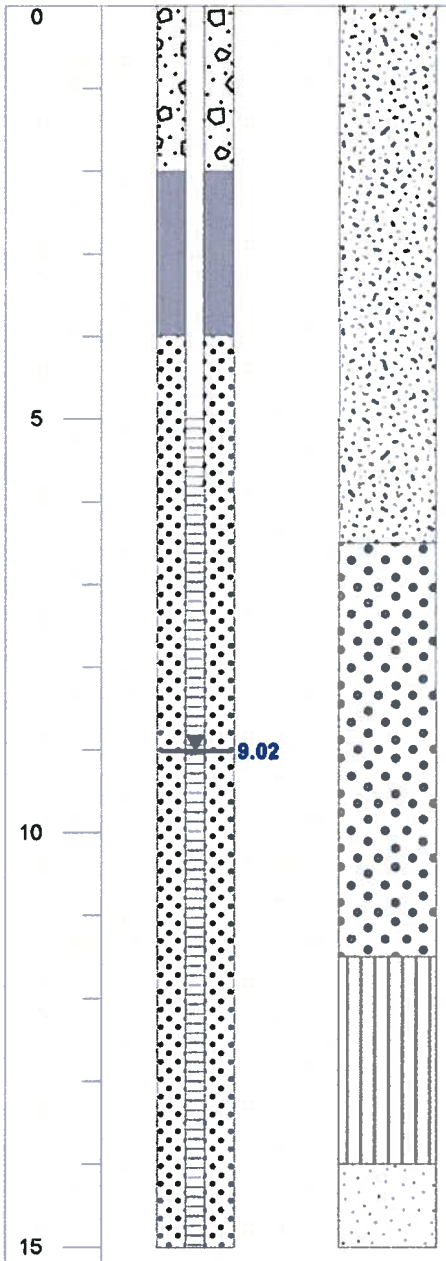
Depth to water in feet below top of casing on 8/6/09

Split-spoon soil sample interval

Note: refer to legend cover sheet for lithologic and well construction symbol descriptions

WELL CONSTRUCTION DETAILS:
Casing: 2-inch diameter Sch. 40 PVC, screen with 0.010 inch slots, end cap
Surface Seal: Concrete
Grout Seal: Medium bentonite chips (hydrated)
Filter Pack: #2/16 sand

Surface completion consists of a flush-mounted 12-inch well box set in a 2x2 foot concrete pad



DEPTH IN FEET (BGS)	USCS CODE	DESCRIPTION
0	SM	SAND: dark yellowish brown (10YR4/6); medium to very fine grained, some fines, moderately well-sorted, loose, moist, no odor (PID = 0 ppm)
5		As above; dark yellowish brown (10YR4/4); slight odor (PID = 0 ppm)
9.02	SW	SAND: dark yellowish brown (10YR3/6); medium to very fine grained, trace fines, poorly sorted, loose, compactable, moist, no odor (PID = 0 ppm)
10	MH	Sandy SILT: olive gray (5Y4/2); some very fine sand, slightly plastic, soft, moist to wet, weathered fuel odor (PID = 1.2 ppm)
15	SP	As above; grades to very fine well sorted sand, loose, compactible, wet to saturated, weathered fuel odor (PID = 0.6 ppm)

LOG OF MONITORING WELL

		NWS SEAL BEACH UST 229	*Richard Brady & Associates* *Engineering and Construction*
		DATUM: NAVD 1988 / NAD 1983	DATE FINISHED: 21-Jul-09
BORING/WELL LOCATION:	SB229-MW03	CASING ELEVATION (ft msl): 11.014	SURFACE ELEV. (ft msl): 11.459
DRILLING CONTRACTOR:	TEST AMERICA	NORTHING: 2219011.00	EASTING: 6003086.85
DRILLING METHOD:	HOLLOW STEM AUGER	WELL DEPTH (ft bgs): 14.5	SCREEN INTERVAL (ft bgs): 4.5 to 14.5
SAMPLING METHOD:	CUTTINGS AND SPLIT SPOON	LOGGED BY: HUNTER BUTLER, PG	CHECKED BY: SHANE DEGROSS, PG

Depth to water in feet below top of casing on 8/6/09

Split-spoon soil sample interval

Note: refer to legend cover sheet for lithologic and well construction symbol descriptions

WELL CONSTRUCTION DETAILS:
Casing: 2-inch diameter Sch. 40 PVC, screen with 0.010 inch slots, end cap
Surface Seal: Concrete
Grout Seal: Medium bentonite chips (hydrated)
Filter Pack: #2/16 sand

Surface completion consists of a flush-mounted 12-inch well box set in a 2x2 foot concrete pad

DEPTH IN FEET (BGS)	WELL LOG	LITHOLOGY	USCS CODE	DESCRIPTION
0			SW	SAND: dark yellowish brown (10YR3/4); coarse to very fine grained, trace fines, moderately sorted, loose, compactable, moist, no odor (PID = 0 ppm)
5			SM	SILTY SAND: dark brown (10YR3/3); coarse to very fine grained, some fines, moderately sorted, loose, slightly plastic, moist, slight odor (PID = 0 ppm)
	7.64		ML	Sandy SILT: dark olive brown (2.5Y3/3); some medium to very fine sand, moderately plastic, firm, moist, slight odor (PID = 0 ppm)
10			SM	SILTY SAND: dark greenish gray (5GY4/1); medium to very fine grained, some fines, moderately well sorted, slightly plastic, wet to saturated, weathered diesel odor (PID = 0.9 ppm)
			SP/SM	SILTY SAND: dark yellowish brown (10YR4/4); fine to very fine grained, well sorted, trace coarse and medium sand, compactable, slightly plastic, wet, slight odor (PID = 0 ppm)
			SP	SAND: dark yellowish brown (10YR4/4); fine to very fine grained, well sorted, trace coarse and medium sand, trace to little fines, compactable, slightly plastic, wet, slight odor (PID = 0 ppm)
15				

LOG OF MONITORING WELL

		NWS SEAL BEACH UST 229	*Richard Brady & Associates* *Engineering and Construction*
		DATUM: NAVD 1988 / NAD 1983	DATE FINISHED: 30-Jul-09
BORING/WELL LOCATION:	SB229-MW04	CASING ELEVATION (ft msl): 12.434	SURFACE ELEV. (ft msl): 12.507
DRILLING CONTRACTOR:	TEST AMERICA	NORTHING: 2219119.88	EASTING: 6002990.98
DRILLING METHOD:	HOLLOW STEM AUGER	WELL DEPTH (ft bgs): 16	SCREEN INTERVAL (ft bgs): 6 to 16
SAMPLING METHOD:	CUTTINGS AND SPLIT SPOON	LOGGED BY: STEVE BLANCHARD, PG	CHECKED BY: SHANE DEGROSS, PG

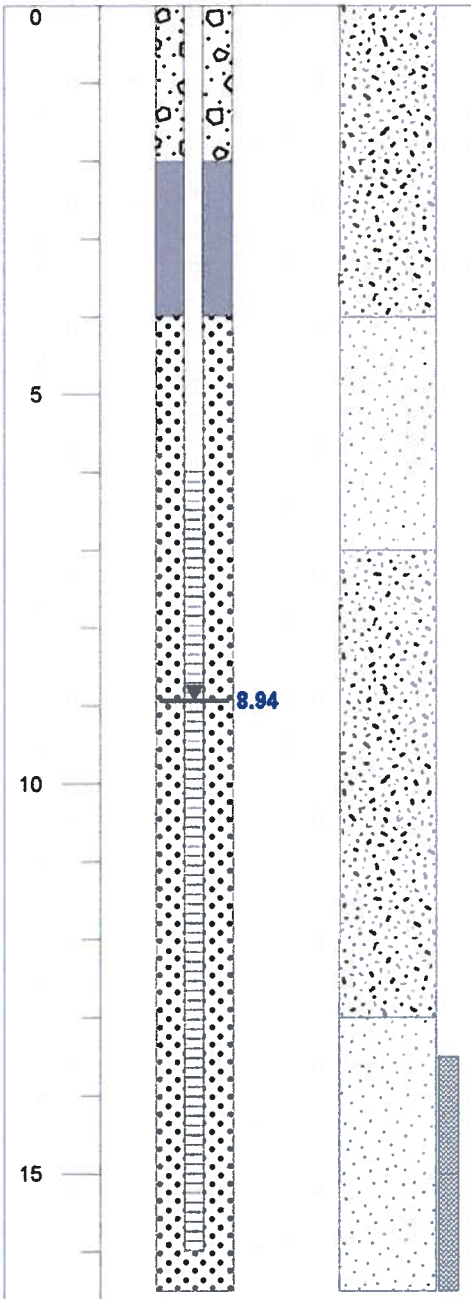
Depth to water in feet below top of casing on 8/6/09

Split-spoon soil sample interval

Note: refer to legend cover sheet for lithologic and well construction symbol descriptions

WELL CONSTRUCTION DETAILS:
Casing: 2-inch diameter Sch. 40 PVC, screen with 0.010 inch slots, end cap
Surface Seal: Concrete
Grout Seal: Medium bentonite chips (hydrated)
Filter Pack: #2/16 sand

Surface completion consists of a flush-mounted 12-inch well box set in a 2x2 foot concrete pad



DEPTH IN FEET (BGS)	USCS CODE	DESCRIPTION
0	SM	SILTY SAND: brown (10YR4/3); fine to medium grained sand, trace to some coarse sand, dry to slightly moist, no odor (PID = 0 ppm)
5	SP	SAND: dark yellowish brown (10YR4/6); fine to coarse grained, trace to some fines, slightly moist, no odor (PID = 0 ppm)
		Clayey SILTY SAND: dark grayish brown (10YR4/2); fine to medium grained sand, moist, no odor (PID = 0 ppm)
10	SM	At 9 feet, as above except: olive gray (5Y4/2); possible grayish staining, slight odor (PID = 4.2 ppm)
		At 11 feet, becomes SILTY SAND: olive brown (2.5Y4/3); no clay, fine grained with some medium grained sand, saturated, no staining, no odor (PID = 1.2 ppm)
15	SP	SAND: dark grayish brown (2.5Y4/2); fine to medium grained, trace silt, finely laminated, micaceous, wet to saturated, no odor (PID = 0 ppm); split spoon samples for lithologic description only collected at 13.5 to 15 feet, and 15 to 16.5 feet

Appendix C

Field Documentation

Sampling Identification & Analyses Form

COC#	Sample ID	Station ID	Time	Date	Sample Analysis: BTEX/Naph (8260B)	PAHs (8270C-SIM)	TPH-d (8015M)	BTEX/Naph (8260B)	VOCs (8260B)	SVOCs (8270C)					COMMENTS
#1	SB229-08-W-01	SB229-08	0840	4/29/09	X										QCTB (Blind)
	SB229-08-S-01	SB229-08	0905		X	X	X								MS/MSD
	SB229-01-S-01	SB229-01	0950		X	X	X								5.0'-6.5' bgs
	SB229-01-S-02	SB229-01	1005		X	X	X								11.0'-12.5' bgs
	SB229-02-S-01	SB229-02	1053		X	X	X								
	SB229-02-W-01	SB229-02	1125		X	X	X								QCEB (Blind)
	SB229-02-W-02	SB229-02	1135		X	X	X								QCFB (Blind)
	SB229-10-S-01	SB229-10	1221		X	X	X								
	SB229-21-S-01	SB229-21	1320		X	X	X								
	SB229-19-S-01	SB229-19	1355		X	X	X								
#2	SB229-IDW	IDW	1500					X	X						IDW (H_2O) Sample

Sampling Identification & Analyses Form

COC#	Sample ID	Station ID	Time	Date	PAHs (8270C-SIM LOW)	TPH-D (8015M)								COMMENTS
					Sample Analysis									
01	SB229MW2-3Q09-GW01	/SB229-MW02	1200	08.06.09	X	X								MS/MSD
	SB229MW2-3Q09-GW02	/SB229-MW02	1300		X	X								Source Blank
	SB229MW2-3Q09-GW03	/SB229-MW02	1305		X	X								Equipment Blank
	SB229MW4-3Q09-GW01	/SB229-MW04	1525		X	X								
	SB229MW4-3Q09-GW02	/SB229-MW04	1540		X	X								Dup
	SB229MW3-3Q09-GW01	/SB229-MW03	0918	08.07.09	X	X								
	SB229MW3-3Q09-GW02	/SB229-MW03	0945		X	X								Equipment Blank *3 Ambers u
	SB229MW1-3Q09-GW01	/SB229-MW01	1135		X	X								
02	BSW-14-6-3Q09-GW01	BSW-14-6	1310		X	X								
	BSW-14-4-3Q09-GW01	BSW-14-4	1455		X	X								

Sampling Identification & Analyses Form

COC#	Sample ID	Station ID	Time	Date	Sample Analysis: TPH-D	Sample Analysis: PAHs								COMMENTS
01	SB229MW2-4Q09-GW01	SB229MW02	1022	11/12/09	X	X								QC level 3
01	SB229MW4-4Q09-GW01	SB229-MW04	1156	↓	X	X								QC level 3 / MS/MSD
01	SB229MW3-4Q09-GW01	SB229-MW03	1337	↓	X	X								QC level 3
01	SB229MW3-4Q09-GW02	↓	1347	↓	X	X								Dup / QC level 3
01	SB229MW1-4Q09-GW01	SB229-MW1	1515	↓	X	X								QC level 4
01	SB229MW1-4Q09-GW02	↓	1535	↓	X	X								Source Blank / QC level 3
01	SB229MW1-4Q09-GW03	↓	1545	↓	X	X								Equipment rinsate / QC level 3
01	~~SB229M~~ BSW-14-6-4Q09-GW01	BSW-14-6	0906	11/13/09	X	X								QC level 3
01	BSW-14-4-4Q09-GW01	BSW-14-4		↓	X	X								QC level 3
01	BSW-14-4-4Q09-GW02	↓		↓	X	X								QC level 3 / Equip. Rinsate
002	SB229MW2-3Q10-GW01	SB229MW02	1105	07/29/10	X	X								MS/MSD
002	SB229MW4-3Q10-GW01	SB229 MW04	1331	↓	X	X								QC Level 4
↓	SB229MW4-3Q10-GW02	SB229 MW04	1345	↓	X	X								Dup
↓	SB229MW3-3Q10-GW01	SB229 MW03	1525	↓	X	X								
↓	SB229MW1-3Q10-GW01	SB229 MW01	1639	↓	X	X								
↓	SB229MW1-3Q10-GW02	SB229MW01	1702	↓	X	X								Equipment Rinsate
↓	BSW-14-6-3Q10-GW01	BSW-14-6	0910	07/20/10	X	X								
↓	BSW-14-4-3Q10 GW02	↓	1134											Source Blank

Sampling Identification & Analyses Form

COC#	Sample ID	Station ID	Time	Date	TPH-D (8015-M)	PAH (8270C SIM Low)									COMMENTS
					Sample Analysis										
002	BSW-14-4-3Q10-GW03	BSW-14-4	1142	7/20/10	X	X									Equipment Rinsate
002	BSW-14-4-3Q10-GW01	⊥	1110	⊥	X	X									
0005	SB229MW2-4Q10-GW01	SB229 MW2	1005	12/8/2010	X	X									MS/MSD
	SB229MW1-4Q10-GW01	SB229 MW1	1205		X	X									
	SB229MW4-4Q10-GW01	SB229MW4	1445		X	X									
	SB229MW4-4Q10-GW02		1510		X	X									Equipment Rinsate
	SB229MW4-4Q10-GW03	⊥	1515	⊥	X	X									source Blank
	BSW-14-6-4Q10-GW01	BSW-14-6	1040	12/9/2010	X	X									
	BSW-14-6-4Q10-GW02	⊥	1100		X	X									Equipment Rinsate
	BSW-14-4-4Q10-GW01	BSW-14-4	1215		X	X									
	BSW-14-4-4Q10-GW02	⊥	1225		X	X									dup.
⊥	SB229MW3-4Q10-GW01	SB229MW3	0915	⊥	X	X									

Well Development Record

Richard Brady & Associates
Engineering and Construction

Project Name	Well Number
NUSS SEAL BEACH NAS 229	SB229-MW02

PROJECT NUMBER	PREPARED BY
SHAROUL.004.009.00	H. BUTLER / S Blanchard (8/3/09)

PURGING CRITERIA: <10 NTU, 3-5 WELL VOL.

PURGE METHOD	TOTAL VOL REMOVED	TOTAL HOURS
SURGING	0	0.5
BAILER	47	
PUMP	18	
OTHER		

DATE STARTED: 07.23.09 DATE COMPLETED:

WEATHER: PARTIALLY CLOUDY - 80% - W - 5 MPH

TEMPERATURE: 80+°

SUBCONTRACTOR: TEST AMERICA

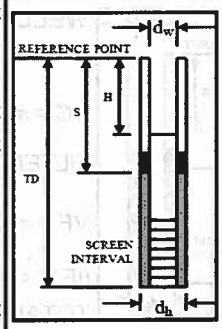
BOREHOLE DIAM d_h = 0.67 ft

WELL CASING:
INSIDE DIAM d_wID= 0.17 ft
OUTSIDE DIAM d_wOD= 0.20 ft

REF POINT: ground surface/TOC

DEPTH TO:
WATER LEVEL H= 8.61 ft
BASE OF SEAL S= 4.0 ft
TOP OF SCREEN 5.8 ft
BASE OF SCREEN 15.5 ft
BASE OF WELL TD= 15.8 ft
DTB - 14.68

ESTIMATED FILTER PACK PORSITY P= 30%



WELL VOLUME CALCULATION

CASING VOLUME (VC)

$$VC = \pi\left(\frac{d_wID}{2}\right)^2(TD - H) = 0.62 \text{ ft}^3$$

FILTER PACK PORE VOLUME (VF)

$$VF = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_wOD}{2}\right)^2\right](TD - SorH)(P) = 0.88 \text{ ft}^3$$

(IF S < H, USE H. IF S > H, USE S)

TOTAL WELL VOLUME (VT)

$$VT = VC + VF = 0.89 \text{ ft}^3$$

$$\text{ft}^3 \times \frac{7.48 \text{ gallons}}{\text{ft}^3} = 6.27 \text{ gallons}$$

×3 = 18.83
×5 = 31.4
WELL INSTALL → ADD 3 GAL

PURGING DATA				TOTAL WATER REMOVED		FIELD PARAMETERS				COMMENTS
Time Begin (hrs)	Time Finish (hrs)	Method	Water Removed (Gal)	Gal	Well Vols	pH	Conduct (umhos)	~~Temp (°C)~~	Turbidity (visual/NTU)	
1448	1518	SURGE	0							
1519		BAILER	0	0						- SCREEN OK 1ST REDEVELOP
1531			5	5	1			CLEAR	1.62	DIESEL ODOR
1538			10	10	2			CLEAR	107.3	
1551			17	17	3				916.5	
1603			25	25	4				833.4	
1610		PUMP	30	30	5				244.6	
1620			35	35	5.6				566.0	* DRIVER STOPPED - BASE HOURS
8/3/09										
1419	1425	bailer	5	5	0.8				340	DTW=8.50, TD=15.5
1425	1434	↓	7	12	1.91				635	Sheen on water.
1436	1441	pump	8	20	3.19	6.88	0.71	25.0°C	66/22	2" pump
1441	1446		5	25	3.99	6.65	0.71	24.26	125/25	
1446	1451		5	30	4.78	6.67	0.72	23.7	144/15.3	driller Turb. 38.8
	Total		65 gal	30.4 gal	9.4 vols					

Turb. drop

Well Development Record

Richard Brady & Associates
Engineering and Construction

Project Name	Well Number
NWS SEAL BEACH LOT 229	SB 229-MW02

PROJECT NUMBER	PREPARED BY
SHAWM.001.009.00	G. BUSER

PURGING CRITERIA < 10 NTU
3-5 WELL VOLUMES

PURGE METHOD	TOTAL VOL REMOVED	TOTAL HOURS
SURGING	0	0.5
BAILER	379	1.5
PUMP	–	–
OTHER	–	–

DATE STARTED 07-23-09 DATE COMPLETED 07-23-09

WEATHER AM PTLY CLDY - 05-10W - 40 70+%

TEMPERATURE AM 70°

SUBCONTRACTOR TEST AMERICA

BOREHOLE DIAM d_h = 0.67 ft

WELL CASING:

INSIDE DIAM d_wID= 0.17 ft

OUTSIDE DIAM d_wOD= 0.20 ft

REF POINT: ground surface/TOC

DEPTH TO:

WATER LEVEL H= 9.05 ft

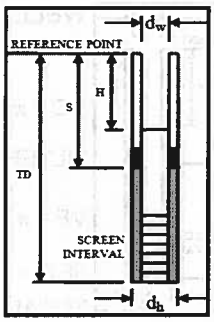
BASE OF SEAL S= 4.0 ft

TOP OF SCREEN 5.0 ft

BASE OF SCREEN 14.72 ft

BASE OF WELL TD= 15.07 ft

ESTIMATED FILTER PACK PORSITY P= 30%



WELL VOLUME CALCULATION

CASING VOLUME (VC)

$$VC = \pi\left(\frac{d_wID}{2}\right)^2(TD - H) = 0.136 \text{ ft}^3$$

FILTER PACK PORE VOLUME (VF)

$$VF = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_wOD}{2}\right)^2\right](TD - SorH)(P) = 0.57 \text{ ft}^3$$

(IF S < H, USE H. IF S > H, USE S)

TOTAL WELL VOLUME (VT)

$$VT = VC + VF = 0.71 \text{ ft}^3$$

$$\text{ft}^3 \times \frac{7.48 \text{ gallons}}{\text{ft}^3} = 5.28 \text{ gallons}$$

x3 => 15.84
x5 => 26.4

WELL INSTALL => ADD 3 GALS

PURGING DATA				TOTAL WATER REMOVED		FIELD PARAMETERS				COMMENTS
Time Begin (hrs)	Time Finish (hrs)	Method	Water Removed (Gal)	Gal	Well Vols	pH	Conduct (µmhos)	Temp (°C)	Turbidity (visual/NTU)	
0930	1000	SURGE	0							
1002		BAILER	0							
1012			5	5	1				87.55	OPAQUE
1022			10	10	2				741.4	
1036			15	15	3				821.6	
1048			20	20	4				521.1	
1100			25	25	5				522.3	
1120			30	30	6				348.2	
1128			35	35					269.7	
1126			37	37	7				125.5	

07-27-09

Well Development Record

Richard Brady & Associates
Engineering and Construction

Project Name	Well Number
NAVS SAN BEACH LST 229	SB229-MW03

PROJECT NUMBER	PREPARED BY
SHAWN.001.009.00	H. BATLER

PURGING CRITERIA 2 VOL METH
3-5 WELL VOLUMES

PURGE METHOD	TOTAL VOL REMOVED	TOTAL HOURS
SURGING	0	0.5
BAILER	40	1.5
PUMP		
OTHER		

DATE STARTED 07.23.09 DATE COMPLETED 07.23.09

WEATHER PM-CLEAR/WINDY - 80% - W-5-10M

TEMPERATURE 80°

SUBCONTRACTOR TESTAMERICA

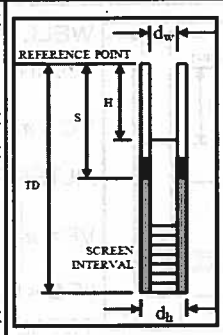
BOREHOLE DIAM d_h = 0.67 ft

WELL CASING:
INSIDE DIAM d_wID= 0.17 ft
OUTSIDE DIAM d_wOD= 0.20 ft

REF POINT: ground surface/TOC

DEPTH TO:
WATER LEVEL H= 2.55 ft
BASE OF SEAL S= 3.5 ft
TOP OF SCREEN 4.5 ft
BASE OF SCREEN 14.2 ft
BASE OF WELL TD= 14.55 ft

ESTIMATED FILTER PACK PORSITY P= 30%



WELL VOLUME CALCULATION

CASING VOLUME (VC)

$$VC = \pi\left(\frac{d_wID}{2}\right)^2(TD - H) = 0.158 \text{ ft}^3$$

FILTER PACK PORE VOLUME (VF)

$$VF = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_wOD}{2}\right)^2\right](TD - SorH)(P) = 0.659 \text{ ft}^3$$

(IF S < H, USE H. IF S > H, USE S)

TOTAL WELL VOLUME (VT)

$$VT = VC + VF = 0.82 \text{ ft}^3$$

$$\text{ft}^3 \times \frac{7.48 \text{ gallons}}{\text{ft}^3} = 6.11 \text{ gallons}$$

x 3 = 18.3
x 5 = 30.5

WELL INSTALL ⇒ ADD 3 GAL

PURGING DATA				TOTAL WATER REMOVED		FIELD PARAMETERS				COMMENTS
Time Begin (hrs)	Time Finish (hrs)	Method	Water Removed (Gal)	Gal	Well Vols	pH	Conduct (µmhos)	Temp (°C)	Turbidity (visual/NTU)	
1218	1248	SURGE	0							
1248		BAILER								
1301			5	5	1				90.34	OPAQUE
1303			10	10	2				1100+	
1324			15	15					1100+	
1336			20	20	3				483.4	
1348			25	25	4				233.2	
1401			30	30	5				140.8	
1413			35	35	6				164.6	
1425			40	40					201.9	

Well Development Record

Richard Brady & Associates
Engineering and Construction

Project Name	NWS Seal Beach UST 229
Well Number	SB229-MW04 New (replacement)
PROJECT NUMBER	
PREPARED BY	S. Blanchard
PURGING CRITERIA	<10NTU; 3-5 well vols.
DATE STARTED	8/3/09
DATE COMPLETED	8/3/09
WEATHER	Sunny, breezy, high 70s
TEMPERATURE	high 70s
SUBCONTRACTOR	Test America, Smeal rig

PURGE METHOD	TOTAL VOL REMOVED	TOTAL HOURS
SURGING	0	↓
BAILER	22	↓
PUMP	28	1.5
OTHER	—	—

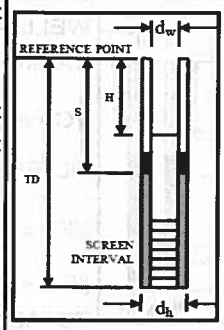
BOREHOLE DIAM d_h = 0.67 ft

WELL CASING:
INSIDE DIAM d_wID = 0.17 ft
OUTSIDE DIAM d_wOD = 0.20 ft

REF POINT: ground surface/TOC

DEPTH TO:
WATER LEVEL H= 8.94 ft
BASE OF SEAL S= 4.0 ft
TOP OF SCREEN = 6 ft
BASE OF SCREEN = 16 ft
BASE OF WELL TD= ~~16.9~~ 16.4 ft

ESTIMATED FILTER PACK PORSITY P= 30%



WELL VOLUME CALCULATION

CASING VOLUME (VC)

$VC = \pi \left(\frac{d_wID}{2}\right)^2 (TD - H)$ (0.17, 16.4-8.94) = 0.17 ft³

FILTER PACK PORE VOLUME (VF)

$VF = \pi \left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_wOD}{2}\right)^2\right](TD - So(H))(P)$ (0.67, 0.2, 16.4-8.94 (0.3), 0.335, 0.1, 7.46) = 0.72 ft³

(IF S < H, USE H. IF S > H, USE S)

TOTAL WELL VOLUME (VT)

VT = VC + VF = 0.89 ft³

0.89 ft³ x 7.48 gallons / ft³ = ~~6.7~~ 6.65 gallons 8/3/11/09

During well install, added 5 gal D.I. water

PURGING DATA				TOTAL WATER REMOVED		FIELD PARAMETERS				COMMENTS
Time Begin (hrs)	Time Finish (hrs)	Method	Water Removed (Gal)	Gal	Well Vols	pH	Conduct (~~mmhos~~ mS/cm)	Temp (°C)	Turbidity (visual/NTU) / ORP	
1230	1300	surging	0							
1302	1315	bailing	7	7	1.05				~~very turbid~~	494 8/3/09
1315	1326	~~13~~	13	20	3.0				1100	
1326	1332	↓	2	22	3.3			20	very turbid	
1332	1340	pump	8	30	4.5			109	~~566~~	2" pump
1340	1344		5	35	5.26				40	
1354	—	pump	0	35	5.26	8.09	0.553	23.98	60/199	initial @ start of pump
1354	1359	pump	5	40	6.02	7.47	0.554	23.60	32/199	
1359	1402	pump	~~25~~ 5	~~45~~ 45	6.77	7.31	0.550	23.60	19.6/186	
1402	1406	pump	5	50	7.51	7.41	0.542	23.41	7.9/185	

660 - 100
~~15~~ - 8.58

1335 - 1355
6.84
7.00
pH

~~4.87~~ 4.55
3.97
DH 23

9.2
10

1.21
1.00
uS/cm
Cond

229
234.7

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS SealBeach-UST Site 229
Project Number:
Well Number: SB229-MW02
Date: 08-06-09
Field Personnel: Hunter Butler and Tara Heberman
Weather clear

Screen Interval (Depth in feet): 5-15
Pump Intake at (Depth in feet): 13' bgs
Purging Device: Micro purge Basic ; YSI
Total Depth (feet): 15.07

Materials: ☐ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☒ Disposable ☐ Other

Clock Time 24 Hr:	Water Depth Below TOC (ft)	20psi Pump Dial 950psi	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1051		103 10/5	440	Set pump rate							
1113					24.22	1.686	6.70	119.0	1.71	38.54	
1118					23.68	1.672	6.39	94.7	0.67	17.31	
1123					23.59	1.596	6.33	64.1	0.48	16.93	
1128	9.72			2 gal	23.37	1.538	6.37	44.7	0.29	7.12	
1133				3 gal	23.40	1.485	6.33	40.3	0.22	5.40	
1138	9.70			4 gal	23.35	1.439	6.43	31.3	0.19	3.46	
1144					23.03	1.389	6.39	27.3	0.15	2.76	
1148	9.71			5.5 gal	23.34	1.368	6.41	24.1	0.15	2.22	
										(TU)	

Sample ID: SB229 MW2-3Q09-GW01; -GW02; -GW03
Sample Time: 1200 1300 1305

Comments: * resumed purging at 1111 due to problems w/ regulator pressure.
Sampler Signature:

0940 - CAL YSI: DO: 8.59 ⇒ 9.21 15 min SPEC.C: 0.786 ⇒ 0.864 ⇒ 271.000
pH: 4.00/7.00/9.86 ORP: 248.3 ⇒ 247.6

all parameters in 1148

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NNS Seal Beach - UST Site 229
Project Number:
Well Number: SB229-MW04
Date: 08-06-09
Field Personnel: Hunter Butler ; Tara Lieberman
Weather Clear, sunny ~ 80°F

Screen Interval (Depth in feet): ~~6.5-16.~~ 6.4-16.4
Pump Intake at (Depth in feet): 14' bgs
Purging Device: Micro Purge Basic ; YSI
Total Depth (feet): 16.4

Materials: ☐ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☒ Disposable ☐ Other

Clock Time 24 Hr:	Water Depth Below TOC (ft)	Pump Dial 20 psi	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
~~1418~~ ~~1420~~ JL		103 10/5	440	SET PUMP RATE							
1420	9.02				25.31	0.821	7.49	27.7	0.820	49.12	
1425	9.03			1gal	23.94	0.791	6.74	37.3	0.39	29.23	
1430				1.5gal	23.84	0.783	6.81	14.9	0.33	16.87	
1435	9.00			2gal	23.79	0.770	7.02	-20.5	0.38	15.61	
1440	9.01			3gal	23.66	0.753	7.11	-34.4	0.46	10.17	
1445	8.98			3.5gal	23.61	0.741	7.16	-37.2	0.60	6.21	
1451	8.96			4gal	23.57	0.726	7.22	-37.6	0.89	4.45	
1455	9.04			4.5gal	23.57	0.721	7.22	-35.7	1.03	4.08	
1500	9.02			5gal	23.53	0.714	7.21	-31.6	1.27	3.10	
1505	9.02				23.53	0.706	7.21	-26.6	1.51	5.25	
1513	9.00			6.5gal	23.49	0.702	7.22	-22.1	1.71	2.79	
1517	8.99			7gal	23.48	0.699	7.23	-20.6	1.85	2.75	

Sample ID: SB229MW4-3Q09-GW01, -GW02
Sample Time: 1525 1540

Comments: All parameters in 1517
Sampler Signature: [signature]

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS-Seal Beach UST Site 229
Project Number:
Well Number: SB229-MW03
Date: 08.07.09
Field Personnel: Hunter Butler & Tara Lieberman
Weather Cloudy, ~70°F

Screen Interval (Depth in feet): 4.5 - 14.5
Pump Intake at (Depth in feet): 12' bgs
Purging Device: Micro Purge Basic YSI
Total Depth (feet): 14.55

Materials: ☐ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☒ Disposable ☐ Other

Clock Time 24 Hr:	Water Depth Below TOC (ft)	Pump Dial 15psi	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
0830	7.55	103 10/5	440	SET	PUMP	RATE	→				
0832	7.87				22.93	1.054	8.85	162.0	1.37	16.15	
0837	7.97			1.25 gal	22.69	1.060	8.98	150.9	0.41	11.61	
0842	8.00			1.5	22.59	1.071	8.88	142.5	0.27	7.87	
0847	7.94				22.46	1.146	8.71	136.7	0.20	4.04	
0852	7.98			3 gal	22.46	1.147	8.62	129.3	0.18	4.31	
0857	7.98				22.57	1.181	8.54	121.1	0.15	2.72	
0902	8.07				22.51	1.207	8.45	108.6	0.14	2.31	
0907	8.03			4.5 gal	22.60	1.228	8.38	104.2	0.12	1.77	
0912	8.06			5.5 gal	22.58	1.245	8.33	95.7	0.12	1.67	

Sample ID: SB229MW3-3Q09-GW01 ; -GW02
Sample Time: 0918 0945

Comments: all parameters in @ 0912
Sampler Signature:

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach UST Site 229
Project Number:
Well Number: SB229-MW01
Date: 08.07.09
Field Personnel: Hunter Butler ; Tara Lieberman
Weather Clear ~72°F

Screen Interval (Depth in feet): 4.6 - 14.68
Pump Intake at (Depth in feet): 12' bgs
Purging Device: Micro Purge Basic & YSI
Total Depth (feet): 14.68' bgs

Materials: ☐ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☒ Disposable ☐ Other

Clock Time 24 Hr:	Water Depth Below TOC (ft)	Pump Dial 15psi	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1043	8.66	103 10/5	SET PUMP RATE								
1047	8.77			0.5gal	24.09	1.154	7.27	-16.7	1.73	25.85	
1053	8.80			1gal	23.38	1.089	6.28	-7.4	0.53	10.57	
1057	8.78			1.5gal	23.31	1.029	6.31	-20.3	0.34	6.74	
1103	8.84			2gal	23.32	0.954	6.45	-34.5	0.22	3.20	
1107	8.77			2.5gal	23.29	0.926	6.52	-40.0	0.19	4.74	slight odor
1113	8.76			3.5gal	23.30	0.901	6.57	-46.6	0.15	2.52	
1117	8.80			4gal	23.27	0.896	6.56	-48.3	0.14	2.33	
1123	8.77			5gal	23.25	0.888	6.59	-51.0	0.12	1.54	

Sample ID: SB229MW1-3Q09-GW01
Sample Time: 1135

Comments: All parameters in 1123
Sampler Signature:

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach- UST Site 229
Project Number:
Well Number: BSW-14-6
Date: 08.07.09
Field Personnel: Hunter Butler and Tara Lieberman
Weather Clear ~75°F

Screen Interval (Depth in feet): 4.90-24.90' bgs
Pump Intake at (Depth in feet): ~13 ft bgs
Purging Device: Micro Purge Basic and YSI
Total Depth (feet): 24.90' bgs

Materials: ☐ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☒ Disposable ☐ Other_____

Clock Time 24 Hr:	Water Depth Below TOC (ft)	Pump Dial 15psi	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1220	8.18	103 10/5	440	SET PUMP RATE							
1228	8.20				23.62	1.502	6.34	124.6	2.81	11.02	
1233	8.18				22.36	1.508	6.31	113.1	1.47	7.58	
1238	8.19			1.5gal	22.08	1.507	6.34	102.3	1.28	6.11	
1243	8.19			2gal	21.91	1.506	6.40	89.7	1.17	3.84	
1248	8.20			2.5gal	21.85	1.506	6.47	78.7	1.12	2.69	
1253	8.18				21.72	1.506	6.52	70.0	1.10	3.34	
1258	8.18			4gal	21.70	1.507	6.55	64.3	1.09	4.04	

Sample ID: BSW-14-6-3Q09-GW01
Sample Time: 1310

Comments: All parameters in 1258
Sampler Signature: [signature]

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach - UST Site 229
Project Number:
Well Number: BSW-14-4
Date: 08.07.09
Field Personnel: Hunter Butler and Tara Lieberman
Weather Clear, ~80°F

Screen Interval (Depth in feet): 4.69' - 24.69'
Pump Intake at (Depth in feet): 12.5' bgs
Purging Device: Micro Purge Basic & YSI
Total Depth (feet): 24.69' bgs

Materials: ☐ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☒ Disposable ☐ Other

Clock Time 24 Hr:	Water Depth Below TOC (ft)	Pump Dial 15psi	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1404	7.60	103 lb/s	440	SET	PUMP	RATE	→				
1406	7.59				25.35	1.487	6.45	-184.9	2.88	0.57	
1411	7.65				23.37	1.481	6.07	-181.9	0.55	0.95	
1416	7.61				22.99	1.481	6.11	-203.7	0.40	0.87	
1421	7.64			2gal	22.67	1.478	6.11	-215.7	0.22	0.54	
1426	7.62				22.58	1.475	6.22	-232.0	0.16	0.51	
1431	7.60			3.5gal	22.54	1.473	6.30	-249.2	0.13	0.00	
1436	7.63				22.51	1.471	6.36	-259.7	0.11	0.68	
1441	7.60			5gal	22.45	1.470	6.41	-269.8	0.10	0.42	
1446	7.65			5.5gal	22.47	1.470	6.43	-274.5	0.10	0.48	

Sample ID: BSW-14-4-3Q09-GW01
Sample Time: 1455

Comments: All parameters in at 1446
Sampler Signature:

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach, UST Site 229
Project Number: SHAW IN.001.009.00
Well Number: SB229-MW02
Date: 11/12/09
Field Personnel: Hunter Butler; Tara Lieberman
Weather

Screen Interval (Depth in feet): 5-15
Pump Intake at (Depth in feet): 13.0' bgs
Purging Device: Micropurge basic / YSI
Total Depth (feet): 15.07

Materials: ☒ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☐ Disposable ☐ Other

Clock Time 24 Hr:	Water Depth Below TOC (ft)	20psi Pump Dial 760psi	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
0912		103 10/5	200	SET PUMP RATE							
0923					24.03	1.432	6.82	-127.1	1.55	15.62	
0928	8.85			1 gal.	24.08	1.419	6.82	-129.8	1.13	11.49	
0933	8.90				24.04	1.403	6.82	-126.3	0.89	8.22	
0938	8.90			1.5	24.00	1.380	6.82	-124.3	0.63	5.45	
0943	8.91				24.05	1.362	6.82	-121.9	0.53	2.87	
0948	8.91			2.0	24.06	1.352	6.81	-121.2	0.48	4.17	
0953	8.88				24.25	1.346	6.82	-121.2	0.44	9.81	
0958	8.91			2.5	24.13	1.335	6.82	-121.4	0.40	2.71	
1003	8.91				24.06	1.324	6.82	-121.2	0.38	3.74	
1008	8.90			3	23.98	1.313	6.82	-121.3	0.36	1.41	
1013	8.91			3.5	23.91	1.300	6.81	-122.0	0.35	1.47	
1018	8.92			3.75	23.88	1.294	6.82	-122.5	0.37	1.25	
										TL	

Sample ID: SB229MW2-4Q09-GW01
Sample Time: 1022

Comments: All parameters in at 1018.
Sampler Signature: TL

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach, UST site 229
Project Number: SHAWIN.001.009.00
Well Number: SB229-MW04
Date: 11/12/09
Field Personnel: Hunter Butler : Tara Lieberman
Weather cloudy ~70°F

Screen Interval (Depth in feet): 6.4-16.4
Pump Intake at (Depth in feet): 14.0' bgs
Purging Device: Micro purge basic/ YSI
Total Depth (feet): 16.4

Materials: ☒ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☐ Disposable ☐ Other_____

Clock Time 24 Hr:	Water Depth Below TOC (ft)	~~80~~ 30 psi Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1111		103 10/5	440	SET PUMP RATE							
1117	8.71				23.64	0.712	7.41	87.4	0.45	23.51	
1122	8.72			1.5 gal.	23.69	0.702	7.43	74.3	0.44	11.17	
1127	8.72			2 gal	23.71	0.696	7.44	62.0	0.55	6.85	
1132	8.71				23.73	0.689	7.44	48.3	0.66	6.72	
1137	8.70			3 gal	23.71	0.685	7.44	41.1	0.71	6.09	
1142	8.71				23.73	0.680	7.44	34.3	0.80	3.00	
1147	8.71			4.5	23.74	0.678	7.44	29.1	0.87	3.24	
1152	8.72			5.5	23.73	0.676	7.43	25.7	0.89	2.02	

TL

Sample ID: SB229MW4-4Q09-GW01 (MS/MSD)
Sample Time: 1156

Comments: All parameters in at 1152.
Sampler Signature: TL

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach, UST Site 229
Project Number: SHAWIN.001.009.00
Well Number: SB229-MW03
Date: 11/12/09
Field Personnel: Hunter Butler · Tara Lieberman
Weather cloudy, ~70°F, mod. wind

Screen Interval (Depth in feet): 4.5-14.5
Pump Intake at (Depth in feet): 12.0' bgs
Purging Device: Micro-purge basic/YSI
Total Depth (feet): 14.55

Materials: [X] Dedicated Tubing [X] Polyethylene [ ] Teflon Lined [ ] Disposable [ ] Other_____

Clock Time 24 Hr:	Water Depth Below TOC (ft)	20psi Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1300		103 10/5	420		SET PUMP RATE						
1304	7.53				23.25	1.018	8.15	1.8	1.20	31.66	
1309	7.66				23.46	1.046	8.04	-87.9	0.39	10.46	
1314	7.65				23.42	1.083	7.86	-107.9	0.27	6.26	
1319	7.68				23.51	1.108	7.79	-114.4	0.22	4.75	
1324	7.71				23.50	1.124	7.73	-120.0	0.23	4.16	
1329	7.65				23.50	1.145	7.70	-125.9	0.21	3.28	
1334	7.72			4.5 gal.	23.50	1.159	7.68	-128.0	0.19	2.24	

Sample ID: SB229MW3-4Q09-GW01; -GW02 (dup)
Sample Time: 1337; 1347

Comments: All parameters in at 1334
Sampler Signature: TL

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach, UST Site229
Project Number: SHAWIN.001.009.00
Well Number: SB229-MW01
Date: 11/12/09
Field Personnel: Hunter Butler; Tara Lieberman
Weather Cloudy, ~70°F, mod. wind

Screen Interval (Depth in feet): 4.90-24.90'
Pump Intake at (Depth in feet): 13' bgs
Purging Device: Micropurge basic / YSI
Total Depth (feet): 24.90' bgs

Materials: ☒ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☐ Disposable ☐ Other_____

Clock Time 24 Hr:	Water Depth Below TOC (ft)	Pump Dial 900psi	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1441		103 10/5	SET	PUMP	RATE						
1445	8.54		440		23.23	0.898	6.89	-148.9	1.25	9.47	Heavy gas hydrocarbon odor
1450	8.60				23.31	0.888	6.91	-184.7	0.68	5.17	
1455	8.56			2 gal.	23.30	0.865	6.91	-199.1	0.50	4.13	
1500	8.57				23.30	0.853	6.90	-205.5	0.42	3.35	
1505	8.59			3 gal	23.32	0.849	6.90	-209.3	0.36	2.71	
1510	8.61			4 gal	23.29	0.844	6.90	-212.7	0.30	2.22	

TU

Sample ID: S229MW1-4Q09-GW01; -GW02; -GW03
Sample Time: 1515; 1535; 1545

Comments: All parameters in at 1510
Sampler Signature: TU

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach, UST Site 229
Project Number: SHAWIN.001.009.00
Well Number: BSW-14-6
Date: 11/13/09
Field Personnel: Hunter Butters, Tara Lieberman
Weather clear, ~70°F, mod wind

Screen Interval (Depth in feet): 4.90'-24.90'
Pump Intake at (Depth in feet): 13' bgs
Purging Device: Micropurge Basic / YSI
Total Depth (feet): 24.90' bgs.

Materials: ☐ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☒ Disposable ☐ Other

Clock Time 24 Hr:	Water Depth Below TOC (ft)	20 psi Pump Dial 800 psi	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
0835	7.71	103 10/5	460		SET	PUMP RATE					
0838	7.75				21.92	1.341	~~1.72~~*	177.0	1.62	5.40	*6.96
0843	7.76			1.06	22.26	1.355	6.97	166.9	0.93	3.30	
0848	7.74			1.75	22.19	1.353	6.97	160.7	0.92	2.44	
0853	7.74			2.5	22.07	1.353	6.97	153.4	0.95	2.37	
0858	7.76			3.0	22.00	1.348	6.97	149.8	0.95	2.00	
0903	7.75			3.75	21.98	1.347	6.97	145.5	0.95	1.95	

TL

Sample ID: BSW-14-6-4Q09-GW01
Sample Time: 0906

Comments: All parameters in @ 0903
Sampler Signature: TL

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NNS Seal Beach, UST Site 229
Project Number: SHAWIN.001.009.00
Well Number: BSW-14-4
Date: 11/13/09
Field Personnel: Hunter Butters, Tara Lieberman
Weather Clear, ~72°F, mod wind.

Screen Interval (Depth in feet): 4.69'-24.69'
Pump Intake at (Depth in feet): 12.5' bgs
Purging Device: Micropurge Base / PSI
Total Depth (feet): 24.69' bgs

Materials: ☐ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☒ Disposable ☐ Other_____

Clock Time 24 Hr:	Water Depth Below TOC (ft)	20 psi Pump Dial 800psi	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
0958	7.23	103 l/s	480		SET	PUMP RATE					
1001	7.28				23.27	1.347	6.69	-214.0	0.70	3.71	
1006	7.27				23.35	1.352	6.70	-275.3	0.49	3.44	*Reducing odor to water
1011	7.28			1.5 gal.	23.28	1.345	6.72	-291.7	0.55	2.65	
1016	7.26				23.26	1.343	6.72	-297.9	0.43	3.11	
1021	7.28			3 gal.	23.24	1.342	6.70	-301.2	0.36	3.03	
1026	7.28			4 gal	23.06	1.330	6.71	-303.6	0.31	2.73	

Sample ID: BSW-14-4-4Q09-GW01, -GW02
Sample Time: 1030 1100

Comments: All parameters in at 1026
Sampler Signature: [signature]

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach UST Site 229
Project Number: SHAWIN.001.009.01
Well Number: SB229-MW02
Date: 07/19/2010
Field Personnel: HB/SS/TL
Weather Sunny ~70°F, windy

Screen Interval (Depth in feet): 5-15
Pump Intake at (Depth in feet): 13.0 bgs
Purging Device: micro purge basic/ YSI
Total Depth (feet): 15.07

Materials: [X] Dedicated Tubing [X] Polyethylene [ ] Teflon Lined [ ] Disposable [ ] Other_____

Clock Time 24 Hr:	Water Depth Below TOC (ft)	20psi Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1034	8.77	103 1/5	480	1 gal	SET	PUMP RATE					
1035					22.62	0.972	6.66	6.4	0.75	9.42	
1040	9.85				22.63	0.974	6.66	8.5	0.73	2.56	
1045	9.90				22.55	0.971	6.65	17.7	0.66	3.50	
1050	9.93				22.43	0.971	6.64	25.1	0.49	2.68	
1055	9.96				22.44	0.971	6.64	30.2	0.40	3.20	
1100	9.98			4.5 gal	22.45	0.973	6.64	31.5	0.33	2.71	
								TL			

Sample ID: SB229MW2-3Q10-GW01
Sample Time: 1105 - MS/MSD

Comments: All parameters in @ 1100
Sampler Signature: TL

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach UST Site 229
Project Number: SHAWIN.001.009.0081
Well Number: SB229MW04
Date: 07/19/2010
Field Personnel: SS/HB/TL
Weather Sunny ~70°F, windy

Screen Interval (Depth in feet): 6.4-16.4
Pump Intake at (Depth in feet): 14.0' bgs
Purging Device: Micropurge basic
Total Depth (feet): 16.4'

Materials: [X] Dedicated Tubing [X] Polyethylene [ ] Teflon Lined [ ] Disposable [ ] Other

Clock Time 24 Hr:	Water Depth Below TOC (ft)	20psi Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1240	8.69	10/5 103	480		SET	PUMP RATE					
1302	8.85	↓	↓	.25gal	23.5	0.641	7.25	114.3	1.71	36.58	
1307	8.73			1gal	22.95	0.630	7.24	110.1	0.65	13.67	
1312	8.73			1.75gal	22.80	0.627	7.25	105.3	0.68	10.37	
1317	8.77			2.5	22.78	0.626	7.25	101.1	0.64	6.82	
1322	8.73			3	22.75	0.624	7.25	96.8	0.59	5.88	
1327	8.72			3.5	22.75	0.624	7.25	93.6	0.62	4.79	

All parameters in 1327
TW

Sample ID: SB229MW4-3Q10-GW01 & GW02 (Dup)
Sample Time: 1331 & 1345

Comments: All parameters in at 1327
Sampler Signature: TW

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach UST Site 229
Project Number: SHAWIN.001.009.01
Well Number: SB229MW03
Date: 07/19/2010
Field Personnel: HB/TL/SS
Weather Sunny, ~70°F, windy

Screen Interval (Depth in feet): 4.5-14.5
Pump Intake at (Depth in feet): 12.0
Purging Device: Micropurge basic/YSI
Total Depth (feet): 14.55

Materials: ☒ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☐ Disposable ☐ Other_____

Clock Time 24 Hr:	Water Depth Below TOC (ft)	20psi Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1415	7.27	103 10/5	440		SET	PUMP	RATE				
1427	7.56				22.54	1.121	7.74	114.3	0.50	42.55	
1432	7.62				22.23	1.123	7.72	85.1	0.25	16.68	
1437	7.69			2gal	22.20	1.135	7.67	72.2	0.24	13.16	
1442	7.64				22.14	1.147	7.69	61.8	0.24	9.48	
1447	7.68				22.09	1.152	7.66	47.1	0.20	7.75	
1452	7.69			4gal	22.09	1.159	7.64	20.0	0.18	5.90	
1457	7.71				22.03	1.161	7.63	5.2	0.18	5.01	
1502	7.67				22.04	1.164	7.62	-1.8	0.18	4.11	
1507	7.65			5.5	22.02	1.169	7.60	-9.3	0.17	3.55	
1512	7.65				22.07	1.174	7.61	-17.4	0.17	3.55	
1517	7.65				22.07	1.177	7.60	-22.5	0.17	3.26	
1522	7.63			7.5	22.06	1.180	7.59	-27.2	0.19	2.91	
							All parameters in 1522				TL

Sample ID: SB229MW3-3Q10-GW01
Sample Time: 1525

Comments: All parameters in at 1522
Sampler Signature: TL

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach, UST 229
Project Number: SHAWIN.001.009.01
Well Number: SB229-MW01
Date: 07/19/10
Field Personnel: HB; TL; SS
Weather Sunny, ~75°F, windy

Screen Interval (Depth in feet): 4.90 - 24.90'
Pump Intake at (Depth in feet): 13.0' bgs
Purging Device: MicroPurge basic / YSI
Total Depth (feet): 24.90' bgs

Materials: [X] Dedicated Tubing [X] Polyethylene [ ] Teflon Lined [ ] Disposable [ ] Other

Clock Time 24 Hr:	Water Depth Below TOC (ft)	20psi Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1607	8.03	10 3 1/2 5	480	.5gal	SET PUMP RATE						
1621	8.54				22.29	0.933	6.74	-112.7	0.62	9.86	
1626	8.49				22.08	0.882	6.73	-135.5	0.42	5.99	
1631	8.46			2.0 gal	22.00	0.862	6.73	-140.9	0.30	5.28	
1636	8.44			2.5gal	21.99	0.847	6.72	-142.7	0.32	6.10	

Sample ID: SB229MW1-3Q10-GW01; -GW02
Sample Time: 1639; 1702 (Equipment Rinsate)
Comments: All parameters in @ 1636
Sampler Signature:

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach, UST Site 229
Project Number: SHAWIN.001.009.01
Well Number: BSW-14-6
Date: 7/20/10
Field Personnel: HB/TH/SS
Weather Cloudy, ~70°F

Screen Interval (Depth in feet): 4.90-24.90'
Pump Intake at (Depth in feet): 13' bgs
Purging Device: Micropurge Basic YSI
Total Depth (feet): 24.90

Materials: ☐ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☒ Disposable ☐ Other

Clock Time 24 Hr:	Water Depth Below TOC (ft)	20 psi Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
0828	7.96	103 10/s	440		SET	PUMP RATE					
0843	8.00				21.21	1.414	6.71	200.3	2.26	6.01	
0848	7.98			1.5gal	20.99	1.492	6.73	193.6	1.61	6.05	
0853	7.99				20.90	1.408	6.74	188.6	1.51	4.22	
0858	7.99				20.84	1.406	6.76	183.9	1.34	2.96	
0903	7.99			3	20.84	1.405	6.78	180.9	1.44	3.20	
0908	7.98			4gal	20.85	1.404	6.77	177.4	1.46	2.79	

Sample ID: BSW-14-6-3Q10-GW01
Sample Time: 0910

Comments: All parameters in at 0908
Sampler Signature:

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach, UST Site 229
Project Number: SHAWIN.001.009.01
Well Number: BSW-14-4
Date: 04-20-10
Field Personnel: HB/SSTL
Weather Cloudy, ~70°F

Screen Interval (Depth in feet): 4.69' - 24.69'
Pump Intake at (Depth in feet): 12.5' bgs
Purging Device: Micropurge Basic YSI
Total Depth (feet): 24.69' bgs

Materials: ☐ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☒ Disposable ☐ Other

Clock Time 24 Hr:	Water Depth Below TOC (ft)	20psi Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1004	7.37	103 10/5	488		SET PUMP RATE						
1022	7.39			.3 gal	22.12	1.434	6.53	-90.6	1.08	3.54	
1027	7.40				21.82	1.427	6.53	-146.9	0.62	3.59	
1032	7.40				21.70	1.419	6.54	-197.1	0.62	3.01	
1037	7.41				21.67	1.415	6.56	-219.7	0.49	3.18	
1042	7.40				21.62	1.412	6.60	-234.9	0.33	3.03	
1047	7.39				21.61	1.412	6.65	-240.5	0.29	3.47	
1052	7.39			4 gal	21.61	1.413	6.67	-248.8	0.25	3.61	
1057	7.39			5 gal	21.61	1.413	6.68	-254.4	0.25	3.45	
1102	7.40				21.64	1.413	6.69	-259.6	0.20	3.98	
1107	7.41				21.67	1.413	6.70	-262.5	0.28	2.99	

Sample ID: BSW-14-4-3Q10-GW01; GW02; GW03
Sample Time: 1110 1134 (SB) 1142 (ER)

Comments: All parameters in at 1107
Sampler Signature: [illegible]

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach UST Site 229
Project Number: SHAWIN.001.009.00
Well Number: SB229-MW02
Date: 12/8/2010
Field Personnel: Fred Essig; Tara Lieberman
Weather clear, sunny, ~56°F

Screen Interval (Depth in feet): 5-15
Pump Intake at (Depth in feet): 13.0' bgs
Purging Device: Micropurge Basic YSI
Total Depth (feet): 15.07'

Materials: [X] Dedicated Tubing [X] Polyethylene [ ] Teflon Lined [ ] Disposable [ ] Other_____

Clock Time 24 Hr:	Water Depth Below TOC (ft)	Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
0930		95 14.9/1.0	~~14~~/1.0	440 mL/min							
0938	9.52	↓	↓	↓	22.09	0.747	6.93	75.2	0.59	5.66	
0945	9.68	↓	↓	↓	22.20	0.751	6.90	53.7	0.39	3.53	
0950	9.75	↓	↓	↓	22.28	0.753	6.90	46.4	0.35	2.32	
0955	9.72	↓	↓	↓	22.33	0.754	6.91	41.6	0.31	1.88	
1000	9.72	↓	↓	3gal	22.38	0.754	6.91	38.3	0.28	1.40	

TL

Sample ID: SB229MW2-4Q10-GW01
Sample Time: @1005
MS/MSD

Comments: All parameters in @ 1000
Sampler Signature: TL

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach, UST Site 229
Project Number: SHAWIN.001.009.00
Well Number: SB229 ~~MW1~~ MW1
Date: 12/8/2010
Field Personnel: Fred Essig & Tara Lieberman
Weather Clear, ~65°F

Screen Interval (Depth in feet): ~~6.4-16.4~~ 4.90-24.90 TL 12/8/1
Pump Intake at (Depth in feet): ~~14.0' bgs~~ 13' bgs TL 12/8/1
Purging Device: Micropurge basic/YSI
Total Depth (feet): ~~16.4~~ 24.90' bgs TL 12/8/10

Materials: ☒ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☐ Disposable ☐ Other_____

Clock Time 24 Hr:	Water Depth Below TOC (ft)	Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1120		96 135/1.5	440	SET	PUMP	RATE	→				
1125	8.47				22.25	0.268	7.04	-79.7	2.39	2.58	
1130	8.44				22.31	0.506	7.00	-80.8	0.76	3.23	
1135	8.42				22.36	0.506	6.99	-83.4	0.33	2.82	
1140	8.44				22.39	0.505	7.00	-84.6	0.24	1.71	
1145	8.45				22.38	0.505	6.98	-84.4	0.22	0.20	
1150	8.44				22.36	0.505	6.98	-85.0	0.21	0.72	
1155	8.44				22.39	0.504	6.98	-85.1	0.19	1.31	
1200	8.44			4 gal	22.39	0.505	6.99	-85.2	0.18	0.70	

TL

Sample ID: SB229 ~~MW4~~ MW1-4Q10-GW01
Sample Time: @1205

Comments: All parameters in @1200
Sampler Signature: TL

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach, UST Site 229
Project Number: SHAWIN.001.009.00
Well Number: MASB229MW4
Date: 12/8/2010
Field Personnel: Fred Essig; Tara Lieberman
Weather clear, bright sun, ~65°F

Screen Interval (Depth in feet): 6.4-16.4
Pump Intake at (Depth in feet): 14.0' bgs
Purging Device: Micropurge basic/YSI
Total Depth (feet): 16.4

Materials: [X] Dedicated Tubing [X] Polyethylene [ ] Teflon Lined [ ] Disposable [ ] Other_____

Clock Time 24 Hr:	Water Depth Below TOC (ft)	Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1320		97 13.8/2.0	480	SET	PUMP RATE						
1326	8.68				22.98	0.434	7.39	291.9	1.44	31.46	
1331	8.68				23.01	0.432	7.34	282.4	1.08	12.27	
1336	8.69			2 gal	23.04	0.431	7.37	270.3	0.82	8.14	
1341	8.69				23.06	0.432	7.38	261.7	0.74	3.47	
1346	8.68				23.06	0.432	7.40	251.6	0.68	2.71	
1351	8.68			4 gal	23.06	0.431	7.39	242.9	0.73	0.44	
1356	8.69				23.06	0.430	7.40	233.2	0.74	0.34	
1401	8.69				23.07	0.430	7.39	226.5	0.73	~~0.00~~ 0.73	(FI) 12/8/2010
1406	8.68				23.07	0.429	7.40	218.5	0.77	0.00	
1411	8.68				23.07	0.429	7.40	211.4	0.80	0.00	
1416	8.69				23.03	0.428	7.40	202.9	0.83	0.00	
1421	8.69				23.01	0.427	7.41	196.8	0.83	0.00	
1426	8.69				22.85	0.426	7.37	192.6	0.82	0.00	
1431	8.69				23.03	0.426	7.43	183.6	0.87	0.00	
1436	8.69				22.92	0.426	7.42	180.3	0.90	0.00	

Sample ID:_____
Sample Time:_____

Comments:_____
Sampler Signature:_____

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: _____
Project Number: _____
Well Number: _____
Date: _____
Field Personnel: _____
Weather _____

Screen Interval (Depth in feet): _____
Pump Intake at (Depth in feet): _____
Purging Device: _____
Total Depth (feet): _____

Materials: ☐ Dedicated Tubing ☐ Polyethylene ☐ Teflon Lined ☐ Disposable ☐ Other_____

Clock Time 24 Hr:	Water Depth Below TOC (ft)	Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1441	8.68	97 13.8/20	480	8 gal	22.77	0.425	7.38	178.0	0.90	0.00	

Sample ID: SB229MW4-4Q10-GW01, -GW02 & -GW03
Sample Time: @1445, @1510, @1515

Comments: All parameters in @1441
Sampler Signature: _____

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach, UST Site 229
Project Number: SHAWIN.001.009.00
Well Number: SB229MW3
Date: 12/9/2010
Field Personnel: Fred Essig & Tara Lieberman
Weather Cloudy, ~52°F

Screen Interval (Depth in feet): 4.5-14.5
Pump Intake at (Depth in feet): 12.0' bgs
Purging Device: YSI Micro Purge
Total Depth (feet): 14.55

Materials: [X] Dedicated Tubing [X] Polyethylene [ ] Teflon Lined [ ] Disposable [ ] Other

Clock Time 24 Hr:	Water Depth Below TOC (ft)	Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
0758		96 13.5/1.5	440		SET	PUMP RATE	→				
0810	7.65				21.00	0.764	7.80	181.3	0.72	147.7	
0815	7.66				21.68	0.771	7.94	175.8	0.45	112.5	
0820	7.68				21.88	0.774	7.94	173.6	0.37	69.51	
0825	7.67				21.86	0.775	7.93	173.0	0.30	44.62	
0830	7.67			2.5 gal	22.01	0.776	7.92	172.3	0.27	36.21	
0835	7.65				22.06	0.777	7.90	172.4	0.24	21.67	
0840	7.67				22.13	0.778	7.89	172.2	0.23	16.55	
0845	7.65				22.15	0.780	7.86	171.7	0.22	17.42	
0850	7.67			4 gal	22.15	0.782	7.86	171.1	0.23	9.40	
0855	7.65				22.13	0.784	7.84	170.6	0.21	9.06	
0900	7.67				22.35	0.789	7.82	169.0	0.21	5.16	
0905	7.68				22.37	0.793	7.81	168.7	0.18	4.55	
0910	7.67			5.5 gal	22.34	0.795	7.79	168.0	0.17	4.24	
						TV					

Sample ID: SB229MW3-4Q10-GW01
Sample Time: @ 0915

Comments: All parameters in @ 0910
Sampler Signature: TV

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NNS Seal Beach
Project Number: SHAWIN.001.009.00
Well Number: BSW-14-6
Date: 12/9/2010.
Field Personnel: Fred Essig & Tara Lieberman
Weather Clear, ~60°F

Screen Interval (Depth in feet): 4.90 - 24.90
Pump Intake at (Depth in feet): 13' ~~bgs~~ TOC
Purging Device: YSI Micropurge basic
Total Depth (feet): 24.90

Materials: [ ] Dedicated Tubing (NO) [x] Polyethylene [ ] Teflon Lined [x] Disposable [ ] Other

Clock Time 24 Hr:	Water Depth Below TOC (ft)	Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
0955		97 13.9/2.0	480	~~480~~	SET	PUMP	RATE				
1000	7.93				20.61	0.932	6.89	130.9	1.29	26.46	
1005	7.95				20.81	0.943	6.79	147.0	0.98	14.65	
1010	7.95				20.91	0.945	6.79	153.4	0.87	10.13	
1015	7.94				20.95	0.946	6.79	156.9	0.84	8.58	
1020	7.95				21.01	0.947	6.80	158.9	0.85	6.88	
1025	7.92				21.04	0.947	6.81	159.7	0.86	5.15	
1030	7.92				21.00	0.947	6.82	160.9	0.85	4.69	
1035	7.92			4.5 gal	21.05	0.947	6.85	160.8	0.79	4.50	

TL

Sample ID: BSW-14-6-4Q10-GW01 & GW02
Sample Time: @1040 @1100

Comments: All parameters in @ 1035
Sampler Signature: TL

LOW FLOW WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Project Name: NWS Seal Beach, UST Site 229
Project Number: SHAWIN.001.009.00
Well Number: BSW-14-4
Date: 12/9/2010
Field Personnel: Fred Essig, Tara Lieberman
Weather Clear, ~60°F

Screen Interval (Depth in feet): 4.69-24.69
Pump Intake at (Depth in feet): 12.5
Purging Device: YSI Micro Purge Basic
Total Depth (feet): 24.69

Materials: ☐ Dedicated Tubing ☒ Polyethylene ☐ Teflon Lined ☒ Disposable ☐ Other_____

Clock Time 24 Hr:	Water Depth Below TOC (ft)	Pump Dial	Pumping Rate (mL/min) <500	Cum. Volume Purged (gallons)	Temp (°C) (± 3%)	Conductivity (µS/cm) (±3%)	pH (±0.1)	ORP/Eh (mV) (±10)	DO (mg/L) (±0.2)	Turbidity (NTU) (±10%)	Comments
1128		97 13.0/2.0	480		SET	PUMP RATE					
1131	7.30				21.34	0.967	6.82	-78.2	2.47	4.30	
1136	7.30			1gal	21.56	0.971	6.71	-87.8	0.62	2.18	
1141	7.30				21.62	0.971	6.70	-102.7	0.51	1.92	
1146	7.30				21.70	0.974	6.70	-122.2	0.39	1.78	
1151	7.30			3gal	21.72	0.973	6.71	-143.2	0.33	1.96	
1156	7.30				21.74	0.973	6.70	-151.4	0.28	2.19	
1201	7.30				21.74	0.974	6.71	-158.2	0.25	2.21	
1206	7.30				21.70	0.974	6.72	-162.0	0.23	2.28	
1211	7.30				21.57	0.972	6.73	-164.7	0.20	2.12	
					TL						

Sample ID: BSW-14-4-4Q10-6W01; -6W02
Sample Time: @1215 @1225

Comments: All parameters in @ 1211
Sampler Signature: TL

Appendix D

IDW Manifests and Lab Data

Western Environmental
INCORPORATED

GENERATOR WASTE PROFILE SHEET _____ _____
Profile Number **initial**

(Please carefully read instructions before completing this form. Please Print in Ink or Type)

1. Billing Information

1. Billing Party Name: EFR Environmental Services, Inc.
2. Mailing Address:
3. Contact: Thad Harris
4. Phone: 619-722-6781
5. Fax: N/A

2. Generator Information

1. Generator Name: **Naval Weapons Station Seal Beach**			
2. Generator Site Address: 800 Seal Beach Blvd., Building 230			
3. City: Seal Beach	***Country:*** US	***State:*** CA	***Zip:*** 90740-5000
4. Generator US EPA Identification Number: CA0170024491 ***SIC Code No.***			
5. Generator Mailing Address (if Different):			
6. City:	***Country:***	***State:***	***Zip:***
7. Generator Contact Name: Pei-Fen Tamashiro			
8. Phone Number: 562-626-7897		***9. Fax Number:*** N/A	

3. WASTE PROPERITES AND COMPOSITION

10. (a) Process Generating Waste: Soil Sampling
10. (b) Is the waste US EPA HAZARDOUS WASTE (40 CFR Part 261)? No

11. (a) Waste Name: Soil Cutting, Groundwater & Decontamination Water	
11. (b) US DOT Proper Shipping Name: Non-Hazardous Waste Liquid & Solid	
12. Physical State	X ***Solid*** □ ***Semi-Solid*** □ ***Powder*** X ***Liquid*** □ ***Other***
13. Method of Shipment	□ ***Bulk*** X ***Drum*** □ ***Bagged*** □ ***Other Explain***
14: Estimated Volume:	> 1 ***Cubic Yards*** Soil Approx. 20 ***Gallons*** Water
15: Special Handling Instructions:	

4. SAMPLING INFORMATION

Type of Sample: □ ***Grab Sample*** X ***Composite Sample***

16: Sampling Source (drum, stockpile, pond): Groundwater, Soil Cuttings, Containerized Distilled Water	***16 (a) Date Sampled :*** April 6 thru April 29, 2009
16 (b): Sampler's Name & Company: Jason Williams, Richard Brady & Assocaites	□ ***No Sample Required***

5. Characteristic Components

COLOR:	***ODOR:***	***FREE LIQUIDS %:***	***% SOLIDS***	***pH:***	***Flash Point:***	***Phenol ppm:***
Brown Clear	Mild to Strong	0	50	Exact	Open Cup	Unknown

Does this waste contain regulated concentrations of listed hazardous wastes defined by § 40 CFR 261.31.261.32.261.33 including RCRA F Listed Solvents	***No***
Does this waste contain any dioxins?	***Not Applicable***
Is this a regulated Toxic Material as defined by State or Federal Regulations	***No***
Does this waste exhibit <u>any</u> characteristics of Radioactivity as defined by State or Federal Regulations?	***No***
Does this waste contain any Infectious or Medical Waste as defined by State or Federal Regulations?	***No***

Generator Certification

I hereby certify that all information submitted in this and all attached documents contains true and accurate descriptions of the waste. Any sample submitted is representative as defined in 40 CFR 261 – Appendix 1 or by using an equivalent method. All relevant information regarding known or suspected hazards in possession of the generator has been disclosed. I authorize Western Environmental, Inc. to obtain a sample from any waste shipment for purposes of identifying the waste or recertification. If this certification is made by a broker, the undersigned signs as authorized agent of the generator and has confirmed the information contained in the Profile Sheet from information provided by the generator and additional information as it has determined to be reasonably necessary.

Signature | **Jason L. Williams Env. Specialist** Printed (or typed) name and title | 05/26/2009 **Date**

Western Environmental
INCORPORATED

GENERATOR WASTE PROFILE SHEET 209997 / WEI998 _____

Profile Number **initial**

(Please carefully read instructions before completing this form. Please Print in Ink or Type)

1. Billing Information

1. Billing Party Name: EFR Environmental Services, Inc.
2. Mailing Address:
3. Contact: Thad Harris
4. Phone: 619-722-6781
5. Fax: N/A

2. Generator Information

1. Generator Name: **Naval Weapons Station Seal Beach**			
2. Generator Site Address: 800 Seal Beach Blvd., Building 230			
3. City: Seal Beach	***Country:*** US	***State:*** CA	***Zip:*** 90740-5000
4. Generator US EPA Identification Number: CA0170024491 ***SIC Code No.***			
5. Generator Mailing Address (if Different):			
6. City:	***Country:***	***State:***	***Zip:***
7. Generator Contact Name: Pei-Fen Tamashiro			
8. Phone Number: 562-626-7897		***9. Fax Number:*** N/A	

3. WASTE PROPERITES AND COMPOSITION

10. (a) Process Generating Waste: well development and groundwater sampling
10. (b) Is the waste US EPA HAZARDOUS WASTE (40 CFR Part 261)? No
11. (a) Waste Name: Groundwater & Decontamination Water

11. (b) US DOT Proper Shipping Name: Non-Hazardous Waste Liquid	
12. Physical State	□ ***Solid*** □ ***Semi-Solid*** □ ***Powder*** X ***Liquid*** □ ***Other***
13. Method of Shipment	□ ***Bulk*** X ***Drum*** □ ***Bagged*** □ ***Other Explain***
14: Estimated Volume:	***n/a Cubic Yards*** Soil; Approx. 330 ***Gallons*** Water
15: Special Handling Instructions:	

4. SAMPLING INFORMATION

Type of Sample: X ***Grab Sample*** □ ***Composite Sample***

16: Sampling Source (drum, stockpile, pond): Groundwater (multiple grab samples are representative of the drummed water)	***16 (a) Date Sampled :*** August 6 thru August 7, 2009 (water)
16 (b): Sampler's Name & Company: Hunter Butler and Tara Lieberman, Richard Brady & Associates	□ ***No Sample Required***

5. Characteristic Components

COLOR:	***ODOR:***	***FREE LIQUIDS %:***	***% SOLIDS***	***pH:***	***Flash Point:***	***Phenol ppm:***
Brown to Clear	None to Mild	90 (est.)	10 (est.)	6.4 to 8.8	Not applicable	Unknown

Does this waste contain regulated concentrations of listed hazardous wastes defined by § 40 CFR 261.31.261.32.261.33 including RCRA F Listed Solvents	***No***
Does this waste contain any dioxins?	***Not Applicable***
Is this a regulated Toxic Material as defined by State or Federal Regulations	***No***
Does this waste exhibit <u>any</u> characteristics of Radioactivity as defined by State or Federal Regulations?	***No***
Does this waste contain any Infectious or Medical Waste as defined by State or Federal Regulations?	***No***

Generator Certification

I hereby certify that all information submitted in this and all attached documents contains true and accurate descriptions of the waste. Any sample submitted is representative as defined in 40 CFR 261 – Appendix 1 or by using an equivalent method. All relevant information regarding known or suspected hazards in possession of the generator has been disclosed. I authorize Western Environmental, Inc. to obtain a sample from any waste shipment for purposes of identifying the waste or recertification. If this certification is made by a broker, the undersigned signs as authorized agent of the generator and has confirmed the information contained in the Profile Sheet from information provided by the generator and additional information as it has determined to be reasonably necessary.

	Pei-Fen Tamashiro / IR Program Coordinator	9/16/09
Signature	**Printed (or typed) name and title**	**Date**

Western Environmental
INCORPORATED

GENERATOR WASTE PROFILE SHEET 209997/WEI998 _____

Profile Number **initial**

(Please carefully read instructions before completing this form. Please Print in Ink or Type)

1. Billing Information

1. Billing Party Name: EFR Environmental Services, Inc.
2. Mailing Address:
3. Contact: Thad Harris
4. Phone: 619-722-6781
5. Fax: N/A

2. Generator Information

1. Generator Name: **Naval Weapons Station Seal Beach**			
2. Generator Site Address: 800 Seal Beach Blvd., Building 230			
3. City: Seal Beach	***Country:*** US	***State:*** CA	***Zip:*** 90740-5000
4. Generator US EPA Identification Number: CA0170024491 ***SIC Code No.***			
5. Generator Mailing Address (if Different):			
6. City:	***Country:***	***State:***	***Zip:***
7. Generator Contact Name: Pei-Fen Tamashiro			
8. Phone Number: 562-626-7897		***9. Fax Number:*** N/A	

3. WASTE PROPERITES AND COMPOSITION

10. (a) Process Generating Waste: monitoring well installation and destruction
10. (b) Is the waste US EPA HAZARDOUS WASTE (40 CFR Part 261)? No
11. (a) Waste Name: Soil Cuttings, destroyed well materials (casing, grout)

11. (b) US DOT Proper Shipping Name: Non-Hazardous Waste Solid	
12. Physical State	X ***Solid*** □ ***Semi-Solid*** □ ***Powder*** □ ***Liquid*** □ ***Other***
13. Method of Shipment	□ ***Bulk*** X ***Drum*** □ ***Bagged*** □ ***Other Explain***
14: Estimated Volume:	***1.4 Cubic Yards*** Soil n/a ***Gallons***
15: Special Handling Instructions:	

4. SAMPLING INFORMATION

Type of Sample: X ***Grab Sample*** □ ***Composite Sample***

16: Sampling Source (drum, stockpile, pond): Soil Cuttings (multiple grab samples are representative of the drummed soil)	***16 (a) Date Sampled :*** April 6 thru April 29, 2009 (soil)
16 (b): Sampler's Name & Company: Hunter Butler and Tara Lieberman, Richard Brady & Associates	□ ***No Sample Required***

5. Characteristic Components

COLOR:	***ODOR:***	***FREE LIQUIDS %:***	***% SOLIDS***	***pH:***	***Flash Point:***	***Phenol ppm:***
Brown	None to Mild	0	100	unknown	Not applicable	Unknown

Does this waste contain regulated concentrations of listed hazardous wastes defined by § 40 CFR 261.31.261.32.261.33 including RCRA F Listed Solvents	***No***
Does this waste contain any dioxins?	***Not Applicable***
Is this a regulated Toxic Material as defined by State or Federal Regulations	***No***
Does this waste exhibit <u>any</u> characteristics of Radioactivity as defined by State or Federal Regulations?	***No***
Does this waste contain any Infectious or Medical Waste as defined by State or Federal Regulations?	***No***

Generator Certification

I hereby certify that all information submitted in this and all attached documents contains true and accurate descriptions of the waste. Any sample submitted is representative as defined in 40 CFR 261 – Appendix 1 or by using an equivalent method. All relevant information regarding known or suspected hazards in possession of the generator has been disclosed. I authorize Western Environmental, Inc. to obtain a sample from any waste shipment for purposes of identifying the waste or recertification. If this certification is made by a broker, the undersigned signs as authorized agent of the generator and has confirmed the information contained in the Profile Sheet from information provided by the generator and additional information as it has determined to be reasonably necessary.

	Pei-Fen Tamashiro / IR program coordinator	9/16/09
Signature	**Printed (or typed) name and title**	**Date**

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
CA0170024491	1	1-800-424-9300	33832

5. Generator's Name and Mailing Address
NAVAL WEAPONS STATION SEAL BEACH
800 SEAL BEACH BLVD., #230
SEAL BEACH, CA 90740-5000
Generator's Phone: 562 626-7897 CONTACT:PEI-FEN TAMASHIRO

Generator's Site Address (if different than mailing address)
SAME

6. Transporter 1 Company Name: EFR ENVIRONMENTAL SERVICES, INC.
U.S. EPA ID Number: CAR000011205

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
WESTERN ENVIRONMENTAL INC.
62-150 GENE WELMAS DRIVE
MECCA, CA 92254
Facility's Phone: 760-396-0222
U.S. EPA ID Number: CAR000157206

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1.	NON-HAZARDOUS WASTE SOLID (SOIL)	1	DM	50	P
2.	NON-HAZARDOUS WASTE LIQUID (GROUNDWATER/DECON WATER)	1	DM	10	G
3.					
4.					

13. Special Handling Instructions and Additional Information
9B-1 PROFILE NO:209997/WEI998
9B-2 PROFILE NO:209997/WEI998

ALWAYS WEAR APPROPRIATE PPE & USE SAFE HANDLING METHODS.

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Jeff McGovern
Signature: Jeff McGovern
Month: 6 Day: 3

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Octavio Quintero
Signature: Octavio Quintero
Month: 6 Day: 3
Transporter 2 Printed/Typed Name
Signature
Month Day

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejecti
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name
Signature
Month Day

GENERATOR
INT'L
TRANSPORTER
DESIGNATED FACILITY

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90071

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	CA0170024491	1	1-800-424-9300	33588

GENERATOR

5. Generator's Name and Mailing Address
NAVAL WEAPONS STATION SEAL BEACH
800 SEAL BEACH BLVD., 230
SEAL BEACH, CA 90740-5000
Generator's Phone: 562-626-7897 PEI-FEN TAMASHIRO

Generator's Site Address (if different than mailing address)
SITE 229

6. Transporter 1 Company Name
EFR ENVIRONMENTAL SERVICES, INC.
U.S. EPA ID Number
CAR000011205

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
WESTERN ENVIRONMENTAL INC.
62-150 GENE WELMAS DRIVE
MECCA, CA 92254
Facility's Phone: 760-396-0222
U.S. EPA ID Number
CAR000157206

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1. NON-HAZARDOUS WASTE SOLID (SOIL)	6	DM	3000	P
2. NON-HAZARDOUS WASTE LIQUID (GROUNDWATER/DECON WATER)	6	DM	330	G
3. NON-HAZARDOUS WASTE SOLID (WELL DEBRIS)	1	DM	90	P
4.				

13. Special Handling Instructions and Additional Information
9B-1 PROFILE NO:209997/WEI998
9B-2 PROFILE NO:209997/WEI998
9B-3 PROFILE NO:209997/WEI998
ALWAYS WEAR APPROPRIATE PPE & USE SAFE HANDLING METHODS.

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Pei Fen Tamashiro
Signature
Month 9 Day 17 Year 9

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S.
Port of entry/exit:
Transporter Signature (for exports only):
Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Octavio Quintero
Signature
Month 9 Day 17 Year 9

Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Cruz Flores
Signature
Month 9 Day 24 Year 09

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
CA0170024491	1	1-800-424-9300	34377

5. Generator's Name and Mailing Address
NAVAL WEAPONS STATION SEAL BEACH
800 SEAL BEACH BLVD., 230
SEAL BEACH, CA 90740-5000
Generator's Phone: 562 626-7897 PEI-FEN TAMASHIRO

Generator's Site Address (if different than mailing address)
SITE 229

6. Transporter 1 Company Name
EFR ENVIRONMENTAL SERVICES, INC.
U.S. EPA ID Number: CAR000011205

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
WESTERN ENVIRONMENTAL INC.
62-150 GENE WELMAS DRIVE
MECCA, CA 92254
Facility's Phone: 760-396-0222
U.S. EPA ID Number: CAR000157206

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1. NON-HAZARDOUS WASTE LIQUID (GROUNDWATER/DECON WATER)	~~2~~ 1 06	DM	~~110~~ 550	G
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
9B-1 PROFILE NO:2009997/WEI998

ALWAYS WEAR APPROPRIATE PPE & USE SAFE HANDLING METHODS.

UST229

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Pei Fen Tamashiro
Signature: [signature]
Month 01 Day 12 Year 10

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Octavio Quintero
Signature: [signature]
Month 01 Day 12 Year 10
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Bill Coates
Signature: [signature]
Month 1 Day 20 Year 10

GENERATOR

169-BLC-O 6 10498 (Rev. 8/06)

TRANSPORTER #1

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
CA0170024491	1	1-800-424-9300	35730

5. Generator's Name and Mailing Address
NAVAL WEAPONS STATION SEAL BEACH
800 SEAL BEACH BLVD. 230
SEAL BEACH, CA 90740-5000
Generator's Phone: 562-626-7897 PEI-FEN TAMASHIRO

Generator's Site Address (if different than mailing address)
SITE 229

6. Transporter 1 Company Name: EFR ENVIRONMENTAL SERVICES, INC.
U.S. EPA ID Number: CAR000011205

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
WESTERN ENVIRONMENTAL INC
62-150 GENE WELMAS DRIVE
MECCA, CA 92254
Facility's Phone: 760-396-0222
U.S. EPA ID Number: CAR000157206

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1	NON-HAZARDOUS WASTE LIQUID (GROUNDWATER/DECON WATER)	1	DM	45	G	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
9B-1 PROFILE NO: 20101752/WEI1753

ALWAYS WEAR APPROPRIATE PPE & USE SAFE HANDLING METHODS

UST Site 229
Same Profile as previous shipment.

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Pei-Fen Tamashiro
Signature:
Month 7 Day 20 Year 10

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Octavio Quintero
Signature:
Month 7 Day 20 Year 10

Transporter 2 Printed/Typed Name
Signature
Month Day Year

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Sonia Murillo
Signature:
Month 7 Day 23 Year 10

GENERATOR
INT'L
TRANSPORTER
DESIGNATED FACILITY

IDW Laboratory Data

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CLIENT: **RICHARD BRADY & ASSOCIATES**

PROJECT: **NWS SEAL BEACH UST SITE 229**

SDG: **09D294**

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GC-SVOA	**	5000 –
HPLC	**	6000 –
METALS	**	7000 –
WET	**	8000 –
OTHERS	**	9000 –

** - Not Requested

EMAX
LABORATORIES, INC.
1835 W. 205th Street
Torrance, CA 90501
Tel: (310) 618-8889
Fax: (310) 618-0818

Date: 05-21-2009
EMAX Batch No.: 09D294

Attn: Jesse MacNeill

Richard Brady & Associates
3710 Ruffin Road
San Diego, CA 92123

Subject: Laboratory Report
Project: NWS Seal Beach UST Site 229

Enclosed is the Laboratory report for samples received on 04/29/09.
The data reported include :

Sample ID	Control #	Col Date	Matrix	Analysis
SB229-IDW	D294-01	04/29/09	WATER	SEMIVOLATILE ORGANICS BY GCMS
				VOLATILE ORGANICS BY GC/MS

The results are summarized on the following pages.

Please feel free to call if you have any questions concerning
these results.

Sincerely yours,

Caspar J. Pang
Acting Laboratory Director

This report is confidential and intended solely for the use of the individual or entity to whom it is addressed. This report shall not be reproduced except in full or without the written approval of EMAX.

EMAX certifies that the results included in this report meet all NELAC requirements unless noted in the Case Narrative.

CHAIN OF CUSTODY

090294

EMAX LABORATORIES, INC.
1835 W. 205th Street, Torrance, CA 90501
Tel #: 310-618-8889 Fax #: 310-618-0818
Email: info@emaxlabs.com

PO NUMBER:
SAMPLE STORAGE

EMAX CONTROL NO. * ~~090293~~ 4/29
PROJECT CODE: SHAWIN.001.009.00

CLIENT: Richard Brady & Assoc.
PROJECT: Seal Beach UST Site 229
COORDINATOR: Jesse MacNeill
TEL: 858.634.4549 FAX: EMAIL: jmacneille rbrady.net
SEND REPORT TO: Jesse MacNeill
COMPANY: RBA
ADDRESS: 3710 Ruffin Rd. San Diego CA 92123
EMAX PM: Rina Kato

MATRIX CODE	PRESERVATIVE CODE
DW=Drinking Water	IC = Ice
GW=Ground Water	HC = HCl
WW=Waste Water	HN=HNO3
SD=Solid Waste SL=Sludge	SH=NaOH
SS=Soil/ Sediment	ST=Na2S2O3
WP=Wipes PP=Pure Products	ZA=Zinc Acetate
AR=Air	HS=H_2SO_4
O=	

ANALYSIS REQUIRED: VOCs (8260B), SVOCs (8270C)

TAT:
- ☐ Rush ____hrs.
- ☐ Rush ____days
- ☐ 7 days
- ☒ 14 days Prelim
- ☐ 21 days
- ☒ 30 days Final
- ☐ ____days
- ☐

LAB	SAMPLE ID CLIENT	SAMPLING LOCATION	DATE	TIME	CONTAINER NO.	SIZE	TYPE	MATRIX CODE	QC	PRESERVATIVE CODE HC	VOCs (8260B)	SVOCs (8270C)	COMMENTS
1	DSB229-IDW	IDW	4.29.09	1500	6	V	V	W		X	X		
2													
3													
4													
5													
6													
7													
8													
9													
0													

Instructions: V=Various

Cooler #	Temp. (°C)	Sample #s
1	3.4	

SAMPLER

COURIER/AIRBILL

RELINQUISHED BY	Date	Time	RECEIVED BY
Jesse MacNeill	4.29.09	1555	
	4/29/09	1640	

NOTICE: Turn-around-time (TAT) for samples shall not begin untill all discrepancies have been resolved. For samples received and discrepacies resolved after 1500 hrs, TAT shall start at 0800 hrs the next business day. The client is responsible for all cost associted with sample disposal. Samples shall be disposed of as soon as practical (but not prior to fifteen (15) calendar days) after issuance of analytical report unless a different sample disposal schedule is pre-arranged with EMAX. Disposal fee for samples defined by CA Title 22 as non-hazardous shall be $5.00 per sample. EMAX will return hazardous samples to the client at the client's expense unless directed in writing otherwise.

1001

EMAX LABORATORIES, INC.

SAMPLE RECEIPT FORM 1

Type of Delivery	Delivered By/Airbill		
☐ EMAX Courier	See COC	ECN	090294
☐ Client Delivery		Recepient	J-LUNA
☐ Third Party		Date	4-29-09
		Time	1640

COC Inspection

☑ Client Name	☑ Client PM/FC	☐ Sampler Name	☑ Sampling Date/Time/Location	☑ Sample ID	☑ Matrix
☑ Address	☑ Tel # / Fax #	☑ Courier Signature	☑ Analysis Required	☑ Preservative (if any)	☑ TAT
Safety Issues	☑ None	☐ High concentrations expected	☐ Superfund Site samples	☐ Rad screening required	

Comments:

Packaging Inspection

Container	☑ Cooler	☐ Box	☐ Other		
Condition	☐ Custody Seal	☑ Intact	☐ Damaged		
Packaging	☑ Bubble Pack	☐ Styrofoam	☐ Popcorn	☑ Sufficient	☐ _____
Temperatures (Cool, ≤6 °C but not frozen)	☑ Cooler 3.4 °C	☐ Cooler 2_____ °C	☐ Cooler 3_____ °C	☐ Cooler 4_____ °C	☐ Cooler 5_____ °C
	☐ Cooler 6_____ °C	☐ Cooler 7_____ °C	☐ Cooler 8_____ °C	☐ Cooler 9_____ °C	☐ Cooler 10_____ °C

Comments: ☐ **PM was informed on non-compliant coolers imediately.**

DISCREPANCIES

LSID	LSCID	Sample Label ID/COC ID	Discrepancy Code	Corrective Action Code

REVIEWS

Sample Labeling _____ Date 4/29/09

SRF _____ Date 4/29/09

PM RK Date 4/30/09

LEGEND:

Code	Description- Sample Management
A1	Analysis is not indicated in COC
A2	Analysis is not indicated in label
A3	Analysis is inconsistent in COC vis-à-vis label
A4	_____
B1	Sample ID is not indicated in COC
B2	Sample ID is not indicated in label
B3	Sample ID is inconsistent in COC vis-à-vis label
B4	_____
C1	Wrong container
C2	Broken container
C3	Leaking container
C4	_____

Code	Description-Sample Management
D1	Date and/or time is not indicated in COC
D2	Date and/or time is not indicated in label
D3	Date and/or time is inconsistent in COC vis-à-vis label
E1	Insuficient preservative
E2	Improper preservation
F1	Insufficient Sample
F2	Bubble is> 6mm
G1	Temperature is out of range
G2	Out of Holding Time
G3	>20 % solid particle
H1	_____
H2	_____

Code	Description-Project Management
R1	Hold sample(s); wait for further instructions
R2	Proceed as indicated in COC
R3	Refer to attached instruction
R4	Cancel the analysis
R5	_____
R6	_____

REPORTING CONVENTIONS

DATA QUALIFIERS:

Lab Qualifier	AFCEE Qualifier	Description
J	F	Indicates that the analyte is positively identified and the result is less than RL but greater than MDL.
N		Indicates presumptive evidence of a compound.
B	B	Indicates that the analyte is found in the associated method blank as well as in the sample at above QC level.
E	J	Indicates that the result is above the maximum calibration range.
*	*	Out of QC limit.

Note: The above qualifiers are used to flag the results unless the project requires a different set of qualification criteria.

ACRONYMS AND ABBREVIATIONS:

CRDL	Contract Required Detection Limit
RL	Reporting Limit
MRL	Method Reporting Limit
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
DO	Diluted out

DATES

The date and time information for leaching and preparation reflect the beginning date and time of the procedure unless the method, protocol, or project specifically requires otherwise.

LABORATORY REPORT FOR

RICHARD BRADY & ASSOCIATES

NWS SEAL BEACH UST SITE 229

METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

SDG#: 09D294

CASE NARRATIVE

Client : RICHARD BRADY & ASSOCIATES

Project : NWS SEAL BEACH UST SITE 229

SDG : 09D294

METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

One(1) water sample was received on 04/29/09 for Volatile Organics by GC/MS analysis, Method 5030B/8260B in accordance with USEPA SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods and Final SAP (March 2009).

Holding Time
The sample was analyzed within the prescribed holding time.

Instrument Performance and Calibration
Instrument tune check was performed prior to calibration. Instrument mass ratios were within specification. Multi-calibration points were generated to establish initial calibration (ICAL). ICAL was verified using secondary source. Continuing calibration was carried on at a frequency required by the project. All project calibration requirements were satisfied. Refer to calibration summary forms for ICAL, ICV and CCV for details.

Method Blank
Method blank was analyzed at the frequency required by the project. For this SDG, one method blank was analyzed with the samples. Result was compliant to project requirement.

Lab Control Sample
A set of LCS/LCD was analyzed with the samples in this SDG.
Percent recoveries for VO67E05L/C were all within QC limits.

Matrix QC Sample
No matrix QC sample was designated in this SDG.

Surrogate
Surrogates were added on QC and field samples. Surrogate recoveries were within project QC limits.

Sample Analysis
The sample was analyzed according to prescribed analytical procedures. All project requirements were met otherwise anomalies were discussed within the associated QC parameter.
Sample was reported at dilution due to matrix interference. Sample is a foamer and analysis at dilution showed surrogates out of QC limit.

LAB CHRONICLE
VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES
Project : NWS SEAL BEACH UST SITE 229

SDG NO. : 09D294
Instrument ID : T-067

WATER

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1W	V067E05Q	1	NA	05/06/0910:48	05/06/0910:48	REC085	RDC247	V067E05	Method Blank
LCS1W	V067E05L	1	NA	05/06/0908:29	05/06/0908:29	REC080	RDC247	V067E05	Lab Control Sample (LCS)
LCD1W	V067E05C	1	NA	05/06/0908:57	05/06/0908:57	REC081	RDC247	V067E05	LCS Duplicate
SB229-IDW	D294-01I	10	NA	05/06/0911:16	05/06/0911:16	REC086	RDC247	V067E05	Diluted Sample

FN - Filename
% Moist - Percent Moisture

SAMPLE RESULTS

METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D294	Date Extracted:	05/06/09 11:16
Sample ID:	SB229-IDW	Date Analyzed:	05/06/09 11:16
Lab Samp ID:	D294-01I	Dilution Factor:	10
Lab File ID:	REC086	Matrix	: WATER
Ext Btch ID:	V067E05	% Moisture	: NA
Calib. Ref.:	RDC247	Instrument ID	: T-067

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
1,1,1-TRICHLOROETHANE	ND	10	2.0
1,1,2,2-TETRACHLOROETHANE	ND	10	2.0
1,1,2-TRICHLOROETHANE	ND	10	2.0
1,1-DICHLOROETHANE	ND	10	2.0
1,1-DICHLOROETHENE	ND	10	2.0
1,2-DICHLOROETHANE	ND	10	2.0
1,2-DICHLOROPROPANE	ND	10	2.0
2-BUTANONE	ND	100	50
2-HEXANONE	ND	100	50
4-METHYL-2-PENTANONE	ND	100	50
ACETONE	ND	100	50
BENZENE	5.0J	10	2.0
BROMODICHLOROMETHANE	ND	10	2.0
BROMOFORM	ND	10	3.0
BROMOMETHANE	ND	10	2.0
CARBON DISULFIDE	ND	10	2.0
CARBON TETRACHLORIDE	ND	10	2.0
CHLOROBENZENE	ND	10	2.0
CHLOROETHANE	ND	10	2.0
CHLOROFORM	ND	10	2.0
CHLOROMETHANE	ND	10	2.0
CIS-1,2-DICHLOROETHENE	ND	10	2.0
CIS-1,3-DICHLOROPROPENE	ND	10	2.0
DIBROMOCHLOROMETHANE	ND	10	2.0
ETHYLBENZENE	11	10	2.0
M/P-XYLENES	40	20	5.0
MTBE	ND	10	2.0
METHYLENE CHLORIDE	ND	10	5.0
O-XYLENE	13	10	2.0
STYRENE	ND	10	2.0
TETRACHLOROETHENE	ND	10	2.0
TOLUENE	2.5J	10	2.0
TRANS-1,2-DICHLOROETHENE	ND	10	2.0
TRANS-1,3-DICHLOROPROPENE	ND	10	2.0
TRICHLOROETHENE	ND	10	2.0
VINYL CHLORIDE	ND	10	2.0

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	90	70-140
4-BROMOFLUOROBENZENE	91	70-130
TOLUENE-D8	99	70-140

QC SUMMARIES

2005

METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	NA
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	05/06/09
Batch No.	: 09D294	Date Extracted:	05/06/09 10:48
Sample ID:	MBLK1W	Date Analyzed:	05/06/09 10:48
Lab Samp ID:	V067E05Q	Dilution Factor:	1
Lab File ID:	REC085	Matrix	: WATER
Ext Btch ID:	V067E05	% Moisture	: NA
Calib. Ref.:	RDC247	Instrument ID	: T-067

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
1,1,1-TRICHLOROETHANE	ND	1.0	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.20
1,1-DICHLOROETHANE	ND	1.0	0.20
1,1-DICHLOROETHENE	ND	1.0	0.20
1,2-DICHLOROETHANE	ND	1.0	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.20
2-BUTANONE	ND	10	5.0
2-HEXANONE	ND	10	5.0
4-METHYL-2-PENTANONE	ND	10	5.0
ACETONE	ND	10	5.0
BENZENE	ND	1.0	0.20
BROMODICHLOROMETHANE	ND	1.0	0.20
BROMOFORM	ND	1.0	0.30
BROMOMETHANE	ND	1.0	0.20
CARBON DISULFIDE	ND	1.0	0.20
CARBON TETRACHLORIDE	ND	1.0	0.20
CHLOROBENZENE	ND	1.0	0.20
CHLOROETHANE	ND	1.0	0.20
CHLOROFORM	ND	1.0	0.20
CHLOROMETHANE	ND	1.0	0.20
CIS-1,2-DICHLOROETHENE	ND	1.0	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.20
DIBROMOCHLOROMETHANE	ND	1.0	0.20
ETHYLBENZENE	ND	1.0	0.20
M/P-XYLENES	ND	2.0	0.50
MTBE	ND	1.0	0.20
METHYLENE CHLORIDE	ND	1.0	0.50
O-XYLENE	ND	1.0	0.20
STYRENE	ND	1.0	0.20
TETRACHLOROETHENE	ND	1.0	0.20
TOLUENE	ND	1.0	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.20
TRICHLOROETHENE	ND	1.0	0.20
VINYL CHLORIDE	ND	1.0	0.20

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	95	70-140
4-BROMOFLUOROBENZENE	101	70-130
TOLUENE-D8	103	70-130

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: RICHARD BRADY & ASSOCIATES
PROJECT: NWS SEAL BEACH UST SITE 229
BATCH NO.: 09D294
METHOD: SW 5030B/8260B

MATRIX:	WATER			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK1W				
LAB SAMP ID:	V067E05Q	V067E05L	V067E05C		
LAB FILE ID:	REC085	REC080	REC081		
DATE EXTRACTED:	05/06/0910:48	05/06/0908:29	05/06/0908:57	DATE COLLECTED:	NA
DATE ANALYZED:	05/06/0910:48	05/06/0908:29	05/06/0908:57	DATE RECEIVED:	05/06/09
PREP. BATCH:	V067E05	V067E05	V067E05		
CALIB. REF:	RDC247	RDC247	RDC247		

ACCESSION:

PARAMETER	BLNK RSLT (ug/L)	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
1,1-Dichloroethene	ND	10.0	8.73	87	10.0	9.36	94	7	60-130	30
Benzene	ND	10.0	9.15	91	10.0	9.55	95	4	70-130	30
Chlorobenzene	ND	10.0	9.60	96	10.0	10.0	100	4	70-120	30
Toluene	ND	10.0	9.57	96	10.0	10.1	101	5	70-130	30
Trichloroethene	ND	10.0	9.33	93	10.0	9.72	97	4	70-130	30

SURROGATE PARAMETER	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	QC LIMIT (%)
1,2-Dichloroethane-d4	10.0	9.24	92	10.0	9.35	94	70-140
4-Bromofluorobenzene	10.0	9.56	96	10.0	9.47	95	70-130
Toluene-d8	10.0	9.88	99	10.0	10.1	101	70-130

INITIAL CALIBRATIONS

2008

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: EMAX Inc
Lab Code: EMXT Case No.:
Lab File ID: RDC238
Instrument ID: T067
GC Column:RTX502.2ID:0.32mm (mm)

Contract: NWS SEAL BEACH UST SITE 229
SAS No.: SDG No.: 09D294
BFB Injection Date : 04/09/09
BFB Injection Time : 16:48
Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	16.53
75	30.0 - 60.0% of mass 95	40.31
95	Base peak, 100% relative abundance	100.00
96	5.0 - 9.0% of mass 95	7.08
173	Less than 2.0% of mass 174	0.00(0.0)1
174	Greater than 50% of mass 95	80.77
175	5.0 - 9.0% of mass 174	5.61(6.9)1
176	95.0 - 101.0% of mass 174	77.03(95.4)1
177	5.0 - 9.0% of mass 176	4.89(6.3)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD,BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1	VSTD0.3	V067D091	RDC242	04/09/09	18:55
2	VSTD0.5	V067D092	RDC243	04/09/09	19:23
3	VSTD01	V067D093	RDC244	04/09/09	19:51
4	VSTD02	V067D094	RDC245	04/09/09	20:19
5	VSTD05	V067D095	RDC246	04/09/09	20:46
6	VSTD010	V067D096	RDC247	04/09/09	21:14
7	VSTD020	V067D097	RDC248	04/09/09	21:42
8	VSTD030	V067D098	RDC249	04/09/09	22:10
9	VSTD040	V067D099	RDC250	04/09/09	22:39
10	VSTD050	V067D0910	RDC251	04/09/09	23:07

FORM V VOA OLM02.0

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK

BROMOFLUOROBENZENE (BFB)

Lab Name: EMAX Inc
Lab Code: EMXT Case No.:
Lab File ID: RDC257
Instrument ID: T067
GC Column:RTX502.2ID:0.32mm (mm)

Contract: NWS SEAL BEACH UST SITE 229
SAS No.: SDG No.: 09D294
BFB Injection Date : 04/10/09
BFB Injection Time : 09:18
Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	16.65
75	30.0 - 60.0% of mass 95	39.48
95	Base peak, 100% relative abundance	100.00
96	5.0 - 9.0% of mass 95	6.31
173	Less than 2.0% of mass 174	0.00(0.0)1
174	Greater than 50% of mass 95	79.20
175	5.0 - 9.0% of mass 174	5.50(6.9)1
176	95.0 - 101.0% of mass 174	76.75(96.9)1
177	5.0 - 9.0% of mass 176	5.19(6.8)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD,BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1	VSTD010	IV067D0903	RDC258	04/10/09	09:45

FORM V VOA OLM02.0

2010

INITIAL_CALIBRATION - RELATIVE_RESPONSE_FACTOR

Instrument ID :T067
Beginning DateTime :04/09/09 18:55
Spike Units :PPB
IC File :RDC247

Column Spec :RTX502.2 ID :0.32MM
Ending DateTime :04/09/09 23:07
HPChem Method :V067D09

M	IDX	Parameters	.3 18:55 RDC242	.5 19:23 RDC243	1 19:51 RDC244	2 20:19 RDC245	5 20:46 RDC246	10 21:14 RDC247	20 21:42 RDC248	30 22:10 RDC249	40 22:39 RDC250	50 23:07 RDC251	Av_RRF	%_RSD	Av_Rt_M
	1	1,4-DIFLUOROBENZENE	1	1	1	1	1	1	1	1	1	1	1	0	9.3197
	2	Dichlorodifluoromethane	------	0.172	0.217	0.213	0.203	0.193	0.217	0.204	0.208	0.199	0.203	6.99	3.5878
	3	Chloromethane	0.327	0.309	0.311	0.297	0.287	0.265	0.287	0.276	0.278	0.260	0.290	7.39	3.9152
	4	Vinyl chloride	0.286	0.248	0.268	0.261	0.254	0.238	0.251	0.233	0.217	0.193	0.245	10.85	4.0715
	5	Bromomethane	0.351	0.317	0.281	0.264	0.254	0.233	0.251	0.248	0.248	0.237	0.268	14.15	4.6298
	6	Chloroethane	0.164	0.157	0.170	0.167	0.161	0.149	0.165	0.160	0.160	0.155	0.161	3.83	4.7147
	7	Dichlorofluoromethane	0.591	0.582	0.580	0.553	0.594	0.556	0.572	0.555	0.554	0.531	0.567	3.56	4.7191
	8	Trichlorofluoromethane	0.341	0.291	0.334	0.315	0.304	0.284	0.307	0.297	0.295	0.276	0.304	6.86	5.0005
5	9	Acrolein	------	0.011	0.011	0.009	0.011	0.011	0.012	0.012	0.012	0.011	0.011	10.07	5.4241
	10	1,1,2-Trichloro-1,2,2-trifluoroethane	0.189	0.196	0.194	0.187	0.204	0.191	0.189	0.188	0.184	0.176	0.190	4.00	5.4665
5	11	Acetone	------	0.028	0.024	0.022	0.022	0.019	0.019	0.019	0.019	0.017	0.021	16.03	5.4737
	12	sec-Propyl alcohol	------	------	------	------	------	------	------	------	------	------	0.000	0.00	0.0000
	13	1,1-Dichloroethene	0.397	0.403	0.394	0.383	0.410	0.388	0.397	0.384	0.393	0.377	0.393	2.49	5.7033
5	14	tert-Butyl alcohol	------	------	0.008	0.008	0.009	0.009	0.009	0.009	0.010	0.009	0.009	7.14	5.6944
	15	Methyl acetate	------	------	------	------	------	------	------	------	------	------	0.000	0.00	0.0000
	16	Iodomethane	0.512	0.514	0.498	0.481	0.528	0.504	0.503	0.527	0.529	0.507	0.510	2.98	6.1202
	17	Methylene chloride	0.601	0.534	0.436	0.375	0.376	0.345	0.346	0.339	0.345	0.322	0.402	23.42	6.2229
6	18	Acrylonitrile	0.033	0.030	0.031	0.032	0.036	0.034	0.036	0.035	0.038	0.034	0.034	7.19	6.3167
	19	tert-Butyl methyl ether (MTBE)	0.297	0.295	0.302	0.297	0.337	0.316	0.333	0.331	0.350	0.326	0.318	6.19	6.3420
	20	Carbon disulfide	1.016	1.011	0.977	0.950	1.029	0.979	1.023	1.017	1.021	1.003	1.003	2.54	6.4015
	21	Acetonitrile	------	------	------	------	------	------	------	------	------	------	0.000	0.00	0.0000
	22	trans-1,2-Dichloroethene	0.411	0.418	0.407	0.404	0.435	0.416	0.429	0.424	0.427	0.407	0.418	2.55	6.5757
	23	Isopropyl ether (DIPE)	0.729	0.751	0.746	0.737	0.828	0.775	0.816	0.821	0.839	0.780	0.782	5.27	6.8020
	24	Vinyl acetate	------	------	0.201	0.197	0.224	0.223	0.242	0.242	0.250	0.248	0.228	9.04	6.9450
	25	1,1-Dichloroethane	0.502	0.530	0.520	0.503	0.541	0.513	0.531	0.528	0.536	0.517	0.522	2.55	7.0566
	26	tert-Butyl ethyl ether (ETBE)	0.459	0.453	0.474	0.451	0.529	0.511	0.540	0.544	0.574	0.543	0.508	8.86	7.2874
5	27	2-Butanone	0.045	0.040	0.043	0.039	0.042	0.040	0.043	0.042	0.045	0.040	0.042	5.04	7.4765
	28	2,2-Dichloropropane	0.221	0.228	0.228	0.217	0.234	0.223	0.229	0.222	0.224	0.207	0.223	3.34	7.7281
	29	cis-1,2-Dichloroethene	0.401	0.419	0.417	0.407	0.442	0.416	0.437	0.425	0.430	0.404	0.420	3.33	7.7862
	30	Chloroform	0.482	0.475	0.468	0.463	0.489	0.467	0.486	0.475	0.478	0.456	0.474	2.20	7.9797
	31	Bromochloromethane	0.192	0.203	0.205	0.195	0.221	0.207	0.212	0.206	0.210	0.196	0.205	4.27	8.2164
	32	Cyclohexane	------	------	------	------	------	------	------	------	------	------	0.000	0.00	0.0000
	33	Dibromofluoromethane	0.253	0.230	0.292	0.302	0.330	0.296	0.326	0.326	0.327	0.312	0.299	11.36	8.2522
	34	1,1,1-Trichloroethane	0.354	0.374	0.362	0.359	0.388	0.370	0.381	0.377	0.375	0.357	0.370	3.06	8.5008
	35	tert-Amyl methyl ether (TAME)	0.415	0.395	0.400	0.372	0.434	0.415	0.450	0.456	0.484	0.449	0.427	7.85	8.7376
2	36	tert-Butyl formate (TBF)	------	------	------	------	------	------	------	------	------	------	0.000	0.00	0.0000
	37	1,2-Dichloroethane-d4	0.136	0.114	0.149	0.158	0.168	0.149	0.163	0.161	0.161	0.149	0.151	10.62	8.8730
	38	CHLOROBENZENE-D5	1	1	1	1	1	1	1	1	1	1	1	0	14.1823
	39	1,1-Dichloropropene	0.166	0.176	0.154	0.159	0.177	0.171	0.168	0.167	0.171	0.167	0.167	4.15	8.6884
	40	Carbon tetrachloride	0.452	0.454	0.438	0.430	0.453	0.435	0.430	0.430	0.433	0.424	0.438	2.58	8.8656
	41	1,2-Dichloroethane	0.253	0.251	0.247	0.234	0.252	0.236	0.230	0.227	0.236	0.223	0.239	4.64	8.9936
	42	Benzene	1.550	1.543	1.433	1.387	1.453	1.390	1.391	1.404	1.429	1.398	1.438	4.27	9.0681
	43	Trichloroethene	0.400	0.419	0.398	0.387	0.421	0.408	0.411	0.414	0.426	0.413	0.410	2.83	9.8869
	44	Methylcyclohexane	------	------	------	------	------	------	------	------	------	------	0.000	0.00	0.0000
	45	1,2-Dichloropropane	0.361	0.366	0.357	0.345	0.364	0.358	0.355	0.354	0.366	0.353	0.358	1.84	10.1386
	46	Bromodichloromethane	0.362	0.348	0.358	0.346	0.385	0.375	0.374	0.375	0.386	0.373	0.368	3.82	10.5257
	47	Dibromomethane	0.147	0.139	0.151	0.143	0.159	0.153	0.152	0.152	0.157	0.150	0.150	3.98	10.6582
	48	2-Chloroethyl vinyl ether	------	------	------	------	------	------	------	------	------	------	0.000	0.00	0.0000
5	49	4-Methyl-2-pentanone	------	0.102	0.108	0.105	0.123	0.122	0.125	0.126	0.137	0.126	0.119	9.68	10.8782
	50	cis-1,3-Dichloropropene	0.299	0.303	0.320	0.331	0.396	0.400	0.418	0.423	------	------	0.361	14.71	11.3296
	51	Toluene-d8	------	------	1.097	1.184	1.287	1.181	1.235	1.258	1.280	------	1.217	5.58	11.7721
	52	Toluene	1.360	1.446	1.365	1.364	1.510	1.452	1.472	1.477	1.511	1.474	1.443	4.09	11.8998
	53	Ethyl methacrylate	------	------	0.133	0.146	0.185	0.192	0.208	0.213	0.227	0.217	0.190	17.94	11.9438
	54	trans-1,3-Dichloropropene	0.140	0.149	0.181	0.194	0.241	0.247	0.268	0.277	0.298	0.284	0.228	25.29	12.0904
5	55	2-Hexanone	------	0.060	0.060	0.061	0.070	0.072	0.078	0.079	0.089	0.080	0.072	14.36	12.2694
	56	1,1,2-Trichloroethane	0.182	0.174	0.184	0.176	0.196	0.187	0.189	0.186	0.196	0.185	0.186	3.88	12.3852
	57	1,3-Dichloropropane	0.296	0.288	0.309	0.295	0.334	0.320	0.327	0.319	0.336	0.319	0.314	5.33	12.7738
	58	Tetrachloroethene	0.304	0.324	0.316	0.305	0.336	0.325	0.324	0.323	0.329	0.326	0.321	3.19	12.9629
	59	Dibromochloromethane	0.201	0.207	0.217	0.216	0.257	0.250	0.257	0.259	0.275	0.261	0.240	11.16	13.2949
	60	1,2-Dibromoethane	0.168	0.160	0.172	0.171	0.201	0.197	0.200	0.202	0.213	0.202	0.189	9.87	13.6225
	61	1-Chlorohexane	0.344	0.409	0.416	0.438	0.545	0.568	0.593	0.601	0.620	0.609	0.514	19.81	13.6820

T067

05
4/15/09

62	Chlorobenzene	0.973	0.991	0.959	0.935	1.018	1.010	1.018	1.037	1.074	------	1.002	4.23	14.2478
63	Ethylbenzene	1.439	1.479	1.441	1.462	1.664	1.700	1.734	1.735	1.733	------	1.599	8.65	14.2627
64	1,1,1,2-Tetrachloroethane	0.261	0.256	0.266	0.258	0.291	0.287	0.289	0.293	0.304	------	0.278	6.45	14.2759
2 65	m-Xylene & p-Xylene	1.066	1.123	1.093	1.109	1.254	1.264	1.279	1.248	------	------	1.179	7.56	14.3725
66	o-Xylene	1.057	1.101	1.085	1.101	1.290	1.264	1.274	1.287	1.326	1.284	1.207	8.77	15.0652
67	Styrene	0.634	0.658	0.680	0.702	0.867	0.896	0.931	0.958	1.001	0.977	0.830	17.51	15.1098
68	1,2-DICHLOROBENZENE-D4	1	1	1	1	1	1	1	1	1	1	1	0	18.2962
69	Isopropylbenzene	5.180	5.776	5.587	5.919	6.349	6.181	6.105	6.165	6.000	------	5.918	6.07	15.5652
70	Bromoform	0.340	0.361	0.385	0.395	0.440	0.415	0.421	0.425	0.444	------	0.403	8.81	15.7191
71	1,1,2,2-Tetrachloroethane	0.858	0.771	0.845	0.788	0.815	0.739	0.719	0.713	0.739	------	0.776	6.93	15.8250
72	4-Bromofluorobenzene	------	------	1.220	1.367	1.394	1.266	1.339	------	------	------	1.317	5.49	15.9782
73	1,2,3-Trichloropropane	0.053	0.108	0.181	0.184	0.165	0.153	0.119	------	------	------	0.138	34.45	16.0452
74	trans-1,4-Dichloro-2-butene	------	------	------	0.084	0.097	0.104	0.111	0.124	0.133	0.129	0.112	15.97	16.0927
75	n-Propylbenzene	5.249	5.864	5.877	6.243	7.044	7.174	7.359	7.303	------	------	6.514	12.38	16.1591
76	Bromobenzene	1.149	1.181	1.142	1.135	1.170	1.112	1.123	1.122	------	------	1.142	2.10	16.3322
77	1,3,5-Trimethylbenzene	3.427	3.937	3.918	4.191	4.617	4.556	4.614	4.573	3.058	4.176	4.107	13.02	16.3688
78	2-Chlorotoluene	3.610	7.430	3.912	4.217	4.456	4.281	4.412	4.228	3.962	4.332	4.484	23.80	16.4820
79	4-Chlorotoluene	3.301	3.364	3.167	3.075	3.115	3.020	2.955	3.193	3.513	3.027	3.173	5.50	16.5326
80	tert-Butylbenzene	3.640	4.023	3.955	4.280	4.751	4.718	4.688	4.656	4.623	4.527	4.386	8.89	16.8974
81	1,2,4-Trimethylbenzene	2.994	3.362	3.370	3.575	4.036	4.091	4.196	4.193	4.220	4.079	3.812	11.67	16.9569
82	sec-Butylbenzene	4.065	4.802	4.839	5.336	6.155	6.467	6.554	6.453	6.244	------	5.657	16.21	17.1949
83	p-Isopropyltoluene	2.591	2.900	2.941	3.310	4.061	4.408	4.714	4.721	4.710	------	3.817	23.06	17.3686
84	1,3-Dichlorobenzene	1.774	1.821	1.779	1.834	1.948	1.982	2.027	2.038	2.106	2.078	1.939	6.53	17.6128
85	1,4-Dichlorobenzene	1.490	1.499	1.474	1.516	1.636	1.645	1.710	1.708	1.785	1.759	1.622	7.33	17.7602
86	n-Butylbenzene	1.973	2.119	2.264	2.493	3.227	3.897	4.402	4.536	4.627	4.533	3.407	32.67	17.9627
87	1,2-Dichlorobenzene	1.679	1.578	1.531	1.507	1.584	1.560	1.592	1.594	1.642	1.575	1.584	3.12	18.3334
88	1,2-Dibromo-3-chloropropane	------	------	0.050	0.057	0.065	0.066	0.071	0.073	0.077	0.073	0.067	13.67	19.4870
89	1,2,4-Trichlorobenzene	0.350	0.304	0.335	0.386	0.444	0.514	0.595	0.615	0.644	0.653	0.484	28.29	20.9076
90	Hexachlorobutadiene	0.224	0.382	0.360	0.396	0.446	0.519	0.520	0.462	0.426	0.413	0.415	20.63	21.0803
91	Naphthalene	------	------	0.477	0.538	0.571	0.650	0.764	0.821	------	------	0.637	21.02	21.4390
92	1,2,3-Trichlorobenzene	------	0.237	0.262	0.305	0.348	0.392	0.442	0.448	0.480	0.486	0.378	24.90	21.8612

Spike Amount = Nominal Amount * M
Ave_%RSD : 9.7 Max_%RSD : 34.5

Use Least Square Linear Regression with weighting factor of inverse concentration for comps with %_RSD > 15
Resp_Ratio = xo + x1 * Amt_Ratio

IDX	Parameter	x0	x1	CCF
11	Acetone	0.00304	0.01837	0.9987
17	Methylene chloride	0.00937	0.33390	0.9994
53	Ethyl methacrylate	-0.01230	0.21967	0.9992
54	trans-1,3-Dichloropropene	-0.00755	0.28279	0.9985
61	1-Chlorohexane	-0.01280	0.60730	0.9994
67	Styrene	-0.01925	0.97017	0.9992
73	1,2,3-Trichloropropane	-0.00004	0.13795	0.9821*
74	trans-1,4-Dichloro-2-butene	-0.01337	0.12938	0.9978
78	2-Chlorotoluene	0.03769	4.21031	0.9983
82	sec-Butylbenzene	-0.09359	6.41029	0.9996
83	p-Isopropyltoluene	-0.10841	4.68954	0.9990
86	n-Butylbenzene	-0.15078	4.50196	0.9976
89	1,2,4-Trichlorobenzene	-0.01960	0.62628	0.9968
90	Hexachlorobutadiene	-0.00467	0.44876	0.9957
91	Naphthalene	-0.04887	0.79043	0.9959
92	1,2,3-Trichlorobenzene	-0.02084	0.46876	0.9979

Use Quadratic Regression of inv conc w.f. for comps of linear reg of inv conc w.f. with CCF < .995
Resp_Ratio = xo + x1 * Amt_Ratio + x2 * Amt_Ratio * Amt_Ratio

IDX	Parameter	x0	x1	x2	CCF2
73	1,2,3-Trichloropropane	-0.00385	0.19913	-0.03972	0.9990

2912

4/K/09

SECOND SOURCE VERIFICATION

Evaluate Continuing Calibration Report

Data File : D:\HPCHEM\1\DATA\09D10\RDC258.D Vial: 3
Acq On : 10 Apr 2009 9:45 am Operator: MH
Sample : IVO67D0903 Inst : TO67
Misc : 10ppb 8260/50ppb KET-A/50ppb TBA Multiplr: 1.00
MS Integration Params: 524TAIL.P

Method : D:\HPCHEM\1\METHODS\VO67D09.M (RTE Integrator)
Title : METHOD 8260
Last Update : Tue Apr 14 10:21:00 2009
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 300%

		Compound	Amount	Calc.	%Dev	Area%	Dev(min)
1	I	1,4-DIFLUOROBENZENE	10.000	10.000	0.0	110	0.00
2	T	Dichlorodifluoromethane	10.000	10.520	-5.2	121	0.00
3	P,T	Chloromethane	10.000	9.577	4.2	115	0.00
4	C,T	Vinyl chloride	10.000	10.403	-4.0	117	-0.01
5	T	Bromomethane	10.000	9.021	9.8	114	0.02
6	T	Chloroethane	10.000	9.951	0.5	118	0.00
7	T	Dichlorofluoromethane	10.000	9.610	3.9	107	0.00
8	T	Trichlorofluoromethane	10.000	9.535	4.6	112	0.00
9	T	Acrolein	50.000	54.008	-8.0	119	0.00
10	T	1,1,2-Trichloro-1,2,2-trifl	10.000	9.663	3.4	105	0.00
11	T	Acetone	50.000	53.899	-7.8	117	0.00
12	T	sec-Propyl alcohol	-1.000	0.000	0.0	0	0.00
13	C,TM	1,1-Dichloroethene	10.000	9.755	2.4	108	0.00
14	T	tert-Butyl alcohol	50.000	57.780	-15.6	127	-0.01
15	T	Methyl acetate	-1.000	0.000	0.0	0	0.00
16	T	Iodomethane	10.000	9.776	2.2	108	0.00
17	T	Methylene chloride	10.000	9.885	1.2	108	0.00
18	T	Acrylonitrile	60.000	62.898	-4.8	115	0.00
19	T	tert-Butyl methyl ether (MT	10.000	10.349	-3.5	114	0.00
20	T	Carbon disulfide	10.000	10.026	-0.3	112	0.00
21	T	Acetonitrile	-1.000	0.000	0.0	0	0.00
22	T	trans-1,2-Dichloroethene	10.000	9.912	0.9	109	0.00
23	T	Isopropyl ether (DIPE)	10.000	10.350	-3.5	114	0.00
24	T	Vinyl acetate	10.000	10.689	-6.9	120	0.00
25	P,T	1,1-Dichloroethane	10.000	9.867	1.3	110	0.00
26	T	tert-Butyl ethyl ether (ETB	10.000	10.262	-2.6	112	0.00
27	T	2-Butanone	50.000	49.754	0.5	115	0.00
28	T	2,2-Dichloropropane	10.000	11.003	-10.0	121	0.00
29	T	cis-1,2-Dichloroethene	10.000	10.111	-1.1	112	0.00
30	C,T	Chloroform	10.000	9.629	3.7	107	0.00
31	T	Bromochloromethane	10.000	10.045	-0.4	109	0.00
32	T	Cyclohexane	-1.000	0.000	0.0	0	0.00
33	S	Dibromofluoromethane	10.000	10.686	-6.9	118	0.02
34	T	1,1,1-Trichloroethane	10.000	9.912	0.9	108	0.02
35	T	tert-Amyl methyl ether (TAM	10.000	10.297	-3.0	116	0.00
36	T	tert-Butyl formate (TBF)	-1.000	0.000	0.0	0	0.00
37	S	1,2-Dichloroethane-d4	10.000	10.553	-5.5	117	0.00
38	I	CHLOROBENZENE-D5	10.000	10.000	0.0	110	0.00
39	T	1,1-Dichloropropene	10.000	10.180	-1.8	110	0.00
40	T	Carbon tetrachloride	10.000	9.692	3.1	107	0.00

(#) = Out of Range

4/15/09

2014

Evaluate Continuing Calibration Report

Data File : D:\HPCHEM\1\DATA\09D10\RDC258.D Vial: 3
Acq On : 10 Apr 2009 9:45 am Operator: MH
Sample : IV067D0903 Inst : TO67
Misc : 10ppb 8260/50ppb KET-A/50ppb TBA Multiplr: 1.00
MS Integration Params: 524TAIL.P

Method : D:\HPCHEM\1\METHODS\VO67D09.M (RTE Integrator)
Title : METHOD 8260
Last Update : Tue Apr 14 10:21:00 2009
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 300%

		Compound	Amount	Calc.	%Dev	Area%	Dev(min)
41	T	1,2-Dichloroethane	10.000	9.640	3.6	107	0.00
42	M,T	Benzene	10.000	9.567	4.3	109	0.00
43	M,T	Trichloroethene	10.000	9.882	1.2	109	0.02
44	T	Methylcyclohexane	-1.000	0.000	0.0	0	0.00
45	C,T	1,2-Dichloropropane	10.000	10.124	-1.2	111	0.00
46	T	Bromodichloromethane	10.000	10.169	-1.7	110	0.00
47	T	Dibromomethane	10.000	10.301	-3.0	112	0.00
48	T	2-Chloroethyl vinyl ether	-1.000	0.000	0.0	133	0.02
49	T	4-Methyl-2-pentanone	50.000	53.021	-6.0	114	0.00
50	T	cis-1,3-Dichloropropene	10.000	11.471	-14.7	114	0.00
51	S	Toluene-d8	10.000	10.056	-0.6	114	0.00
52	C,TM	Toluene	10.000	10.014	-0.1	109	0.02
53	T	Ethyl methacrylate	10.000	9.640	3.6	114	0.00
54	T	trans-1,3-Dichloropropene	10.000	9.717	2.8	119	0.00
55	T	2-Hexanone	50.000	52.215	-4.4	114	0.00
56	T	1,1,2-Trichloroethane	10.000	10.167	-1.7	111	0.00
57	T	1,3-Dichloropropane	10.000	10.273	-2.7	111	0.00
58	T	Tetrachloroethene	10.000	10.068	-0.7	109	0.00
59	T	Dibromochloromethane	10.000	10.719	-7.2	113	0.00
60	T	1,2-Dibromoethane	10.000	10.516	-5.2	111	0.00
61	T	1-Chlorohexane	10.000	9.962	0.4	115	0.00
62	P,M	Chlorobenzene	10.000	10.028	-0.3	109	0.00
63	C,T	Ethylbenzene	10.000	10.518	-5.2	109	0.00
64	T	1,1,1,2-Tetrachloroethane	10.000	10.338	-3.4	110	0.00
65	T	m-Xylene & p-Xylene	20.000	21.394	-7.0	110	0.02
66	T	o-Xylene	10.000	10.374	-3.7	109	0.00
67	T	Styrene	10.000	9.400	6.0	110	0.00
68	I	1,2-DICHLOROBENZENE-D4	10.000	10.000	0.0	114	0.00
69	T	Isopropylbenzene	10.000	9.914	0.9	108	0.02
70	P,T	Bromoform	10.000	10.071	-0.7	111	0.00
71	P,T	1,1,2,2-Tetrachloroethane	10.000	9.366	6.3	112	0.00
72	S	4-Bromofluorobenzene	10.000	10.003	-0.0	118	0.02
73	T	1,2,3-Trichloropropane	10.000	10.197	-2.0	117	0.00
74	T	trans-1,4-Dichloro-2-butene	10.000	9.800	2.0	124	0.00
75	T	n-Propylbenzene	10.000	10.809	-8.1	112	0.00
76	T	Bromobenzene	10.000	9.386	6.1	110	0.00
77	T	1,3,5-Trimethylbenzene	10.000	10.517	-5.2	108	0.02
78	T	2-Chlorotoluene	10.000	9.210	7.9	104	0.00
79	T	4-Chlorotoluene	10.000	9.944	0.6	119	0.02
80	T	tert-Butylbenzene	10.000	10.168	-1.7	107	0.00

(#) = Out of Range

Evaluate Continuing Calibration Report

Data File : D:\HPCHEM\1\DATA\09D10\RDC258.D Vial: 3
Acq On : 10 Apr 2009 9:45 am Operator: MH
Sample : IV067D0903 Inst : TO67
Misc : 10ppb 8260/50ppb KET-A/50ppb TBA Multiplr: 1.00
MS Integration Params: 524TAIL.P

Method : D:\HPCHEM\1\METHODS\VO67D09.M (RTE Integrator)
Title : METHOD 8260
Last Update : Tue Apr 14 10:21:00 2009
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 300%

		Compound	Amount	Calc.	%Dev	Area%	Dev(min)
81	T	1,2,4-Trimethylbenzene	10.000	10.429	-4.3	111	0.00
82	T	sec-Butylbenzene	10.000	9.895	1.1	110	0.00
83	T	p-Isopropyltoluene	10.000	9.511	4.9	112	0.02
84	T	1,3-Dichlorobenzene	10.000	10.012	-0.1	111	0.00
85	T	1,4-Dichlorobenzene	10.000	10.085	-0.9	113	0.00
86	T	n-Butylbenzene	10.000	9.421	5.8	119	0.02
87	T	1,2-Dichlorobenzene	10.000	9.703	3.0	112	0.02
88	T	1,2-Dibromo-3-chloropropane	10.000	10.482	-4.8	120	0.00
89	T	1,2,4-Trichlorobenzene	10.000	8.745	12.6	117	0.02
90	T	Hexachlorobutadiene	10.000	11.209	-12.1	109	0.00
91	T	Naphthalene	10.000	8.922	10.8	115	0.00
92	T	1,2,3-Trichlorobenzene	10.000	8.725	12.8	113	0.02

(#) = Out of Range SPCC's out = 0 CCC's out = 0

CT 4/15/09

2016

DAILY CALIBRATIONS

8A

VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: EMAX Inc
Lab Code: EMXT
Lab File ID: RDC247
Instrument ID: T067
GC Column: RTX502.2 ID: 0.32mm (mm)

Project: NWS SEAL BEACH UST SITE 229
SDG No.: 09D294
Date Analyzed: 04/09/09
Time Analyzed: 21:14
Heated Purge: (Y/N) N

		IS1(DBF)		IS2(CBZ)		IS3(DCB)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	2760488	9.32	2233119	14.19	618392	18.30
	UPPER LIMIT	5520976	9.82	4466238	14.69	1236784	18.80
	LOWER LIMIT	1380244	8.82	1116560	13.69	309196	17.80
	SAMPLE ID						
1	VSTD010	2496392	9.32	2040951	14.17	580877	18.28
2	MBLK1W	2463118	9.32	1860463	14.19	445129	18.30
3	LCS1W	2610910	9.31	2109612	14.18	603822	18.28
4	LCD1W	2655751	9.32	2130136	14.17	615177	18.28
5	SB229-IDW	2128272	9.32	1720254	14.19	520810	18.31

IS1 (DFB) = 1,4-Difluorobenzene
IS2 (CBZ) = Chlorobenzene-d5
IS3 (DCB) = 1,2-Dichlorobenzene-d4

AREA UPPER LIMIT = + 100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
AREA UPPER LIMIT = + 50% of surrogate area
AREA LOWER LIMIT = - 50% of surrogate area

Column used to flag internal standard area values with an asterisk
* Values outside of QC limits.

FORM VIII VOA-8260 1/2000

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: EMAX Inc
Lab Code: EMXT Case No.:
Lab File ID: REC076
Instrument ID: T067
GC Column:RTX502.2ID:0.32mm (mm)

Contract: NWS SEAL BEACH UST SITE 229
SAS No.: SDG No.: 09D294
BFB Injection Date : 05/06/09
BFB Injection Time : 06:37
Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	17.16
75	30.0 - 60.0% of mass 95	40.06
95	Base peak, 100% relative abundance	100.00
96	5.0 - 9.0% of mass 95	6.78
173	Less than 2.0% of mass 174	0.00(0.0)1
174	Greater than 50% of mass 95	74.78
175	5.0 - 9.0% of mass 174	5.38(7.2)1
176	95.0 - 101.0% of mass 174	72.24(96.6)1
177	5.0 - 9.0% of mass 176	4.96(6.9)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD,BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1	VSTD010	CV067D0915	REC079	05/06/09	08:01
2	MBLK1W	V067E05Q	REC085	05/06/09	10:48
3	LCS1W	V067E05L	REC080	05/06/09	08:29
4	LCD1W	V067E05C	REC081	05/06/09	08:57
5	SB229-IDW	D294-01I	REC086	05/06/09	11:16

FORM V VOA OLM02.0

Evaluate Continuing Calibration Report

Data File : D:\HPCHEM\1\DATA\09E06\REC079.D Vial: 5
Acq On : 6 May 2009 8:01 am Operator: MH
Sample : CVO67D0915 Inst : TO67
Misc : 10ppb 8260/50ppb KET-A/50ppb TBA Multiplr: 1.00
MS Integration Params: 524TAIL.P

Method : D:\HPCHEM\1\METHODS\VO67D09.M (RTE Integrator)
Title : METHOD 8260
Last Update : Tue Apr 14 10:21:00 2009
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 300%

		Compound	Amount	Calc.	%Dev	Area%	Dev(min)
1	I	1,4-DIFLUOROBENZENE	10.000	10.000	0.0	90	0.00
2	T	Dichlorodifluoromethane	10.000	8.695	13.0	83	0.00
3	P,T	Chloromethane	10.000	8.475	15.3	84	0.00
4	C,T	Vinyl chloride	10.000	8.686	13.1	81	-0.01
5	T	Bromomethane	10.000	7.733	22.7#	81	0.02
6	T	Chloroethane	10.000	8.942	10.6	87	0.00
7	T	Dichlorofluoromethane	10.000	9.250	7.5	85	0.00
8	T	Trichlorofluoromethane	10.000	8.355	16.4	81	0.00
9	T	Acrolein	50.000	35.357	29.3#	64	0.00
10	T	1,1,2-Trichloro-1,2,2-trifl	10.000	9.051	9.5	81	-0.01
11	T	Acetone	50.000	45.155	9.7	82	0.00
12	T	sec-Propyl alcohol	-1.000	0.000	0.0	0	0.00
13	C,TM	1,1-Dichloroethene	10.000	9.215	7.9	84	0.00
14	T	tert-Butyl alcohol	50.000	52.801	-5.6	96	0.00
15	T	Methyl acetate	-1.000	0.000	0.0	0	0.00
16	T	Iodomethane	10.000	8.955	10.4	82	0.00
17	T	Methylene chloride	10.000	9.405	6.0	85	0.00
18	T	Acrylonitrile	60.000	56.238	6.3	85	0.00
19	T	tert-Butyl methyl ether (MT	10.000	9.328	6.7	85	0.00
20	T	Carbon disulfide	10.000	8.587	14.1	80	0.00
21	T	Acetonitrile	-1.000	0.000	0.0	0	0.00
22	T	trans-1,2-Dichloroethene	10.000	9.403	6.0	85	-0.01
23	T	Isopropyl ether (DIPE)	10.000	9.534	4.7	87	0.00
24	T	Vinyl acetate	10.000	9.813	1.9	91	-0.01
25	P,T	1,1-Dichloroethane	10.000	9.390	6.1	86	0.00
26	T	tert-Butyl ethyl ether (ETB	10.000	8.979	10.2	81	-0.01
27	T	2-Butanone	50.000	43.736	12.5	83	0.00
28	T	2,2-Dichloropropane	10.000	10.104	-1.0	91	0.00
29	T	cis-1,2-Dichloroethene	10.000	9.444	5.6	86	0.00
30	C,T	Chloroform	10.000	9.329	6.7	86	0.00
31	T	Bromochloromethane	10.000	9.072	9.3	81	0.00
32	T	Cyclohexane	-1.000	0.000	0.0	0	0.00
33	S	Dibromofluoromethane	10.000	9.829	1.7	90	0.00
34	T	1,1,1-Trichloroethane	10.000	9.222	7.8	83	0.00
35	T	tert-Amyl methyl ether (TAM	10.000	8.726	12.7	81	0.00
36	T	tert-Butyl formate (TBF)	-1.000	0.000	0.0	0	0.00
37	S	1,2-Dichloroethane-d4	10.000	9.432	5.7	86	0.00
38	I	CHLOROBENZENE-D5	10.000	10.000	0.0	91	-0.01
39	T	1,1-Dichloropropene	10.000	9.410	5.9	84	0.00
40	T	Carbon tetrachloride	10.000	9.237	7.6	85	-0.01

(#) = Out of Range

2020

Evaluate Continuing Calibration Report

Data File : D:\HPCHEM\1\DATA\09E06\REC079.D Vial: 5
Acq On : 6 May 2009 8:01 am Operator: MH
Sample : CVO67D0915 Inst : TO67
Misc : 10ppb 8260/50ppb KET-A/50ppb TBA Multiplr: 1.00
MS Integration Params: 524TAIL.P

Method : D:\HPCHEM\1\METHODS\VO67D09.M (RTE Integrator)
Title : METHOD 8260
Last Update : Tue Apr 14 10:21:00 2009
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 300%

		Compound	Amount	Calc.	%Dev	Area%	Dev(min)
41	T	1,2-Dichloroethane	10.000	8.965	10.4	83	0.00
42	M,T	Benzene	10.000	9.057	9.4	86	-0.01
43	M,T	Trichloroethene	10.000	9.631	3.7	88	0.00
44	T	Methylcyclohexane	-1.000	0.000	0.0	0	0.00
45	C,T	1,2-Dichloropropane	10.000	9.306	6.9	85	0.00
46	T	Bromodichloromethane	10.000	9.640	3.6	87	0.00
47	T	Dibromomethane	10.000	9.461	5.4	85	0.00
48	T	2-Chloroethyl vinyl ether	-1.000	0.000	0.0	0	-10.82#
49	T	4-Methyl-2-pentanone	50.000	45.972	8.1	82	-0.01
50	T	cis-1,3-Dichloropropene	10.000	10.737	-7.4	89	0.00
51	S	Toluene-d8	10.000	9.808	1.9	92	-0.01
52	C,TM	Toluene	10.000	9.575	4.3	87	0.00
53	T	Ethyl methacrylate	10.000	9.265	7.3	91	0.00
54	T	trans-1,3-Dichloropropene	10.000	8.977	10.2	91	0.00
55	T	2-Hexanone	50.000	50.345	-0.7	92	0.00
56	T	1,1,2-Trichloroethane	10.000	9.620	3.8	87	-0.01
57	T	1,3-Dichloropropane	10.000	9.654	3.5	87	-0.01
58	T	Tetrachloroethene	10.000	9.753	2.5	88	-0.01
59	T	Dibromochloromethane	10.000	10.034	-0.3	88	0.00
60	T	1,2-Dibromoethane	10.000	9.865	1.3	86	0.00
61	T	1-Chlorohexane	10.000	9.768	2.3	93	0.00
62	P,M	Chlorobenzene	10.000	9.765	2.3	89	-0.01
63	C,T	Ethylbenzene	10.000	10.220	-2.2	88	0.00
64	T	1,1,1,2-Tetrachloroethane	10.000	9.895	1.1	88	-0.01
65	T	m-Xylene & p-Xylene	20.000	20.638	-3.2	88	0.00
66	T	o-Xylene	10.000	10.099	-1.0	88	0.00
67	T	Styrene	10.000	9.395	6.1	91	-0.01
68	I	1,2-DICHLOROBENZENE-D4	10.000	10.000	0.0	94	-0.01
69	T	Isopropylbenzene	10.000	9.864	1.4	89	0.00
70	P,T	Bromoform	10.000	9.466	5.3	86	-0.01
71	P,T	1,1,2,2-Tetrachloroethane	10.000	8.774	12.3	87	-0.01
72	S	4-Bromofluorobenzene	10.000	9.464	5.4	92	0.00
73	T	1,2,3-Trichloropropane	10.000	9.356	6.4	90	-0.01
74	T	trans-1,4-Dichloro-2-butene	10.000	8.827	11.7	91	0.00
75	T	n-Propylbenzene	10.000	10.917	-9.2	93	0.00
76	T	Bromobenzene	10.000	9.407	5.9	91	-0.01
77	T	1,3,5-Trimethylbenzene	10.000	10.667	-6.7	90	0.00
78	T	2-Chlorotoluene	10.000	10.419	-4.2	97	0.00
79	T	4-Chlorotoluene	10.000	8.579	14.2	85	0.00
80	T	tert-Butylbenzene	10.000	10.206	-2.1	89	-0.01

(#) = Out of Range

Evaluate Continuing Calibration Report

Data File : D:\HPCHEM\1\DATA\09E06\REC079.D Vial: 5
Acq On : 6 May 2009 8:01 am Operator: MH
Sample : CVO67D0915 Inst : TO67
Misc : 10ppb 8260/50ppb KET-A/50ppb TBA Multiplr: 1.00
MS Integration Params: 524TAIL.P

Method : D:\HPCHEM\1\METHODS\VO67D09.M (RTE Integrator)
Title : METHOD 8260
Last Update : Tue Apr 14 10:21:00 2009
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 300%

		Compound	Amount	Calc.	%Dev	Area%	Dev(min)
81	T	1,2,4-Trimethylbenzene	10.000	10.804	-8.0	95	-0.01
82	T	sec-Butylbenzene	10.000	10.124	-1.2	93	0.00
83	T	p-Isopropyltoluene	10.000	10.211	-2.1	100	0.00
84	T	1,3-Dichlorobenzene	10.000	10.565	-5.6	97	0.00
85	T	1,4-Dichlorobenzene	10.000	10.704	-7.0	99	-0.01
86	T	n-Butylbenzene	10.000	10.795	-7.9	114	0.00
87	T	1,2-Dichlorobenzene	10.000	10.075	-0.7	96	0.00
88	T	1,2-Dibromo-3-chloropropane	10.000	10.376	-3.8	98	0.00
89	T	1,2,4-Trichlorobenzene	10.000	11.579	-15.8	129	0.00
90	T	Hexachlorobutadiene	10.000	12.400	-24.0#	100	-0.01
91	T	Naphthalene	10.000	13.277	-32.8#	145	-0.01
92	T	1,2,3-Trichlorobenzene	10.000	11.487	-14.9	124	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Evaluate Continuing Calibration Report

Data File : D:\HPCHEM\1\DATA\09E06\REC079.D Vial: 5
Acq On : 6 May 2009 8:01 am Operator: MH
Sample : CVO67D0915 Inst : TO67
Misc : 10ppb 8260/50ppb KET-A/50ppb TBA Multiplr: 1.00
MS Integration Params: 524TAIL.P

Method : D:\HPCHEM\1\METHODS\VO67D09.M (RTE Integrator)
Title : METHOD 8260
Last Update : Tue Apr 14 10:21:00 2009
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 300%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	I	1,4-DIFLUOROBENZENE	1.000	1.000	0.0	90	0.00
2	T	Dichlorodifluoromethane	0.203	0.177	12.8	83	0.00
3	P,T	Chloromethane	0.290	0.246	15.2	84	0.00
4	C,T	Vinyl chloride	0.245	0.213	13.1	81	-0.01
5	T	Bromomethane	0.268	0.208	22.4#	81	0.02
6	T	Chloroethane	0.161	0.144	10.6	87	0.00
7	T	Dichlorofluoromethane	0.567	0.524	7.6	85	0.00
8	T	Trichlorofluoromethane	0.304	0.254	16.4	81	0.00
9	T	Acrolein	0.011	0.008	27.3#	64	0.00
10	T	1,1,2-Trichloro-1,2,2-trifl	0.190	0.172	9.5	81	-0.01
11	T	Acetone	0.021	0.017	19.0	82	0.00
12	T	sec-Propyl alcohol	0.000	0.000	0.0	0#	0.00
13	C,TM	1,1-Dichloroethene	0.393	0.362	7.9	84	0.00
14	T	tert-Butyl alcohol	0.009	0.009	0.0	96	0.00
15	T	Methyl acetate	0.000	0.000	0.0	0#	0.00
16	T	Iodomethane	0.510	0.457	10.4	82	0.00
17	T	Methylene chloride	0.402	0.323	19.7	85	0.00
18	T	Acrylonitrile	0.034	0.032	5.9	85	0.00
19	T	tert-Butyl methyl ether (MT	0.318	0.297	6.6	85	0.00
20	T	Carbon disulfide	1.003	0.861	14.2	80	0.00
21	T	Acetonitrile	0.000	0.000	0.0	0#	0.00
22	T	trans-1,2-Dichloroethene	0.418	0.393	6.0	85	-0.01
23	T	Isopropyl ether (DIPE)	0.782	0.746	4.6	87	0.00
24	T	Vinyl acetate	0.228	0.224	1.8	91	-0.01
25	P,T	1,1-Dichloroethane	0.522	0.490	6.1	86	0.00
26	T	tert-Butyl ethyl ether (ETB	0.508	0.456	10.2	81	-0.01
27	T	2-Butanone	0.042	0.037	11.9	83	0.00
28	T	2,2-Dichloropropane	0.223	0.226	-1.3	91	0.00
29	T	cis-1,2-Dichloroethene	0.420	0.396	5.7	86	0.00
30	C,T	Chloroform	0.474	0.442	6.8	86	0.00
31	T	Bromochloromethane	0.205	0.186	9.3	81	0.00
32	T	Cyclohexane	0.000	0.000	0.0	0#	0.00
33	S	Dibromofluoromethane	0.299	0.294	1.7	90	0.00
34	T	1,1,1-Trichloroethane	0.370	0.341	7.8	83	0.00
35	T	tert-Amyl methyl ether (TAM	0.427	0.373	12.6	81	0.00
36	T	tert-Butyl formate (TBF)	0.000	0.000	0.0	0#	0.00
37	S	1,2-Dichloroethane-d4	0.151	0.142	6.0	86	0.00
38	I	CHLOROBENZENE-D5	1.000	1.000	0.0	91	-0.01
39	T	1,1-Dichloropropene	0.167	0.158	5.4	84	0.00
40	T	Carbon tetrachloride	0.438	0.404	7.8	85	-0.01

(#) = Out of Range

Evaluate Continuing Calibration Report

Data File : D:\HPCHEM\1\DATA\09E06\REC079.D Vial: 5
Acq On : 6 May 2009 8:01 am Operator: MH
Sample : CVO67D0915 Inst : TO67
Misc : 10ppb 8260/50ppb KET-A/50ppb TBA Multiplr: 1.00
MS Integration Params: 524TAIL.P

Method : D:\HPCHEM\1\METHODS\VO67D09.M (RTE Integrator)
Title : METHOD 8260
Last Update : Tue Apr 14 10:21:00 2009
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 300%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
41	T	1,2-Dichloroethane	0.239	0.214	10.5	83	0.00
42	M,T	Benzene	1.438	1.302	9.5	86	-0.01
43	M,T	Trichloroethene	0.410	0.395	3.7	88	0.00
44	T	Methylcyclohexane	0.000	0.000	0.0	0#	0.00
45	C,T	1,2-Dichloropropane	0.358	0.333	7.0	85	0.00
46	T	Bromodichloromethane	0.368	0.355	3.5	87	0.00
47	T	Dibromomethane	0.150	0.142	5.3	85	0.00
48	T	2-Chloroethyl vinyl ether	0.000	0.000	0.0	0#	-10.82#
49	T	4-Methyl-2-pentanone	0.119	0.110	7.6	82	-0.01
50	T	cis-1,3-Dichloropropene	0.361	0.388	-7.5	89	0.00
51	S	Toluene-d8	1.217	1.194	1.9	92	-0.01
52	C,TM	Toluene	1.443	1.382	4.2	87	0.00
53	T	Ethyl methacrylate	0.190	0.191	-0.5	91	0.00
54	T	trans-1,3-Dichloropropene	0.228	0.246	-7.9	91	0.00
55	T	2-Hexanone	0.072	0.073	-1.4	92	0.00
56	T	1,1,2-Trichloroethane	0.186	0.178	4.3	87	-0.01
57	T	1,3-Dichloropropane	0.314	0.303	3.5	87	-0.01
58	T	Tetrachloroethene	0.321	0.313	2.5	88	-0.01
59	T	Dibromochloromethane	0.240	0.241	-0.4	88	0.00
60	T	1,2-Dibromoethane	0.189	0.186	1.6	86	0.00
61	T	1-Chlorohexane	0.514	0.580	-12.8	93	0.00
62	P,M	Chlorobenzene	1.002	0.978	2.4	89	-0.01
63	C,T	Ethylbenzene	1.599	1.634	-2.2	88	0.00
64	T	1,1,1,2-Tetrachloroethane	0.278	0.275	1.1	88	-0.01
65	T	m-Xylene & p-Xylene	1.179	1.217	-3.2	88	0.00
66	T	o-Xylene	1.207	1.219	-1.0	88	0.00
67	T	Styrene	0.830	0.892	-7.5	91	-0.01
68	I	1,2-DICHLOROBENZENE-D4	1.000	1.000	0.0	94	-0.01
69	T	Isopropylbenzene	5.918	5.837	1.4	89	0.00
70	P,T	Bromoform	0.403	0.381	5.5	86	-0.01
71	P,T	1,1,2,2-Tetrachloroethane	0.776	0.681	12.2	87	-0.01
72	S	4-Bromofluorobenzene	1.317	1.246	5.4	92	0.00
73	T	1,2,3-Trichloropropane	0.138	0.148	-7.2	90	-0.01
74	T	trans-1,4-Dichloro-2-butene	0.112	0.101	9.8	91	0.00
75	T	n-Propylbenzene	6.514	7.111	-9.2	93	0.00
76	T	Bromobenzene	1.142	1.074	6.0	91	-0.01
77	T	1,3,5-Trimethylbenzene	4.107	4.381	-6.7	90	0.00
78	T	2-Chlorotoluene	4.484	4.425	1.3	97	0.00
79	T	4-Chlorotoluene	3.173	2.722	14.2	85	0.00
80	T	tert-Butylbenzene	4.386	4.477	-2.1	89	-0.01

(#) = Out of Range

Evaluate Continuing Calibration Report

Data File : D:\HPCHEM\1\DATA\09E06\REC079.D Vial: 5
Acq On : 6 May 2009 8:01 am Operator: MH
Sample : CVO67D0915 Inst : TO67
Misc : 10ppb 8260/50ppb KET-A/50ppb TBA Multiplr: 1.00
MS Integration Params: 524TAIL.P

Method : D:\HPCHEM\1\METHODS\VO67D09.M (RTE Integrator)
Title : METHOD 8260
Last Update : Tue Apr 14 10:21:00 2009
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 300%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
81	T	1,2,4-Trimethylbenzene	3.812	4.118	-8.0	95	-0.01
82	T	sec-Butylbenzene	5.657	6.396	-13.1	93	0.00
83	T	p-Isopropyltoluene	3.817	4.680	-22.6#	100	0.00
84	T	1,3-Dichlorobenzene	1.939	2.048	-5.6	97	0.00
85	T	1,4-Dichlorobenzene	1.622	1.736	-7.0	99	-0.01
86	T	n-Butylbenzene	3.407	4.709	-38.2#	114	0.00
87	T	1,2-Dichlorobenzene	1.584	1.596	-0.8	96	0.00
88	T	1,2-Dibromo-3-chloropropane	0.067	0.069	-3.0	98	0.00
89	T	1,2,4-Trichlorobenzene	0.484	0.706	-45.9#	129	0.00
90	T	Hexachlorobutadiene	0.415	0.552	-33.0#	100	-0.01
91	T	Naphthalene	0.637	1.001	-57.1#	145	-0.01
92	T	1,2,3-Trichlorobenzene	0.378	0.518	-37.0#	124	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

ANALYTICAL LOGS

EMAX LABORATORIES, INC.

ANALYSIS LOG FOR VOLATILES

SOP ☑ EMAX-8260 Rev.No. 4 ☐ EMAX-524.2 Rev.No. 4 ☐ EMAX-CLP-VOA ☐ EMAX 624 Rev.No. 1 ☐

Start Date: 4/9/09 ☐ 5-ml Purge ☑ 25-ml Purge

Book # A67 -038

BATCH V067D096

Sample Prep. ID	Data File Name	Lab Sample ID	Sample Amount	DF	Matrix pH-W	Matrix S	Notes
01	RDC238	BFB67D19	2mL	N/A	N/A	N/A	4:48pm
02	239	V067D091	0.5/1.5/1.5 L				0.3/1.5/1.8 ppb 8260
03	240	2	0.5/2.5/2.5 L				0.5/2.5/3.0 ppb
04	241	3	1.0/5.0/5.0 L				1.0/5.0/6.0 ppb
05	242	4 1	0.3/1.5/1.5 L				0.3/1.5/1.8 ppb
06	243	5 2	0.5/2.5/2.5 L				0.5/2.5/3.0 ppb
07	244	6 3	1.0/5.0/5.0 L				1.0/5.0/6.0 ppb
08	245	7 4	2.0/10.0/10.0 L				2.0/10.0/12.0 ppb
09	246	8 5	5.0/25.0/25.0 L				5.0/25.0/30.0 ppb
10	247	9 6	10.0/50.0/50.0 L				10.0/50.0/60.0 ppb
11	248	7	20.0/100.0/100.0 L				20.0/100.0/120.0 ppb
12	249	8	30.0/150.0/150.0 L				30.0/150.0/180.0 ppb
13	250	9	40.0/200.0/200.0 L				40.0/200.0/240.0 ppb
14	251	10	50.0/250.0/250.0 L				50.0/250.0/300.0 ppb
15	252	11/55	25mL				
16	253	V067D093	↓				
17	254	V067D0901	1/1/5 L				
18	255	↓ 2	↓				
19	256	BLANK	25mL				4/10/09 1:26am
20							
21							
22							
23							
24							
25			4/10/09				

Instrument No.	67
INITIAL CALIBRATION REFERENCE	
DATE	4/9/09
ICAL ID	V067D09
STANDARDS	
NAME	ID / CONC. (mg/L)
DCC Gases	S61-14-36-2
DCC 8260	-32-2
DCC KETONE	-35-1
BFB	-10-2
IS/SURR.	-37-2 50/250
LCS Gases	-34-3
LCS 8260	-32-3
LCS KETONE	-16-1
SOLVENT	ID
METHANOL	59-14-29-3 1-30-1 SIGMA
DATA FILE	09D09
Electronic Data Archival	
Location	Date
HPCHEM_VOA/TO67	

Comments:

Analyzed By: [illegible]

Date Disposed: 4/10/09

Disposed By: [illegible]

2021

EMAX LABORATORIES, INC.

ANALYSIS LOG FOR VOLATILES

SOP ☑ EMAX-8260 Rev.No. 4 ☐ EMAX-524.2 Rev.No. 4 ☐ EMAX-CLP-VOA ☐ EMAX 624 Rev.No. 1 ☐

Start Date: 9/10/09 ☐ 5-ml Purge ☑ 25-ml Purge

Book # A67 -038

BATCH V0670901

Sample Prep. ID	Data File Name	Lab Sample ID	Sample Amount	DF	Matrix pH-W	Matrix S	Notes
01	RDC257	BFB67D20	25L				9:17am
02	258	IV0670D0903	1/1/5L				
03	259	CV0670D0901					
04	260	V0670D20L					
05	261	C					
06	262	X					
07	263	B	25mL				
08	264	Q					
09	265	09D059-01		1.0	42		
10	266	-10			7		
11	267	-02Z	0.5mL	10			
12	268	-03R	25mL	1.0			
13	269	-04R					
14	270	-05R					
15	271	-06R					
16	272	-07R					
17	273	-08R					
18	274	-09R					
19	275	-02R					
20	276	-02U					
21	277	-02V					
22	278	RINSE					7:05pm
23							
24							
25			9/19/09				

Instrument No.	67
INITIAL CALIBRATION REFERENCE	
DATE	9/9/09
ICAL ID	V0670909
STANDARDS	
NAME / ID / CONC. (mg/L)	
DCC	SM-14-36-L
DCC	-32-1
DCC	-35-1
BFB	-10-L
IS/SURR.	-37-L 8/25°
LCS	-34-3
LCS	-33-3
LCS	-36-1
SOLVENT	ID
METHANOL	
DATA FILE	09D10
Electronic Data Archival	
Location	Date
HPCHEM_VOA/TO67	

Comments:

Analyzed By: VT

Date Disposed: 9/19/09

Disposed By: VT

2028

EMAX LABORATORIES, INC.

ANALYSIS LOG FOR VOLATILES

SOP ☑ EMAX-8260 Rev.No. 4 ☐ EMAX-524.2 Rev.No. 4 ☐ EMAX-CLP-VOA ☐ EMAX 624 Rev.No. 1 ☐

Start Date: 1/6/09 ☐ 5-ml Purge ☑ 25-ml Purge

Book # A67 -038

BATCH V067D091

Sample Prep. ID	Data File Name	Lab Sample ID	Sample Amount	DF	Matrix pH-W	Matrix S	Notes
01	RE0076	RFB67E05	2 L				6:37am
02	077	CL067D0913	1/1/5 L				
03	078	14					
04	079	15					
05	080	V067E05L	1/1/5 L				
06	081	L					
07	082	X					
08	083	13	2 mL				
09	084	MDL VERF #6	1/1/1 L				0.4/2.0/2.0 ppb #260
10	085	V067E05Q	2 mL				
11	086	09D294-01	2 mL	10	L2		
12	087	RINSE	2 mL				
13	088	09E041-01		1.0	L2		
14	089	-03					
15	090	09E042-04	5 mL				
16	091	~~09E051~~ 09E045-01			7		
17	092	09E045-02			L2		
18	093	09E041-02					not fe filtrd
19	094	-04					
20	095	-05					
21	096	09E042-01					
22	097	-02					9:45am
23	098	DCC TEST	1/1/5 L				
24	101	RINSE	2 mL				
25							

1/7/09

Instrument No.	67
INITIAL CALIBRATION REFERENCE	
DATE	1/9/09
ICAL ID	V067D09

STANDARDS		
NAME	ID	CONC. (mg/L)
DCC	SM-14-36-2	
DCC	-45-3	
DCC	-49-1	
BFB	-10-2	
IS/SURR.	-37-2	50/50
LCS	-34-3	
LCS	-37-3	
LCS	-36-1	

SOLVENT	ID
METHANOL	
DATA FILE	09E06

Electronic Data Archival	
Location	Date
HPCHEM_VOA/TO67	

Comments: REW099 & REW100 are no dates

Analyzed By: MT

Date Disposed: 1/7/09

Disposed By: MT

2026

LABORATORY REPORT FOR

RICHARD BRADY & ASSOCIATES

NWS SEAL BEACH UST SITE 229

METHOD 3520C/8270C
SEMI VOLATILE ORGANICS BY GC/MS

SDG#: 09D294

CASE NARRATIVE

Client : RICHARD BRADY & ASSOCIATES

Project : NWS SEAL BEACH UST SITE 229

SDG : 09D294

METHOD 3520C/8270C
SEMI VOLATILE ORGANICS BY GC/MS

One (1) water sample was received on 04/29/09 for Semivolatile Organics by GCMS analysis, Method 3520C/8270C in accordance with USEPA SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods and Final SAP (March 2009).

Holding Time
The sample was analyzed within the prescribed holding time.

Instrument Performance and Calibration
Instrument tune check was performed prior to calibration. Instrument mass ratios were within specification. Multi-calibration points were generated to establish initial calibration (ICAL). ICAL was verified using secondary source. Continuing calibration was carried on at a frequency required by the project. All project calibration requirements were satisfied. Refer to calibration summary forms for ICAL, ICV and CCV for details.

Method Blank
Method blank was analyzed at the frequency required by the project. For this SDG, one method blank was analyzed with the samples. Result was compliant to project requirements.

Lab Control Sample
A set of LCS/LCD was analyzed with the samples in this SDG.
Percent recoveries for SVE003WL/C were within QC limits.

Matrix QC Sample
No matrix QC sample was designated in this SDG.

Surrogate
Surrogates were added to QC and field samples. Surrogate recoveries were within project QC limits.

Sample Analysis
The sample was analyzed according to prescribed analytical procedures. All project requirements were met otherwise anomalies were discussed within the associated QC parameter.

LAB CHRONICLE
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES
Project : NWS SEAL BEACH UST SITE 229

SDG NO. : 09D294
Instrument ID : T-OE4

WATER

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
MBLK1W	SVE003WB	1	NA	05/06/0912:38	05/04/0915:30	REJ140	RDJ227	SVE003W	Method Blank
LCS1W	SVE003WL	1	NA	05/06/0912:57	05/04/0915:30	REJ141	RDJ227	SVE003W	Lab Control Sample (LCS)
LCD1W	SVE003WC	1	NA	05/06/0913:15	05/04/0915:30	REJ142	RDJ227	SVE003W	LCS Duplicate
SB229-IDW	D294-01	.95	NA	05/06/0922:49	05/04/0915:30	REJ173	RDJ227	SVE003W	Field Sample

FN - Filename
% Moist - Percent Moisture

SAMPLE RESULTS

METHOD 3520C/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D294	Date Extracted:	05/04/09 15:30
Sample ID:	SB229-IDW	Date Analyzed:	05/06/09 22:49
Lab Samp ID:	D294-01	Dilution Factor:	.95
Lab File ID:	REJ173	Matrix :	WATER
Ext Btch ID:	SVE003W	% Moisture :	NA
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
1,2,4-TRICHLOROBENZENE	ND	9.5	4.8
1,2-DICHLOROBENZENE	ND	9.5	4.8
1,3-DICHLOROBENZENE	ND	9.5	4.8
1,4-DICHLOROBENZENE	ND	9.5	4.8
2,4,5-TRICHLOROPHENOL	ND	9.5	4.8
2,4,6-TRICHLOROPHENOL	ND	9.5	4.8
2,4-DICHLOROPHENOL	ND	9.5	4.8
2,4-DIMETHYLPHENOL	ND	9.5	4.8
2,4-DINITROPHENOL	ND	19	4.8
2,4-DINITROTOLUENE	ND	9.5	4.8
2,6-DINITROTOLUENE	ND	9.5	4.8
2-CHLORONAPHTHALENE	ND	9.5	4.8
2-CHLOROPHENOL	ND	9.5	4.8
2-METHYLNAPHTHALENE	5.2J	9.5	4.8
2-METHYLPHENOL	ND	9.5	4.8
2-NITROANILINE	ND	9.5	4.8
2-NITROPHENOL	ND	9.5	4.8
3,3'-DICHLOROBENZIDINE	ND	9.5	4.8
3-NITROANILINE	ND	9.5	4.8
4,6-DINITRO-2-METHYLPHENOL	ND	19	4.8
4-BROMOPHENYL-PHENYL ETHER	ND	9.5	4.8
4-CHLORO-3-METHYLPHENOL	ND	9.5	4.8
4-CHLOROANILINE	ND	9.5	4.8
4-CHLOROPHENYL-PHENYL ETHER	ND	9.5	4.8
4-METHYLPHENOL (1)	ND	9.5	4.8
4-NITROANILINE	ND	9.5	4.8
4-NITROPHENOL	ND	19	4.8
ACENAPHTHENE	ND	9.5	4.8
ACENAPHTHYLENE	ND	9.5	4.8
ANTHRACENE	ND	9.5	4.8
BENZO(A)ANTHRACENE	ND	9.5	4.8
BENZO(A)PYRENE	ND	9.5	4.8
BENZO(B)FLUORANTHENE	ND	9.5	4.8
BENZO(K)FLUORANTHENE	ND	9.5	4.8
BENZO(G,H,I)PERYLENE	ND	9.5	4.8
BIS(2-CHLOROETHOXY)METHANE	ND	9.5	4.8
BIS(2-CHLOROETHYL)ETHER	ND	9.5	4.8
BIS(2-CHLOROISOPROPYL)ETHER	ND	9.5	4.8
BIS(2-ETHYLHEXYL)PHTHALATE	11	9.5	4.8
BUTYLBENZYLPHTHALATE	ND	9.5	4.8
CHRYSENE	ND	9.5	4.8
DI-N-BUTYLPHTHALATE	ND	9.5	4.8
DI-N-OCTYLPHTHALATE	ND	9.5	4.8
DIBENZO(A,H)ANTHRACENE	ND	9.5	4.8
DIBENZOFURAN	ND	9.5	4.8
DIETHYLPHTHALATE	14	9.5	4.8
DIMETHYLPHTHALATE	ND	9.5	4.8
FLUORANTHENE	ND	9.5	4.8
FLUORENE	ND	9.5	4.8
HEXACHLOROBENZENE	ND	9.5	4.8
HEXACHLOROBUTADIENE	ND	9.5	4.8
HEXACHLOROCYCLOPENTADIENE	ND	9.5	4.8
HEXACHLOROETHANE	ND	9.5	4.8
INDENO(1,2,3-CD)PYRENE	ND	9.5	4.8
ISOPHORONE	ND	9.5	4.8
N-NITROSO-DI-N-PROPYLAMINE	ND	9.5	4.8
N-NITROSODIPHENYLAMINE (2)	ND	9.5	4.8
NAPHTHALENE	ND	9.5	4.8
NITROBENZENE	ND	9.5	4.8
PENTACHLOROPHENOL	ND	19	4.8
PHENANTHRENE	ND	9.5	4.8
PHENOL	ND	9.5	4.8
PYRENE	ND	9.5	4.8

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2,4,6-TRIBROMOPHENOL	71	30-150
2-FLUOROBIPHENYL	41	30-130
2-FLUOROPHENOL	55	20-130
NITROBENZENE-D5	53	30-130
PHENOL-D5	75	30-130
TERPHENYL-D14	43	30-130

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

QC SUMMARIES

METHOD 3520C/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	NA
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	05/04/09
Batch No.	: 09D294	Date Extracted:	05/04/09 15:30
Sample ID:	MBLK1W	Date Analyzed:	05/06/09 12:38
Lab Samp ID:	SVE003WB	Dilution Factor:	1
Lab File ID:	REJ140	Matrix :	WATER
Ext Btch ID:	SVE003W	% Moisture :	NA
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
1,2,4-TRICHLOROBENZENE	ND	10	5.0
1,2-DICHLOROBENZENE	ND	10	5.0
1,3-DICHLOROBENZENE	ND	10	5.0
1,4-DICHLOROBENZENE	ND	10	5.0
2,4,5-TRICHLOROPHENOL	ND	10	5.0
2,4,6-TRICHLOROPHENOL	ND	10	5.0
2,4-DICHLOROPHENOL	ND	10	5.0
2,4-DIMETHYLPHENOL	ND	10	5.0
2,4-DINITROPHENOL	ND	20	5.0
2,4-DINITROTOLUENE	ND	10	5.0
2,6-DINITROTOLUENE	ND	10	5.0
2-CHLORONAPHTHALENE	ND	10	5.0
2-CHLOROPHENOL	ND	10	5.0
2-METHYLNAPHTHALENE	ND	10	5.0
2-METHYLPHENOL	ND	10	5.0
2-NITROANILINE	ND	10	5.0
2-NITROPHENOL	ND	10	5.0
3,3'-DICHLOROBENZIDINE	ND	10	5.0
3-NITROANILINE	ND	10	5.0
4,6-DINITRO-2-METHYLPHENOL	ND	20	5.0
4-BROMOPHENYL-PHENYL ETHER	ND	10	5.0
4-CHLORO-3-METHYLPHENOL	ND	10	5.0
4-CHLOROANILINE	ND	10	5.0
4-CHLOROPHENYL-PHENYL ETHER	ND	10	5.0
4-METHYLPHENOL (1)	ND	10	5.0
4-NITROANILINE	ND	10	5.0
4-NITROPHENOL	ND	20	5.0
ACENAPHTHENE	ND	10	5.0
ACENAPHTHYLENE	ND	10	5.0
ANTHRACENE	ND	10	5.0
BENZO(A)ANTHRACENE	ND	10	5.0
BENZO(A)PYRENE	ND	10	5.0
BENZO(B)FLUORANTHENE	ND	10	5.0
BENZO(K)FLUORANTHENE	ND	10	5.0
BENZO(G,H,I)PERYLENE	ND	10	5.0
BIS(2-CHLOROETHOXY)METHANE	ND	10	5.0
BIS(2-CHLOROETHYL)ETHER	ND	10	5.0
BIS(2-CHLOROISOPROPYL)ETHER	ND	10	5.0
BIS(2-ETHYLHEXYL)PHTHALATE	ND	10	5.0
BUTYLBENZYLPHTHALATE	ND	10	5.0
CHRYSENE	ND	10	5.0
DI-N-BUTYLPHTHALATE	ND	10	5.0
DI-N-OCTYLPHTHALATE	ND	10	5.0
DIBENZO(A,H)ANTHRACENE	ND	10	5.0
DIBENZOFURAN	ND	10	5.0
DIETHYLPHTHALATE	ND	10	5.0
DIMETHYLPHTHALATE	ND	10	5.0
FLUORANTHENE	ND	10	5.0
FLUORENE	ND	10	5.0
HEXACHLOROBENZENE	ND	10	5.0
HEXACHLOROBUTADIENE	ND	10	5.0
HEXACHLOROCYCLOPENTADIENE	ND	10	5.0
HEXACHLOROETHANE	ND	10	5.0
INDENO(1,2,3-CD)PYRENE	ND	10	5.0
ISOPHORONE	ND	10	5.0
N-NITROSO-DI-N-PROPYLAMINE	ND	10	5.0
N-NITROSODIPHENYLAMINE (2)	ND	10	5.0
NAPHTHALENE	ND	10	5.0
NITROBENZENE	ND	10	5.0
PENTACHLOROPHENOL	ND	20	5.0
PHENANTHRENE	ND	10	5.0
PHENOL	ND	10	5.0
PYRENE	ND	10	5.0

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2,4,6-TRIBROMOPHENOL	79	40-140
2-FLUOROBIPHENYL	60	40-130
2-FLUOROPHENOL	64	30-130
NITROBENZENE-D5	68	40-130
PHENOL-D5	69	30-130
TERPHENYL-D14	84	50-130

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: RICHARD BRADY & ASSOCIATES
PROJECT: NWS SEAL BEACH UST SITE 229
BATCH NO.: 09D294
METHOD: METHOD 3520C/8270C

MATRIX:	WATER			% MOISTURE:	NA
DILUTION FACTOR:	1	1	1		
SAMPLE ID:	MBLK1W				
LAB SAMP ID:	SVE003WB	SVE003WL	SVE003WC		
LAB FILE ID:	REJ140	REJ141	REJ142		
DATE EXTRACTED:	05/04/0915:30	05/04/0915:30	05/04/0915:30	DATE COLLECTED:	NA
DATE ANALYZED:	05/06/0912:38	05/06/0912:57	05/06/0913:15	DATE RECEIVED:	05/04/09
PREP. BATCH:	SVE003W	SVE003W	SVE003W		
CALIB. REF:	RDJ227	RDJ227	RDJ227		

ACCESSION:

PARAMETER	BLNK RSLT (ug/L)	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	RPD (%)	QC LIMIT (%)	MAX RPD (%)
1,2,4-Trichlorobenzene	ND	80.0	49.9	62	80.0	51.9	65	4	30-130	30
1,4-Dichlorobenzene	ND	80.0	50.9	64	80.0	55.6	70	9	30-130	30
2,4-Dinitrotoluene	ND	80.0	76.8	96	80.0	73.6	92	4	40-130	30
2-Chlorophenol	ND	80.0	50.9	64	80.0	54.2	68	6	30-130	30
4-Chloro-3-Methylphenol	ND	80.0	66.5	83	80.0	66.7	83	0	40-130	30
4-Nitrophenol	ND	80.0	69.3	87	80.0	67.5	84	3	30-130	30
Acenaphthene	ND	80.0	63.4	79	80.0	63.8	80	1	40-130	30
n-Nitroso-di-n-propylamine	ND	80.0	66.8	83	80.0	71.4	89	7	30-130	30
Pentachlorophenol	ND	80.0	49.9	62	80.0	47.6	59	5	30-130	30
Phenol	ND	80.0	51.9	65	80.0	55.3	69	6	20-130	30
Pyrene	ND	80.0	73.4	92	80.0	70.2	88	4	50-130	30

SURROGATE PARAMETER	SPIKE AMT (ug/L)	BS RSLT (ug/L)	BS % REC	SPIKE AMT (ug/L)	BSD RSLT (ug/L)	BSD % REC	QC LIMIT (%)
2,4,6-Tribromophenol	150	155	104	150	147	98	40-140
2-Fluorobiphenyl	50.0	35.2	70	50.0	35.8	72	40-130
2-Fluorophenol	150	98.4	66	150	104	70	30-130
Nitrobenzene-d5	50.0	37.2	74	50.0	38.6	77	40-130
Phenol-d5	150	108	72	150	118	79	30-130
Terphenyl-d14	50.0	44.5	89	50.0	43.6	87	50-130

INITIAL CALIBRATIONS

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK

DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: EMAX Inc
Lab Code: EMXT
Lab File ID: RDJ196
Instrument ID: TOE4

Project: NWS SEAL BEACH UST SITE 229
SDG No.: 09D294
DFTPP Injection Date: 04/15/09
DFTPP Injection Time: 17:20

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	44.84
68	Less than 2% of mass 69	0.21(0.5)1
69	Relative abundance of mass 198	40.71
70	Less than 2.0% of mass 69	0.25(0.6)1
127	40.0 - 60.0% of mass 198	45.65
197	Less than 1.0% of mass 198	0.22
198	Base Peak, 100% relative abundance	100.00
199	5.0 - 9.0% of mass 198	6.77
275	10.0 - 30.0% of mass 198	22.03
365	Greater than 1.00% of mass 198	2.51
441	Present, but less than mass 443	10.56
442	Greater than 40.0% of mass 198	65.90
443	17.0 - 23.0% of mass 442	13.03(19.8)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD,BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1	SSTD01	SVE4D15C3	RDJ223	04/16/09	01:43
2	SSTD02	SVE4D15C4	RDJ224	04/16/09	02:01
3	SSTD05	SVE4D15C5	RDJ225	04/16/09	02:20
4	SSTD010	SVE4D15C6	RDJ226	04/16/09	02:38
5	SSTD050	SVE4D15C7	RDJ227	04/16/09	02:56
6	SSTD080	SVE4D15C8	RDJ228	04/16/09	03:15
7	SSTD100	SVE4D15C9	RDJ229	04/16/09	03:33
8	SSTD120	SVE4D15C10	RDJ230	04/16/09	03:51
9	SSTD160	SVE4D15C11	RDJ231	04/16/09	04:10
10	SSTD050	ISVE4D15C1	RDJ232	04/16/09	04:28

INITIAL_CALIBRATION - RELATIVE_RESPONSE_FACTOR

Instrument ID :E4
Beginning DateTime :04/16/09 01:43
Spike Units :PPM
IC File :RDJ227

Column Spec :ZB-5MS ID :0.18MM
Ending DateTime :04/16/09 04:10
HPChem Method :SVE4D15C

IDX	Parameters	1 01:43 RDJ223	2 02:01 RDJ224	5 02:20 RDJ225	10 02:38 RDJ226	50 02:56 RDJ227	80 03:15 RDJ228	100 03:33 RDJ229	120 03:51 RDJ230	160 04:10 RDJ231	Av_RRF	%_RSD	Av_Rt_M
1	1,4-Dichlorobenzene-d4	1	1	1	1	1	1	1	1	1	1	0	2.8438
2	N-nitrosodimethylamine	------	0.433	0.489	0.520	0.587	0.604	0.615	------	------	0.541	13.46	1.3776
3	Pyridine	------	0.833	0.951	1.057	1.174	1.089	1.164	------	------	1.045	12.59	1.4086
4	2-Fluorophenol	0.990	0.986	1.036	1.032	1.092	1.080	1.086	1.021	1.017	1.038	3.84	1.9418
5	Phenol-d5	1.160	1.118	1.173	1.257	1.293	1.291	1.315	1.237	1.223	1.230	5.48	2.5082
6	Phenol	1.254	1.270	1.348	1.388	1.421	1.411	1.414	------	------	1.358	5.16	2.5180
7	Aniline	1.557	1.483	1.543	1.577	1.517	1.487	1.502	------	------	1.524	2.39	2.5826
8	bis(2-chloroethyl)ether	0.971	1.004	0.994	1.008	0.995	0.986	0.984	------	------	0.992	1.26	2.6116
9	2-Chlorophenol	1.172	1.165	1.169	1.193	1.237	1.223	1.228	------	------	1.198	2.58	2.6726
10	1,3-Dichlorobenzene	1.371	1.467	1.469	1.430	1.448	1.403	1.397	------	------	1.427	2.61	2.7990
11	1,2-Dichlorobenzene-d4	0.871	0.904	0.891	0.912	0.916	0.887	0.888	0.878	0.866	0.890	1.96	2.9727
12	1,4-Dichlorobenzene	1.456	1.520	1.430	1.476	1.469	1.430	1.432	------	------	1.459	2.26	2.8565
13	Benzyl alcohol	0.586	0.626	0.675	0.689	0.730	0.733	0.755	------	------	0.685	8.96	2.9360
14	1,2-Dichlorobenzene	1.364	1.395	1.356	1.380	1.382	1.350	1.346	------	------	1.368	1.35	2.9851
15	2-Methylphenol	0.819	0.866	0.859	0.885	0.902	0.901	0.908	------	------	0.877	3.64	3.0106
16	bis(2-chloroisopropyl)ether	2.238	2.346	2.276	2.317	2.314	2.531	2.261	------	------	2.326	4.19	3.0496
17	4-Methylphenol	1.073	1.211	1.258	1.322	1.392	1.383	1.399	------	------	1.291	9.27	3.1437
18	N-Nitroso-di-n-propylamine	0.637	0.674	0.681	0.714	0.759	0.750	0.765	------	------	0.711	6.94	3.1682
19	Hexachloroethane	0.513	0.566	0.552	0.559	0.582	0.570	0.568	------	------	0.558	3.94	3.2853
20	Naphthalene-d8	1	1	1	1	1	1	1	1	1	1	0	4.0372
21	Nitrobenzene-d5	0.313	0.321	0.331	0.337	0.361	0.357	0.361	0.352	0.351	0.343	5.17	3.3218
22	Nitrobenzene	0.305	0.320	0.329	0.344	0.368	0.359	0.363	------	------	0.341	7.05	3.3369
23	Isophorone	0.455	0.482	0.492	0.529	0.559	0.555	0.553	------	------	0.518	8.03	3.5616
24	2-Nitrophenol	0.140	0.136	0.148	0.168	0.193	0.194	0.198	------	------	0.168	16.14	3.6425
25	2,4-Dimethylphenol	0.327	0.340	0.341	0.358	0.375	0.370	0.373	------	------	0.355	5.36	3.6643
26	Benzoic acid	------	------	0.137	0.166	0.260	0.255	0.261	------	------	0.216	27.64	3.7392
27	bis(2-Chloroethoxy)methane	0.445	0.437	0.426	0.449	0.430	0.431	0.410	------	------	0.433	3.03	3.7711
28	2,4-Dichlorophenol	0.275	0.293	0.312	0.321	0.341	0.341	0.344	------	------	0.318	8.37	3.8757
29	1,2,4-Trichlorobenzene	0.388	0.372	0.386	0.385	0.395	0.385	0.385	------	------	0.385	1.78	3.9734
30	Naphthalene	0.975	0.992	0.971	0.979	0.994	0.962	0.965	------	------	0.977	1.28	4.0594
31	4-Chloroaniline	0.381	0.369	0.398	0.414	0.419	0.412	0.413	------	------	0.401	4.79	4.1079
32	Hexachlorobutadiene	0.245	0.247	0.241	0.260	0.260	0.254	0.252	------	------	0.251	2.87	4.1845
33	4-Chloro-3-methylphenol	0.241	0.248	0.265	0.292	0.316	0.314	0.316	------	------	0.285	11.55	4.6275
34	2-Methylnaphthalene	0.643	0.669	0.654	0.681	0.686	0.667	0.665	------	------	0.666	2.21	4.8166
35	1-Methylnaphthalene	0.597	0.600	0.599	0.624	0.620	0.601	0.608	------	------	0.607	1.80	4.9268
36	Acenaphthene-d10	1	1	1	1	1	1	1	1	1	1	0	6.0298
37	Hexachlorocyclopentadiene	0.478	0.528	0.569	0.576	0.653	0.627	0.636	------	------	0.581	10.89	4.9927
38	2,4,6-Trichlorophenol	0.335	0.405	0.428	0.457	0.502	0.495	0.516	------	------	0.448	14.39	5.1322
39	2,4,5-Trichlorophenol	0.389	0.459	0.478	0.483	0.541	0.531	0.544	------	------	0.489	11.37	5.1673
40	2-Fluorobiphenyl	1.541	1.569	1.541	1.540	1.586	1.529	1.543	1.513	1.527	1.543	1.42	5.2415
41	Biphenyl	1.524	1.544	1.584	1.566	1.588	1.538	1.553	------	------	1.557	1.53	5.3569
42	2-Chloronaphthalene	1.257	1.304	1.273	1.292	1.514	1.425	1.426	------	------	1.356	7.25	5.3755
43	2-Nitroaniline	0.248	0.261	0.303	0.329	0.392	0.397	0.405	------	------	0.334	19.72	5.4966
44	2,6-Dimethylnaphthalene	1.236	1.241	1.272	1.315	1.334	1.304	1.297	------	------	1.286	2.90	5.5392
45	Dimethylphthalate	1.384	1.390	1.452	1.486	1.538	1.510	1.529	------	------	1.470	4.29	5.7256
46	2,6-Dinitrotoluene	0.176	0.203	0.229	0.256	0.307	0.309	0.316	------	------	0.257	21.92	5.7917
47	Acenaphthylene	1.600	1.673	1.749	1.861	1.959	1.911	1.942	------	------	1.813	7.76	5.8611
48	3-Nitroaniline	0.201	0.214	0.256	0.288	0.338	0.334	0.336	------	------	0.281	20.87	5.9842
49	Acenaphthene	1.249	1.274	1.249	1.262	1.277	1.244	1.256	------	------	1.259	1.02	6.0690
50	2,4-Dinitrophenol	------	------	0.087	0.112	0.189	0.207	0.218	------	------	0.163	36.27	6.1099
51	4-Nitrophenol	------	------	0.161	0.190	0.229	0.234	0.236	------	------	0.210	15.83	6.1837
52	2,4-Dinitrotoluene	0.242	0.251	0.325	0.348	0.412	0.416	0.421	------	------	0.345	22.20	6.2692
53	Dibenzofuran	1.885	1.876	1.874	1.908	1.931	1.859	1.859	------	------	1.885	1.40	6.2769
54	2,3,4,6-Tetrachlorophenol	------	0.292	0.327	0.343	0.393	0.397	0.409	------	------	0.360	12.96	6.4211
55	2,3,5-Trimethylnaphthalene	1.063	1.057	1.083	1.122	1.135	1.124	1.224	------	------	1.115	5.10	6.5310
56	Diethylphthalate	1.284	1.411	1.454	1.447	1.520	1.493	1.512	------	------	1.446	5.62	6.5786
57	Fluorene	1.322	1.365	1.384	1.395	1.416	1.383	1.407	------	------	1.382	2.27	6.6887
58	4-Chlorophenyl-phenylether	0.748	0.738	0.747	0.743	0.774	0.738	0.752	------	------	0.749	1.65	6.7016
59	4-Nitroaniline	0.151	0.209	0.249	0.287	0.343	0.326	0.329	------	------	0.270	26.47	6.7152
60	Phenanthrene-d10	1	1	1	1	1	1	1	1	1	1	0	7.7702
61	4,6-Dinitro-2-methylphenol	------	------	0.081	0.101	0.145	0.149	0.169	------	------	0.129	28.24	6.7567
62	N-Nitrosodiphenylamine	0.451	0.487	0.509	0.512	0.544	0.536	0.587	------	------	0.518	8.39	6.8428
63	Azobenzene	0.570	0.611	0.656	0.687	0.729	0.703	0.706	------	------	0.666	8.58	6.8903
64	2,4,6-Tribromophenol	0.073	0.085	0.095	0.102	0.114	0.116	0.120	0.113	0.116	0.104	15.60	6.9727
65	4-Bromophenyl-phenylether	0.236	0.221	0.227	0.238	0.252	0.250	0.253	------	------	0.240	5.19	7.2767
66	Hexachlorobenzene	0.219	0.242	0.233	0.243	0.255	0.250	0.253	------	------	0.242	5.25	7.3279
67	Pentachlorophenol	------	0.112	0.160	0.179	0.227	0.232	0.238	------	------	0.191	26.13	7.5539
68	Phenanthrene	1.165	1.175	1.185	1.175	1.185	1.171	1.172	------	------	1.176	0.63	7.7971
69	Anthracene	1.070	1.102	1.131	1.164	1.193	1.170	1.186	------	------	1.145	4.02	7.8536
70	Carbazole	0.887	0.924	0.999	1.018	1.064	1.045	1.044	------	------	0.997	6.69	8.0367
71	Di-n-butylphthalate	1.090	1.016	1.083	1.171	1.317	1.317	1.325	------	------	1.188	11.01	8.4410
72	1-Methylphenanthrene	0.760	0.793	0.830	0.843	0.868	0.857	0.842	------	------	0.828	4.59	8.4672
73	Fluoranthene	1.107	1.134	1.195	1.233	1.313	1.299	1.307	------	------	1.227	6.90	9.0732
74	Chrysene-d12	1	1	1	1	1	1	1	1	1	1	0	10.5398
75	Benzidine	------	------	------	------	------	------	------	------	------	0.000	0.00	0.0000
76	Pyrene	1.135	1.217	1.283	1.316	1.356	1.328	1.329	------	------	1.281	6.13	9.3073
77	Terphenyl-d14	0.760	0.761	0.811	0.852	0.875	0.868	0.888	0.890	0.904	0.845	6.53	9.4821
78	Butylbenzylphthalate	0.274	0.303	0.361	0.434	0.542	0.545	0.557	------	------	0.431	27.97	9.9899
79	3,3'-Dichlorobenzidine	0.214	0.240	0.297	0.340	0.414	0.424	0.437	------	------	0.338	26.93	10.5084
80	Benzo(a)anthracene	1.108	1.101	1.133	1.164	1.222	1.207	1.213	------	------	1.164	4.38	10.5296
81	Chrysene	1.105	1.080	1.101	1.117	1.143	1.123	1.128	------	------	1.114	1.83	10.5653
82	bis(2-Ethylhexyl)phthalate	------	0.437	0.554	0.634	0.776	0.765	0.780	------	------	0.658	21.56	10.5691
83	Perylene-d12	1	1	1	1	1	1	1	1	1	1	0	11.8954
84	Di-n-octylphthalate	------	------	0.792	0.962	1.322	1.336	1.367	------	------	1.156	22.68	11.1865
85	Benzo(b)fluoranthene	0.813	0.880	0.928	0.998	1.103	1.055	1.086	------	------	0.980	11.23	11.5346
86	Benzo(k)fluoranthene	0.913	0.994	1.031	1.044	1.229	1.278	1.212	------	------	1.100	12.57	11.5603
87	Benzo(e)pyrene	0.962	0.969	1.036	1.065	1.131	1.135	1.111	------	------	1.058	6.86	11.7899
88	Benzo(a)pyrene	0.806	0.869	0.930	0.980	1.062	1.052	1.062	------	------	0.966	10.54	11.8406
89	Perylene	0.996	1.017	1.061	1.107	1.093	1.140	1.101	------	------	1.074	4.82	11.9201
90	Indeno(1,2,3-cd)pyrene	0.792	0.876	0.951	0.998	1.125	1.118	1.121	------	------	0.997	13.28	13.0727
91	Dibenzo(a,h)anthracene	0.723	0.733	0.802	0.861	0.942	0.932	0.939	------	------	0.848	11.33	13.0937
92	Benzo(g,h,i)perylene	0.708	0.753	0.808	0.844	0.928	0.922	0.923	------	------	0.841	10.55	13.4221

Ave_%RSD : 9.2 Max_%RSD : 36.3

Use Least Square Linear Regression with weighting factor of inverse concentration for comps with %_RSD > 15
Resp_Ratio = xo + x1 * Amt_Ratio

SM 4/20/09

3010

IDX	Parameter	x0	x1	CCF
24	2-Nitrophenol	-0.00261	0.19571	0.9994
26	Benzoic acid	-0.01906	0.26797	0.9995
43	2-Nitroaniline	-0.00629	0.39981	0.9993
46	2,6-Dinitrotoluene	-0.00529	0.31227	0.9993
48	3-Nitroaniline	-0.00530	0.33680	0.9995
50	2,4-Dinitrophenol	-0.02016	0.21809	0.9985
51	4-Nitrophenol	-0.01066	0.23923	1.0000
52	2,4-Dinitrotoluene	-0.00699	0.41861	0.9995
59	4-Nitroaniline	-0.00592	0.33267	0.9995
61	4,6-Dinitro-2-methylphenol	-0.01242	0.16306	0.9976
64	2,4,6-Tribromophenol	-0.00149	0.11619	0.9997
67	Pentachlorophenol	-0.00806	0.23633	0.9995
78	Butylbenzylphthalate	-0.01140	0.55088	0.9989
79	3,3'-Dichlorobenzidine	-0.00861	0.42859	0.9990
82	bis(2-Ethylhexyl)phthalate	-0.02228	0.78297	0.9997
84	Di-n-octylphthalate	-0.08510	1.38909	0.9998

SA
4/20/02

SECOND SOURCE VERIFICATION

CONTINUE_CALIBRATION - CALIBRATION VERIFICATION

Instrument ID :E4
IC Beginning DateTime :04/16/09 01:43
Spike Amount :50 PPM
CC/CV File :RDJ232
IC File :RDJ227

Column Spec :ZB-5MS ID :0.18MM
IC Ending DateTime :04/16/09 04:10
HPChem Method :SVE4D15C
Date_Time :04/16/09 04:28

M IDX	Parameters	CC_Con	CC% D	CC_Resp	CCRRF	AVRRF	CC_Rtm	AVRtm	% RSD	Co X0	Co X1	Co X2	Co Cor
1	1,4-Dichlorobenzene-d4	40.000	0	160668	1	1	2.844	2.844	0				
2	N-nitrosodimethylamine	55.834	11.7	121382	0.604	0.541	1.375	1.378	13.46				
3	Pyridine	57.591	15.2	241694	1.203	1.045	1.408	1.409	12.59				
4	2-Fluorophenol												
5	Phenol-d5												
6	Phenol	51.619	3.2	281537	1.402	1.358	2.517	2.518	5.16				
7	Aniline	45.509	-9.0	278546	1.387	1.524	2.584	2.583	2.39				
8	bis(2-chloroethyl)ether	58.124	16.2	231540	1.153	0.992	2.613	2.612	1.26				
9	2-Chlorophenol	52.093	4.2	250692	1.248	1.198	2.675	2.673	2.58				
10	1,3-Dichlorobenzene	53.478	7.0	306441	1.526	1.427	2.799	2.799	2.61				
11	1,2-Dichlorobenzene-d4												
12	1,4-Dichlorobenzene	52.318	4.6	306634	1.527	1.459	2.859	2.856	2.26				
13	Benzyl alcohol	56.507	13.0	155451	0.774	0.685	2.937	2.936	8.96				
14	1,2-Dichlorobenzene	53.557	7.1	294190	1.465	1.368	2.986	2.985	1.35				
15	2-Methylphenol	52.273	4.5	184182	0.917	0.877	3.012	3.011	3.64				
16	bis(2-chloroisopropyl)ether	56.111	12.2	524317	2.611	2.326	3.053	3.050	4.19				
17	4-Methylphenol	48.663	-2.7	252369	1.257	1.291	3.152	3.144	9.27				
18	N-Nitroso-di-n-propylamine	59.016	18.0	168613	0.840	0.711	3.171	3.168	6.94				
19	Hexachloroethane	55.489	11.0	124480	0.620	0.558	3.285	3.285	3.94				
20	Naphthalene-d8	40.000	0	564894	1	1	4.037	4.037	0				
21	Nitrobenzene-d5												
22	Nitrobenzene	54.098	8.2	260720	0.369	0.341	3.338	3.337	7.05				
23	Isophorone	60.572	21.1	443143	0.628	0.518	3.565	3.562	8.03				
24	2-Nitrophenol	49.518	-1.0	135386	0.192	0.168	3.643	3.642	16.14	-0.0026	0.1957		0.9994
25	2,4-Dimethylphenol	52.053	4.1	260923	0.370	0.355	3.665	3.664	5.36				
26	Benzoic acid	49.151	-1.7	175243	0.248	0.216	3.751	3.739	27.64	-0.0191	0.2680		0.9995
27	bis(2-Chloroethoxy)methane	53.683	7.4	327997	0.465	0.433	3.775	3.771	3.03				
28	2,4-Dichlorophenol	52.492	5.0	235781	0.334	0.318	3.878	3.876	8.37				
29	1,2,4-Trichlorobenzene	52.705	5.4	286546	0.406	0.385	3.976	3.973	1.78				
30	Naphthalene	50.493	1.0	696599	0.987	0.977	4.062	4.059	1.28				
31	4-Chloroaniline	51.530	3.1	291761	0.413	0.401	4.111	4.108	4.79				
32	Hexachlorobutadiene	53.534	7.1	189821	0.269	0.251	4.185	4.185	2.87				
33	4-Chloro-3-methylphenol	53.400	6.8	214563	0.304	0.285	4.629	4.628	11.55				
34	2-Methylnaphthalene	51.245	2.5	482251	0.683	0.666	4.819	4.817	2.21				
35	1-Methylnaphthalene	53.374	6.7	457438	0.648	0.607	4.929	4.927	1.80				
36	Acenaphthene-d10	40.000	0	307321	1	1	6.032	6.030	0				
37	Hexachlorocyclopentadiene	54.640	9.3	243902	0.635	0.581	4.995	4.993	10.89				
38	2,4,6-Trichlorophenol	55.621	11.2	191569	0.499	0.448	5.135	5.132	14.39				
39	2,4,5-Trichlorophenol	54.727	9.5	205745	0.536	0.489	5.168	5.167	11.37				
40	2-Fluorobiphenyl												
41	Biphenyl	50.508	1.0	604098	1.573	1.557	5.359	5.357	1.53				
42	2-Chloronaphthalene	58.267	16.5	607023	1.580	1.356	5.376	5.376	7.25				
43	2-Nitroaniline	50.840	1.7	154232	0.401	0.334	5.499	5.497	19.72	-0.0063	0.3998		0.9993
44	2,6-Dimethylnaphthalene	46.294	-7.4	457302	1.190	1.286	5.542	5.539	2.90				
45	Dimethylphthalate	53.219	6.4	601030	1.565	1.470	5.727	5.726	4.29				
46	2,6-Dinitrotoluene	55.527	11.1	123686	0.322	0.257	5.794	5.792	21.92	-0.0053	0.3123		0.9993
47	Acenaphthylene	56.431	12.9	786247	2.047	1.813	5.861	5.861	7.76				
48	3-Nitroaniline	52.023	4.0	132987	0.346	0.281	5.988	5.984	20.87	-0.0053	0.3368		0.9995
49	Acenaphthene	50.547	1.1	488852	1.273	1.259	6.072	6.069	1.02				
50	2,4-Dinitrophenol	47.522	-5.0	73434	0.191	0.163	6.109	6.110	36.27	-0.0202	0.2181		0.9985
51	4-Nitrophenol	48.380	-3.2	85646	0.223	0.210	6.183	6.184	15.83	-0.0107	0.2392		1.0000
52	2,4-Dinitrotoluene	52.312	4.6	166100	0.432	0.345	6.270	6.269	22.20	-0.0070	0.4186		0.9995
53	Dibenzofuran	51.364	2.7	743730	1.936	1.885	6.280	6.277	1.40				
54	2,3,4,6-Tetrachlorophenol	61.613	23.2	170423	0.444	0.360	6.421	6.421	12.96				
55	2,3,5-Trimethylnaphthalene	49.270	-1.5	422234	1.099	1.115	6.533	6.531	5.10				
56	Diethylphthalate	55.152	10.3	612688	1.595	1.446	6.581	6.579	5.62				
57	Fluorene	52.944	5.9	562072	1.463	1.382	6.690	6.689	2.27				
58	4-Chlorophenyl-phenylether	57.407	14.8	330242	0.860	0.749	6.704	6.702	1.65				
59	4-Nitroaniline	53.141	6.3	134004	0.349	0.270	6.723	6.715	26.47	-0.0059	0.3327		0.9995
60	Phenanthrene-d10	40.000	0	573537	1	1	7.771	7.770	0				
61	4,6-Dinitro-2-methylphenol	48.906	-2.2	107220	0.150	0.129	6.757	6.757	28.24	-0.0124	0.1631		0.9976
62	N-Nitrosodiphenylamine	48.266	-3.5	358451	0.500	0.518	6.846	6.843	8.39				
63	Azobenzene	57.937	15.9	553389	0.772	0.666	6.892	6.890	8.58				
64	2,4,6-Tribromophenol												
65	4-Bromophenyl-phenylether	56.090	12.2	192775	0.269	0.240	7.278	7.277	5.19				
66	Hexachlorobenzene	54.100	8.2	187729	0.262	0.242	7.327	7.328	5.25				
67	Pentachlorophenol	44.656	-10.7	146699	0.205	0.191	7.554	7.554	26.13	-0.0081	0.2363		0.9995
68	Phenanthrene	49.019	-2.0	826231	1.152	1.176	7.796	7.797	0.63				
69	Anthracene	50.913	1.8	835990	1.166	1.145	7.855	7.854	4.02				
70	Carbazole	53.935	7.9	771206	1.076	0.997	8.038	8.037	6.69				
71	Di-n-butylphthalate	56.706	13.4	966288	1.348	1.188	8.444	8.441	11.01				
72	1-Methylphenanthrene	54.113	8.2	642254	0.896	0.828	8.469	8.467	4.59				
73	Fluoranthene	53.109	6.2	934158	1.303	1.227	9.074	9.073	6.90				
74	Chrysene-d12	40.000	0	570301	1	1	10.542	10.540	0				
75	Benzidine												
76	Pyrene	52.795	5.6	963933	1.352	1.281	9.310	9.307	6.13				
77	Terphenyl-d14												
78	Butylbenzylphthalate	50.597	1.2	390902	0.548	0.431	9.990	9.990	27.97	-0.0114	0.5509		0.9989
79	3,3'-Dichlorobenzidine	50.221	0.4	301966	0.424	0.338	10.510	10.508	26.93	-0.0086	0.4286		0.9990
80	Benzo(a)anthracene	52.513	5.0	871273	1.222	1.164	10.533	10.530	4.38				
81	Chrysene	52.859	5.7	839432	1.178	1.114	10.570	10.565	1.83				
82	bis(2-Ethylhexyl)phthalate	50.981	2.0	556410	0.781	0.658	10.570	10.569	21.56	-0.0223	0.7830		0.9997
83	Perylene-d12	40.000	0	564339	1	1	11.897	11.895	0				
84	Di-n-octylphthalate	48.175	-3.6	896116	1.270	1.156	11.185	11.186	22.68	-0.0851	1.3891		0.9998
85	Benzo(b)fluoranthene	57.279	14.6	792212	1.123	0.980	11.538	11.535	11.23				
86	Benzo(k)fluoranthene	56.767	13.5	881149	1.249	1.100	11.563	11.560	12.57				
87	Benzo(e)pyrene	51.193	2.4	764360	1.084	1.058	11.794	11.790	6.86				
88	Benzo(a)pyrene	54.798	9.6	746675	1.058	0.966	11.843	11.841	10.54				
89	Perylene	52.683	5.4	798054	1.131	1.074	11.925	11.920	4.82				
90	Indeno(1,2,3-cd)pyrene	55.361	10.7	778944	1.104	0.997	13.076	13.073	13.28				
91	Dibenzo(a,h)anthracene	54.977	10.0	657391	0.932	0.848	13.098	13.094	11.33				
92	Benzo(g,h,i)perylene	55.155	10.3	654249	0.927	0.841	13.431	13.422	10.55				

SM 4/20/09

Evaluate Continuing Calibration Report

Data File : D:\DATA\09D15\RDJ232.D
Acq On : 16 Apr 2009 4:28
Sample : ISVE4D15C1
Misc : ICV 50PPM
Integrator: RTE
Quant Time: Apr 17 17:17:03 2009
Quant Results File: SVE4D15C.RES
Quant Method : C:\msdchem\1\METHODS\SVE4D15C.M
Quant Title : SEMIVOLATILES
QLast Update : Thu Apr 16 09:18:01 2009
Response via : Initial Calibration
DataAcq Meth:SVE4D15S.M

Vial: 38
Operator: KV
Inst : E4
Multiplr: 1.00

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 200%

		Compound	Amount	Calc.	%Dev	Area%	Dev(min)
1	I	1,4-Dichlorobenzene-d4	40.000	40.000	0.0	96	0.00
2	T	N-nitrosodimethylamine	50.000	55.834	-11.7	99	0.00
3	T	Pyridine	50.000	57.591	-15.2	99	0.00
4	S	2-Fluorophenol	50.000	0.000	100.0#	0	-1.95#
5	S	Phenol-d5	50.000	0.000	100.0#	0	-2.51#
6	C	Phenol	50.000	51.619	-3.2	95	0.00
7	T	Aniline	50.000	45.509	9.0	88	0.00
8	T	bis(2-chloroethyl)ether	50.000	58.124	-16.2	112	0.00
9	T	2-Chlorophenol	50.000	52.093	-4.2	97	0.00
10	T	1,3-Dichlorobenzene	50.000	53.478	-7.0	101	0.00
11	S	1,2-Dichlorobenzene-d4	50.000	0.000	100.0#	0	-2.98#
12	C	1,4-Dichlorobenzene	50.000	52.318	-4.6	100	0.00
13	T	Benzyl alcohol	50.000	56.507	-13.0	102	0.00
14	T	1,2-Dichlorobenzene	50.000	53.557	-7.1	102	0.00
15	T	2-Methylphenol	50.000	52.273	-4.5	98	0.00
16	T	bis(2-chloroisopropyl)ether	50.000	56.111	-12.2	109	0.00
17	T	4-Methylphenol	50.000	48.663	2.7	87	0.00
18	P	N-Nitroso-di-n-propylamine	50.000	59.016	-18.0	106	0.00
19	T	Hexachloroethane	50.000	55.489	-11.0	103	0.00
20	I	Naphthalene-d8	40.000	40.000	0.0	99	0.00
21	S	Nitrobenzene-d5	50.000	0.000	100.0#	0	-3.32#
22	T	Nitrobenzene	50.000	54.098	-8.2	100	0.00
23	T	Isophorone	50.000	60.573	-21.1	111	0.00
24	C	2-Nitrophenol	50.000	49.518	1.0	98	0.00
25	T	2,4-Dimethylphenol	50.000	52.052	-4.1	98	0.00
26	T	Benzoic acid	50.000	49.151	1.7	95	0.00
27	T	bis(2-Chloroethoxy)methane	50.000	53.683	-7.4	107	0.00
28	C	2,4-Dichlorophenol	50.000	52.492	-5.0	97	0.00
29	T	1,2,4-Trichlorobenzene	50.000	52.705	-5.4	102	0.00
30	T	Naphthalene	50.000	50.493	-1.0	98	0.00
31	T	4-Chloroaniline	50.000	51.530	-3.1	98	0.00
32	C	Hexachlorobutadiene	50.000	53.534	-7.1	103	0.00
33	C	4-Chloro-3-methylphenol	50.000	53.400	-6.8	95	0.00
34	T	2-Methylnaphthalene	50.000	51.245	-2.5	99	0.00
35	T	1-Methylnaphthalene	50.000	53.374	-6.7	104	0.00
36	I	Acenaphthene-d10	40.000	40.000	0.0	99	0.00
37	P	Hexachlorocyclopentadiene	50.000	54.640	-9.3	96	0.00
38	C	2,4,6-Trichlorophenol	50.000	55.621	-11.2	99	0.00
39	T	2,4,5-Trichlorophenol	50.000	54.727	-9.5	98	0.00
40	S	2-Fluorobiphenyl	50.000	0.000	100.0#	0	-5.24#
41	T	Biphenyl	50.000	50.508	-1.0	98	0.00
42	T	2-Chloronaphthalene	50.000	58.267	-16.5	104	0.00
43	T	2-Nitroaniline	50.000	50.840	-1.7	102	0.00
44	T	2,6-Dimethylnaphthalene	50.000	46.294	7.4	89	0.00
45	T	Dimethylphthalate	50.000	53.219	-6.4	101	0.00
46	T	2,6-Dinitrotoluene	50.000	52.231	-4.5	104	0.00
47	T	Acenaphthylene	50.000	56.431	-12.9	104	0.00
48	T	3-Nitroaniline	50.000	52.023	-4.0	102	0.00
49	C	Acenaphthene	50.000	50.547	-1.1	99	0.00

SW 4/20/09

Data File : D:\DATA\09D15\RDJ232.D
Acq On : 16 Apr 2009 4:28
Sample : ISVE4D15C1
Misc : ICV 50PPM
Integrator: RTE
Quant Time: Apr 17 17:17:03 2009
Quant Results File: SVE4D15C.RES
Quant Method : C:\msdchem\1\METHODS\SVE4D15C.M
Quant Title : SEMIVOLATILES
QLast Update : Thu Apr 16 09:18:01 2009
Response via : Initial Calibration
DataAcq Meth:SVE4D15S.M

Vial: 38
Operator: KV
Inst : E4
Multiplr: 1.00

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 200%

		Compound	Amount	Calc.	%Dev	Area%	Dev(min)
50	P	2,4-Dinitrophenol	50.000	47.522	5.0	100	0.00
51	P	4-Nitrophenol	50.000	48.380	3.2	97	0.00
52	T	2,4-Dinitrotoluene	50.000	52.312	-4.6	104	0.00
53	T	Dibenzofuran	50.000	51.364	-2.7	100	0.00
54	T	2,3,4,6-Tetrachlorophenol	50.000	61.613	-23.2	112	0.00
55	T	2,3,5-Trimethylnaphthalene	50.000	49.270	1.5	96	0.00
56	T	Diethylphthalate	50.000	55.152	-10.3	104	0.00
57	T	Fluorene	50.000	52.944	-5.9	103	0.00
58	T	4-Chlorophenyl-phenylether	50.000	57.407	-14.8	110	0.00
59	T	4-Nitroaniline	50.000	53.141	-6.3	101	0.00
60	I	Phenanthrene-d10	40.000	40.000	0.0	101	0.00
61	T	4,6-Dinitro-2-methylphenol	50.000	48.906	2.2	104	0.00
62	C	N-Nitrosodiphenylamine	50.000	48.266	3.5	93	0.00
63	T	Azobenzene	50.000	57.937	-15.9	107	0.00
64	S	2,4,6-Tribromophenol	50.000	0.000	100.0#	0	-6.97#
65	T	4-Bromophenyl-phenylether	50.000	56.090	-12.2	108	0.00
66	T	Hexachlorobenzene	50.000	54.100	-8.2	104	0.00
67	C	Pentachlorophenol	50.000	44.656	10.7	91	0.00
68	T	Phenanthrene	50.000	49.019	2.0	98	0.00
69	T	Anthracene	50.000	50.913	-1.8	99	0.00
70	T	Carbazole	50.000	53.935	-7.9	102	0.00
71	T	Di-n-butylphthalate	50.000	56.706	-13.4	103	0.00
72	T	1-Methylphenanthrene	50.000	54.113	-8.2	104	0.00
73	C	Fluoranthene	50.000	53.109	-6.2	100	0.00
74	I	Chrysene-d12	40.000	40.000	0.0	101	0.00
75	T	Benzidine	50.000	0.000	100.0#	0	0.00
76	T	Pyrene	50.000	52.795	-5.6	101	0.00
77	S	Terphenyl-d14	50.000	0.000	100.0#	0	-9.48#
78	T	Butylbenzylphthalate	50.000	50.597	-1.2	102	0.00
79		3,3'-Dichlorobenzidine	50.000	50.221	-0.4	104	0.00
80	T	Benzo(a)anthracene	50.000	52.513	-5.0	101	0.00
81	T	Chrysene	50.000	52.859	-5.7	104	0.00
82	T	bis(2-Ethylhexyl)phthalate	50.000	50.982	-2.0	102	0.00
83	I	Perylene-d12	40.000	40.000	0.0	104	0.00
84	C	Di-n-octylphthalate	50.000	48.175	3.7	100	0.00
85	T	Benzo(b)fluoranthene	50.000	57.279	-14.6	105	0.00
86	T	Benzo(k)fluoranthene	50.000	56.767	-13.5	105	0.00
87	T	Benzo(e)pyrene	50.000	51.192	-2.4	99	0.00
88	C	Benzo(a)pyrene	50.000	54.798	-9.6	103	0.00
89	T	Perylene	50.000	52.683	-5.4	107	0.00
90	T	Indeno(1,2,3-cd)pyrene	50.000	55.361	-10.7	102	0.00
91	T	Dibenzo(a,h)anthracene	50.000	54.977	-10.0	102	0.00
92	T	Benzo(g,h,i)perylene	50.000	55.155	-10.3	104	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

SU 4/20/09

Evaluate Continuing Calibration Report

Data File : D:\DATA\09D15\RDJ232.D
Acq On : 16 Apr 2009 4:28
Sample : ISVE4D15C1
Misc : ICV 50PPM
Integrator: RTE
Quant Time: Apr 17 17:17:03 2009
Quant Results File: SVE4D15C.RES
Quant Method : C:\msdchem\1\METHODS\SVE4D15C.M
Quant Title : SEMIVOLATILES
QLast Update : Thu Apr 16 09:18:01 2009
Response via : Initial Calibration
DataAcq Meth:SVE4D15S.M

Vial: 38
Operator: KV
Inst : E4
Multiplr: 1.00

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	I	1,4-Dichlorobenzene-d4	1.000	1.000	0.0	96	0.00
2	T	N-nitrosodimethylamine	0.541	0.604	-11.6	99	0.00
3	T	Pyridine	1.045	1.203	-15.1	99	0.00
4	S	2-Fluorophenol	1.038	0.000#	100.0#	0#	-1.95#
5	S	Phenol-d5	1.230	0.000#	100.0#	0#	-2.51#
6	C	Phenol	1.358	1.402	-3.2	95	0.00
7	T	Aniline	1.524	1.387	9.0	88	0.00
8	T	bis(2-chloroethyl)ether	0.992	1.153	-16.2	112	0.00
9	T	2-Chlorophenol	1.198	1.248	-4.2	97	0.00
10	T	1,3-Dichlorobenzene	1.427	1.526	-6.9	101	0.00
11	S	1,2-Dichlorobenzene-d4	0.890	0.000#	100.0#	0#	-2.98#
12	C	1,4-Dichlorobenzene	1.459	1.527	-4.7	100	0.00
13	T	Benzyl alcohol	0.685	0.774	-13.0	102	0.00
14	T	1,2-Dichlorobenzene	1.368	1.465	-7.1	102	0.00
15	T	2-Methylphenol	0.877	0.917	-4.6	98	0.00
16	T	bis(2-chloroisopropyl)ether	2.326	2.611	-12.3	109	0.00
17	T	4-Methylphenol	1.291	1.257	2.6	87	0.00
18	P	N-Nitroso-di-n-propylamine	0.711	0.840	-18.1	106	0.00
19	T	Hexachloroethane	0.558	0.620	-11.1	103	0.00
20	I	Naphthalene-d8	1.000	1.000	0.0	99	0.00
21	S	Nitrobenzene-d5	0.343	0.000#	100.0#	0#	-3.32#
22	T	Nitrobenzene	0.341	0.369	-8.2	100	0.00
23	T	Isophorone	0.518	0.628	-21.2	111	0.00
24	C	2-Nitrophenol	0.168	0.192	-14.3	98	0.00
25	T	2,4-Dimethylphenol	0.355	0.370	-4.2	98	0.00
26	T	Benzoic acid	0.216	0.248	-14.8	95	0.00
27	T	bis(2-Chloroethoxy)methane	0.433	0.465	-7.4	107	0.00
28	C	2,4-Dichlorophenol	0.318	0.334	-5.0	97	0.00
29	T	1,2,4-Trichlorobenzene	0.385	0.406	-5.5	102	0.00
30	T	Naphthalene	0.977	0.987	-1.0	98	0.00
31	T	4-Chloroaniline	0.401	0.413	-3.0	98	0.00
32	C	Hexachlorobutadiene	0.251	0.269	-7.2	103	0.00
33	C	4-Chloro-3-methylphenol	0.285	0.304	-6.7	95	0.00
34	T	2-Methylnaphthalene	0.666	0.683	-2.6	99	0.00
35	T	1-Methylnaphthalene	0.607	0.648	-6.8	104	0.00
36	I	Acenaphthene-d10	1.000	1.000	0.0	99	0.00
37	P	Hexachlorocyclopentadiene	0.581	0.635	-9.3	96	0.00
38	C	2,4,6-Trichlorophenol	0.448	0.499	-11.4	99	0.00
39	T	2,4,5-Trichlorophenol	0.489	0.536	-9.6	98	0.00
40	S	2-Fluorobiphenyl	1.543	0.000#	100.0#	0#	-5.24#
41	T	Biphenyl	1.557	1.573	-1.0	98	0.00
42	T	2-Chloronaphthalene	1.356	1.580	-16.5	104	0.00
43	T	2-Nitroaniline	0.334	0.401	-20.1	102	0.00
44	T	2,6-Dimethylnaphthalene	1.286	1.190	7.5	89	0.00
45	T	Dimethylphthalate	1.470	1.565	-6.5	101	0.00
46	T	2,6-Dinitrotoluene	0.257	0.322	-25.3#	104	0.00
47	T	Acenaphthylene	1.813	2.047	-12.9	104	0.00
48	T	3-Nitroaniline	0.281	0.346	-23.1	102	0.00
49	C	Acenaphthene	1.259	1.273	-1.1	99	0.00

SU 4/20/09

Evaluate Continuing Calibration Report

Data File : D:\DATA\09D15\RDJ232.D
Acq On : 16 Apr 2009 4:28
Sample : ISVE4D15C1
Misc : ICV 50PPM
Integrator: RTE
Quant Time: Apr 17 17:17:03 2009
Quant Results File: SVE4D15C.RES
Quant Method : C:\msdchem\1\METHODS\SVE4D15C.M
Quant Title : SEMIVOLATILES
QLast Update : Thu Apr 16 09:18:01 2009
Response via : Initial Calibration
DataAcq Meth:SVE4D15S.M

Vial: 38
Operator: KV
Inst : E4
Multiplr: 1.00

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
50	P	2,4-Dinitrophenol	0.163	0.191	-17.2	100	0.00
51	P	4-Nitrophenol	0.210	0.223	-6.2	97	0.00
52	T	2,4-Dinitrotoluene	0.345	0.432	-25.2#	104	0.00
53	T	Dibenzofuran	1.885	1.936	-2.7	100	0.00
54	T	2,3,4,6-Tetrachlorophenol	0.360	0.444	-23.3	112	0.00
55	T	2,3,5-Trimethylnaphthalene	1.115	1.099	1.4	96	0.00
56	T	Diethylphthalate	1.446	1.595	-10.3	104	0.00
57	T	Fluorene	1.382	1.463	-5.9	103	0.00
58	T	4-Chlorophenyl-phenylether	0.749	0.860	-14.8	110	0.00
59	T	4-Nitroaniline	0.270	0.349	-29.3#	101	0.00
60	I	Phenanthrene-d10	1.000	1.000	0.0	101	0.00
61	T	4,6-Dinitro-2-methylphenol	0.129	0.150	-16.3	104	0.00
62	C	N-Nitrosodiphenylamine	0.518	0.500	3.5	93	0.00
63	T	Azobenzene	0.666	0.772	-15.9	107	0.00
64	S	2,4,6-Tribromophenol	0.104	0.000#	100.0#	0#	-6.97#
65	T	4-Bromophenyl-phenylether	0.240	0.269	-12.1	108	0.00
66	T	Hexachlorobenzene	0.242	0.262	-8.3	104	0.00
67	C	Pentachlorophenol	0.191	0.205	-7.3	91	0.00
68	T	Phenanthrene	1.176	1.152	2.0	98	0.00
69	T	Anthracene	1.145	1.166	-1.8	99	0.00
70	T	Carbazole	0.997	1.076	-7.9	102	0.00
71	T	Di-n-butylphthalate	1.188	1.348	-13.5	103	0.00
72	T	1-Methylphenanthrene	0.828	0.896	-8.2	104	0.00
73	C	Fluoranthene	1.227	1.303	-6.2	100	0.00
74	I	Chrysene-d12	1.000	1.000	0.0	101	0.00
75	T	Benzidine	0.000	0.000#	0.0	0#	0.00
76	T	Pyrene	1.281	1.352	-5.5	101	0.00
77	S	Terphenyl-d14	0.845	0.000#	100.0#	0#	-9.48#
78	T	Butylbenzylphthalate	0.431	0.548	-27.1#	102	0.00
79		3,3'-Dichlorobenzidine	0.338	0.424	-25.4#	104	0.00
80	T	Benzo(a)anthracene	1.164	1.222	-5.0	101	0.00
81	T	Chrysene	1.114	1.178	-5.7	104	0.00
82	T	bis(2-Ethylhexyl)phthalate	0.658	0.781	-18.7	102	0.00
83	I	Perylene-d12	1.000	1.000	0.0	104	0.00
84	C	Di-n-octylphthalate	1.156	1.270	-9.9	100	0.00
85	T	Benzo(b)fluoranthene	0.980	1.123	-14.6	105	0.00
86	T	Benzo(k)fluoranthene	1.100	1.249	-13.5	105	0.00
87	T	Benzo(e)pyrene	1.058	1.084	-2.5	99	0.00
88	C	Benzo(a)pyrene	0.966	1.058	-9.5	103	0.00
89	T	Perylene	1.074	1.131	-5.3	107	0.00
90	T	Indeno(1,2,3-cd)pyrene	0.997	1.104	-10.7	102	0.00
91	T	Dibenzo(a,h)anthracene	0.848	0.932	-9.9	102	0.00
92	T	Benzo(g,h,i)perylene	0.841	0.927	-10.2	104	0.00

SCA 4/29/09

(#) = Out of Range SPCC's out = 0 CCC's out = 0

DAILY CALIBRATIONS

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK

DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: EMAX Inc
Lab Code: EMXT
Lab File ID: REJ136
Instrument ID: TOE4

Project: NWS SEAL BEACH UST SITE 229
SDG No.: 09D294
DFTPP Injection Date: 05/06/09
DFTPP Injection Time: 11:10

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	49.43
68	Less than 2% of mass 69	0.71(1.6)1
69	Relative abundance of mass 198	43.65
70	Less than 2.0% of mass 69	0.16(0.4)1
127	40.0 - 60.0% of mass 198	45.09
197	Less than 1.0% of mass 198	0.00
198	Base Peak, 100% relative abundance	100.00
199	5.0 - 9.0% of mass 198	6.70
275	10.0 - 30.0% of mass 198	20.28
365	Greater than 1.00% of mass 198	2.55
441	Present, but less than mass 443	10.40
442	Greater than 40.0% of mass 198	62.81
443	17.0 - 23.0% of mass 442	12.11(19.3)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD,BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1	SSTD050	CSVE4D15C16A	REJ138	05/06/09	12:00
2	MBLK1W	SVE003WB	REJ140	05/06/09	12:38
3	LCS1W	SVE003WL	REJ141	05/06/09	12:57
4	LCD1W	SVE003WC	REJ142	05/06/09	13:15
5	SB229-IDW	D294-01	REJ173	05/06/09	22:49

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: EMAX Inc
Lab Code: EMXT
Lab File ID: RDJ227
Instrument ID: TOE4

Project:NWS SEAL BEACH UST SITE 229
SDG No.: 09D294
Date Analyzed: 04/16/09
Time Analyzed: 02:56

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
	12 HOUR STD	166857	2.84	569311	4.04	309697	6.03
	UPPER LIMIT	333714	3.34	1138622	4.54	619394	6.53
	LOWER LIMIT	83429	2.34	284656	3.54	154849	5.53
	SAMPLE ID						
1	SSTD050	136253	2.84	494400	4.03	268771	6.03
2	MBLK1W	140974	2.84	512031	4.03	271711	6.03
3	LCS1W	142001	2.84	507651	4.03	277917	6.03
4	LCD1W	148070	2.84	542645	4.03	292992	6.03
5	SB229-IDW	151867	2.84	552873	4.03	302814	6.03

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal satndard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk
* Values outside of QC limits.

8C

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: EMAX Inc
Lab Code: EMXT
Lab File ID: RDJ227
Instrument ID: TOE4

Project:NWS SEAL BEACH UST SITE 229
SDG No.: 09D294
Date Analyzed: 04/16/09
Time Analyzed: 02:56

		IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
	12 HOUR STD	568301	7.77	563363	10.54	544793	11.90
	UPPER LIMIT	1136602	8.27	1126726	11.04	1089586	12.40
	LOWER LIMIT	284151	7.27	281682	10.04	272397	11.40
	SAMPLE ID						
1	SSTD050	516561	7.77	552467	10.55	566863	11.91
2	MBLK1W	521605	7.77	560380	10.54	579013	11.90
3	LCS1W	521988	7.77	575826	10.55	590264	11.91
4	LCD1W	557073	7.77	594324	10.55	600756	11.91
5	SB229-IDW	577974	7.77	600412	10.54	584120	11.90

IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal satndard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk
* Values outside of QC limits.

Evaluate Continuing Calibration Report

Data File : D:\DATA\09E06\REJ138.D
Acq On : 6 May 2009 12:00
Sample : CSVE4D15C16A
Misc :
Integrator: RTE
Quant Time: May 06 15:04:02 2009
Quant Results File: SVE4D15C.RES
Quant Method : C:\msdchem\1\METHODS\SVE4D15C.M
Quant Title : SEMIVOLATILES
QLast Update : Fri Apr 17 16:57:40 2009
Response via : Initial Calibration
DataAcq Meth:SVE4D15S.M

Vial: 3
Operator: GL/KV
Inst : E4
Multiplr: 1.00

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

		Compound	Amount	Calc.	%Dev	Area%	Dev(min)
1	I	1,4-Dichlorobenzene-d4	40.000	40.000	0.0	82	0.00
2	T	N-nitrosodimethylamine	50.000	62.859	-25.7#	95	0.00
3	T	Pyridine	50.000	55.416	-10.8	81	0.00
4	S	2-Fluorophenol	50.000	55.365	-10.7	86	0.00
5	S	Phenol-d5	50.000	56.517	-13.0	88	0.00
6	C	Phenol	50.000	54.584	-9.2	85	0.00
7	T	Aniline	50.000	49.734	0.5	82	0.00
8	T	bis(2-chloroethyl)ether	50.000	52.217	-4.4	85	0.00
9	T	2-Chlorophenol	50.000	52.712	-5.4	83	0.00
10	T	1,3-Dichlorobenzene	50.000	51.404	-2.8	83	0.00
11	S	1,2-Dichlorobenzene-d4	50.000	49.268	1.5	78	0.00
12	C	1,4-Dichlorobenzene	50.000	51.121	-2.2	83	0.00
13	T	Benzyl alcohol	50.000	55.580	-11.2	85	0.00
14	T	1,2-Dichlorobenzene	50.000	52.071	-4.1	84	0.00
15	T	2-Methylphenol	50.000	53.475	-7.0	85	0.00
16	T	bis(2-chloroisopropyl)ether	50.000	54.140	-8.3	89	0.00
17	T	4-Methylphenol	50.000	56.823	-13.6	86	0.00
18	P	N-Nitroso-di-n-propylamine	50.000	59.264	-18.5	91	0.00
19	T	Hexachloroethane	50.000	51.957	-3.9	81	0.00
20	I	Naphthalene-d8	40.000	40.000	0.0	87	0.00
21	S	Nitrobenzene-d5	50.000	55.463	-10.9	91	0.00
22	T	Nitrobenzene	50.000	55.300	-10.6	89	0.00
23	T	Isophorone	50.000	56.014	-12.0	90	0.00
24	C	2-Nitrophenol	50.000	49.381	1.2	86	0.00
25	T	2,4-Dimethylphenol	50.000	52.874	-5.7	87	0.00
26	T	Benzoic acid	50.000	47.083	5.8	79	0.00
27	T	bis(2-Chloroethoxy)methane	50.000	45.450	9.1	79	0.00
28	C	2,4-Dichlorophenol	50.000	52.332	-4.7	85	0.00
29	T	1,2,4-Trichlorobenzene	50.000	46.331	7.3	78	0.00
30	T	Naphthalene	50.000	48.388	3.2	83	0.00
31	T	4-Chloroaniline	50.000	49.949	0.1	83	0.00
32	C	Hexachlorobutadiene	50.000	45.314	9.4	76	0.00
33	C	4-Chloro-3-methylphenol	50.000	57.416	-14.8	90	0.00
34	T	2-Methylnaphthalene	50.000	50.076	-0.2	85	0.00
35	T	1-Methylnaphthalene	50.000	50.142	-0.3	85	0.00
36	I	Acenaphthene-d10	40.000	40.000	0.0	87	0.00
37	P	Hexachlorocyclopentadiene	50.000	44.986	10.0	69	0.00
38	C	2,4,6-Trichlorophenol	50.000	51.796	-3.6	80	0.00
39	T	2,4,5-Trichlorophenol	50.000	51.906	-3.8	81	0.00
40	S	2-Fluorobiphenyl	50.000	47.020	6.0	79	0.00
41	T	Biphenyl	50.000	50.419	-0.8	86	0.00
42	T	2-Chloronaphthalene	50.000	46.285	7.4	72	0.00
43	T	2-Nitroaniline	50.000	56.055	-12.1	98	0.00
44	T	2,6-Dimethylnaphthalene	50.000	49.997	0.0	84	0.00
45	T	Dimethylphthalate	50.000	50.999	-2.0	85	0.00
46	T	2,6-Dinitrotoluene	50.000	50.732	-1.5	88	0.00
47	T	Acenaphthylene	50.000	51.804	-3.6	83	0.00
48	T	3-Nitroaniline	50.000	52.355	-4.7	90	0.00
49	C	Acenaphthene	50.000	51.738	-3.5	88	0.00

Evaluate Continuing Calibration Report

Data File : D:\DATA\09E06\REJ138.D
Acq On : 6 May 2009 12:00
Sample : CSVE4D15C16A
Misc :
Integrator: RTE
Quant Time: May 06 15:04:02 2009
Quant Results File: SVE4D15C.RES
Quant Method : C:\msdchem\1\METHODS\SVE4D15C.M
Quant Title : SEMIVOLATILES
QLast Update : Fri Apr 17 16:57:40 2009
Response via : Initial Calibration
DataAcq Meth:SVE4D15S.M

Vial: 3
Operator: GL/KV
Inst : E4
Multiplr: 1.00

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

		Compound	Amount	Calc.	%Dev	Area%	Dev(min)
50	P	2,4-Dinitrophenol	50.000	49.782	0.4	92	0.00
51	P	4-Nitrophenol	50.000	51.899	-3.8	91	0.01
52	T	2,4-Dinitrotoluene	50.000	52.090	-4.2	91	0.00
53	T	Dibenzofuran	50.000	50.237	-0.5	85	0.00
54	T	2,3,4,6-Tetrachlorophenol	50.000	53.636	-7.3	85	0.00
55	T	2,3,5-Trimethylnaphthalene	50.000	50.886	-1.8	87	0.00
56	T	Diethylphthalate	50.000	51.240	-2.5	85	0.00
57	T	Fluorene	50.000	49.925	0.2	85	0.00
58	T	4-Chlorophenyl-phenylether	50.000	48.217	3.6	81	0.00
59	T	4-Nitroaniline	50.000	52.820	-5.6	88	0.00
60	I	Phenanthrene-d10	40.000	40.000	0.0	91	0.00
61	T	4,6-Dinitro-2-methylphenol	50.000	52.302	-4.6	100	0.00
62	C	N-Nitrosodiphenylamine	50.000	50.383	-0.8	87	0.00
63	T	Azobenzene	50.000	55.940	-11.9	93	0.00
64	S	2,4,6-Tribromophenol	50.000	55.718	-11.4	102	0.00
65	T	4-Bromophenyl-phenylether	50.000	47.996	4.0	83	0.00
66	T	Hexachlorobenzene	50.000	48.225	3.5	83	0.00
67	C	Pentachlorophenol	50.000	45.945	8.1	85	0.00
68	T	Phenanthrene	50.000	48.692	2.6	88	0.00
69	T	Anthracene	50.000	50.676	-1.4	88	0.00
70	T	Carbazole	50.000	52.750	-5.5	90	0.00
71	T	Di-n-butylphthalate	50.000	54.479	-9.0	89	0.00
72	T	1-Methylphenanthrene	50.000	52.816	-5.6	92	0.00
73	C	Fluoranthene	50.000	53.020	-6.0	90	0.00
74	I	Chrysene-d12	40.000	40.000	0.0	98	0.00
75	T	Benzidine	50.000	0.000	100.0#	0	0.00
76	T	Pyrene	50.000	48.711	2.6	90	0.00
77	S	Terphenyl-d14	50.000	46.471	7.1	88	0.00
78	T	Butylbenzylphthalate	50.000	49.958	0.1	98	0.00
79		3,3'-Dichlorobenzidine	50.000	51.464	-2.9	103	0.00
80	T	Benzo(a)anthracene	50.000	50.197	-0.4	94	0.00
81	T	Chrysene	50.000	48.345	3.3	92	0.00
82	T	bis(2-Ethylhexyl)phthalate	50.000	50.547	-1.1	98	0.00
83	I	Perylene-d12	40.000	40.000	0.0	104	0.01
84	C	Di-n-octylphthalate	50.000	49.473	1.1	103	0.00
85	T	Benzo(b)fluoranthene	50.000	50.533	-1.1	93	0.01
86	T	Benzo(k)fluoranthene	50.000	56.111	-12.2	105	0.01
87	T	Benzo(e)pyrene	50.000	52.000	-4.0	101	0.01
88	C	Benzo(a)pyrene	50.000	52.243	-4.5	99	0.02
89	T	Perylene	50.000	50.903	-1.8	104	0.02
90	T	Indeno(1,2,3-cd)pyrene	50.000	57.213	-14.4	106	0.02
91	T	Dibenzo(a,h)anthracene	50.000	55.381	-10.8	104	0.02
92	T	Benzo(g,h,i)perylene	50.000	56.706	-13.4	107	0.02

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Evaluate Continuing Calibration Report

Data File : D:\DATA\09E06\REJ138.D
Acq On : 6 May 2009 12:00
Sample : CSVE4D15C16A
Misc :
Integrator: RTE
Quant Time: May 06 15:04:02 2009
Quant Results File: SVE4D15C.RES
Quant Method : C:\msdchem\1\METHODS\SVE4D15C.M
Quant Title : SEMIVOLATILES
QLast Update : Fri Apr 17 16:57:40 2009
Response via : Initial Calibration
DataAcq Meth:SVE4D15S.M

Vial: 3
Operator: GL/KV
Inst : E4
Multiplr: 1.00

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	I	1,4-Dichlorobenzene-d4	1.000	1.000	0.0	82	0.00
2	T	N-nitrosodimethylamine	0.541	0.680	-25.7#	95	0.00
3	T	Pyridine	1.045	1.158	-10.8	81	0.00
4	S	2-Fluorophenol	1.038	1.149	-10.7	86	0.00
5	S	Phenol-d5	1.230	1.390	-13.0	88	0.00
6	C	Phenol	1.358	1.482	-9.1	85	0.00
7	T	Aniline	1.524	1.516	0.5	82	0.00
8	T	bis(2-chloroethyl)ether	0.992	1.036	-4.4	85	0.00
9	T	2-Chlorophenol	1.198	1.263	-5.4	83	0.00
10	T	1,3-Dichlorobenzene	1.427	1.467	-2.8	83	0.00
11	S	1,2-Dichlorobenzene-d4	0.890	0.877	1.5	78	0.00
12	C	1,4-Dichlorobenzene	1.459	1.492	-2.3	83	0.00
13	T	Benzyl alcohol	0.685	0.761	-11.1	85	0.00
14	T	1,2-Dichlorobenzene	1.368	1.424	-4.1	84	0.00
15	T	2-Methylphenol	0.877	0.938	-7.0	85	0.00
16	T	bis(2-chloroisopropyl)ether	2.326	2.519	-8.3	89	0.00
17	T	4-Methylphenol	1.291	1.467	-13.6	86	0.00
18	P	N-Nitroso-di-n-propylamine	0.711	0.843	-18.6	91	0.00
19	T	Hexachloroethane	0.558	0.580	-3.9	81	0.00
20	I	Naphthalene-d8	1.000	1.000	0.0	87	0.00
21	S	Nitrobenzene-d5	0.343	0.380	-10.8	91	0.00
22	T	Nitrobenzene	0.341	0.377	-10.6	89	0.00
23	T	Isophorone	0.518	0.580	-12.0	90	0.00
24	C	2-Nitrophenol	0.168	0.191	-13.7	86	0.00
25	T	2,4-Dimethylphenol	0.355	0.375	-5.6	87	0.00
26	T	Benzoic acid	0.216	0.237	-9.7	79	0.00
27	T	bis(2-Chloroethoxy)methane	0.433	0.393	9.2	79	0.00
28	C	2,4-Dichlorophenol	0.318	0.333	-4.7	85	0.00
29	T	1,2,4-Trichlorobenzene	0.385	0.357	7.3	78	0.00
30	T	Naphthalene	0.977	0.945	3.3	83	0.00
31	T	4-Chloroaniline	0.401	0.401	0.0	83	0.00
32	C	Hexachlorobutadiene	0.251	0.228	9.2	76	0.00
33	C	4-Chloro-3-methylphenol	0.285	0.327	-14.7	90	0.00
34	T	2-Methylnaphthalene	0.666	0.667	-0.2	85	0.00
35	T	1-Methylnaphthalene	0.607	0.609	-0.3	85	0.00
36	I	Acenaphthene-d10	1.000	1.000	0.0	87	0.00
37	P	Hexachlorocyclopentadiene	0.581	0.523	10.0	69	0.00
38	C	2,4,6-Trichlorophenol	0.448	0.464	-3.6	80	0.00
39	T	2,4,5-Trichlorophenol	0.489	0.508	-3.9	81	0.00
40	S	2-Fluorobiphenyl	1.543	1.451	6.0	79	0.00
41	T	Biphenyl	1.557	1.570	-0.8	86	0.00
42	T	2-Chloronaphthalene	1.356	1.255	7.4	72	0.00
43	T	2-Nitroaniline	0.334	0.443	-32.6#	98	0.00
44	T	2,6-Dimethylnaphthalene	1.286	1.286	0.0	84	0.00
45	T	Dimethylphthalate	1.470	1.499	-2.0	85	0.00
46	T	2,6-Dinitrotoluene	0.257	0.313	-21.8#	88	0.00
47	T	Acenaphthylene	1.813	1.879	-3.6	83	0.00
48	T	3-Nitroaniline	0.281	0.348	-23.8#	90	0.00
49	C	Acenaphthene	1.259	1.303	-3.5	88	0.00

Evaluate Continuing Calibration Report

Data File : D:\DATA\09E06\REJ138.D
Acq On : 6 May 2009 12:00
Sample : CSVE4D15C16A
Misc :
Integrator: RTE
Quant Time: May 06 15:04:02 2009
Quant Results File: SVE4D15C.RES
Quant Method : C:\msdchem\1\METHODS\SVE4D15C.M
Quant Title : SEMIVOLATILES
QLast Update : Fri Apr 17 16:57:40 2009
Response via : Initial Calibration
DataAcq Meth:SVE4D15S.M

Vial: 3
Operator: GL/KV
Inst : E4
Multiplr: 1.00

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
50	P	2,4-Dinitrophenol	0.163	0.201	-23.3#	92	0.00
51	P	4-Nitrophenol	0.210	0.240	-14.3	91	0.01
52	T	2,4-Dinitrotoluene	0.345	0.431	-24.9#	91	0.00
53	T	Dibenzofuran	1.885	1.894	-0.5	85	0.00
54	T	2,3,4,6-Tetrachlorophenol	0.360	0.386	-7.2	85	0.00
55	T	2,3,5-Trimethylnaphthalene	1.115	1.135	-1.8	87	0.00
56	T	Diethylphthalate	1.446	1.482	-2.5	85	0.00
57	T	Fluorene	1.382	1.380	0.1	85	0.00
58	T	4-Chlorophenyl-phenylether	0.749	0.722	3.6	81	0.00
59	T	4-Nitroaniline	0.270	0.347	-28.5#	88	0.00
60	I	Phenanthrene-d10	1.000	1.000	0.0	91	0.00
61	T	4,6-Dinitro-2-methylphenol	0.129	0.161	-24.8#	100	0.00
62	C	N-Nitrosodiphenylamine	0.518	0.522	-0.8	87	0.00
63	T	Azobenzene	0.666	0.745	-11.9	93	0.00
64	S	2,4,6-Tribromophenol	0.104	0.128	-23.1#	102	0.00
65	T	4-Bromophenyl-phenylether	0.240	0.230	4.2	83	0.00
66	T	Hexachlorobenzene	0.242	0.233	3.7	83	0.00
67	C	Pentachlorophenol	0.191	0.211	-10.5	85	0.00
68	T	Phenanthrene	1.176	1.145	2.6	88	0.00
69	T	Anthracene	1.145	1.161	-1.4	88	0.00
70	T	Carbazole	0.997	1.052	-5.5	90	0.00
71	T	Di-n-butylphthalate	1.188	1.295	-9.0	89	0.00
72	T	1-Methylphenanthrene	0.828	0.874	-5.6	92	0.00
73	C	Fluoranthene	1.227	1.301	-6.0	90	0.00
74	I	Chrysene-d12	1.000	1.000	0.0	98	0.00
75	T	Benzidine	0.000	0.000#	0.0	0#	0.00
76	T	Pyrene	1.281	1.248	2.6	90	0.00
77	S	Terphenyl-d14	0.845	0.786	7.0	88	0.00
78	T	Butylbenzylphthalate	0.431	0.541	-25.5#	98	0.00
79		3,3'-Dichlorobenzidine	0.338	0.434	-28.4#	103	0.00
80	T	Benzo(a)anthracene	1.164	1.168	-0.3	94	0.00
81	T	Chrysene	1.114	1.077	3.3	92	0.00
82	T	bis(2-Ethylhexyl)phthalate	0.658	0.774	-17.6	98	0.00
83	I	Perylene-d12	1.000	1.000	0.0	104	0.01
84	C	Di-n-octylphthalate	1.156	1.306	-13.0	103	0.00
85	T	Benzo(b)fluoranthene	0.980	0.991	-1.1	93	0.01
86	T	Benzo(k)fluoranthene	1.100	1.235	-12.3	105	0.01
87	T	Benzo(e)pyrene	1.058	1.101	-4.1	101	0.01
88	C	Benzo(a)pyrene	0.966	1.009	-4.5	99	0.02
89	T	Perylene	1.074	1.093	-1.8	104	0.02
90	T	Indeno(1,2,3-cd)pyrene	0.997	1.141	-14.4	106	0.02
91	T	Dibenzo(a,h)anthracene	0.848	0.939	-10.7	104	0.02
92	T	Benzo(g,h,i)perylene	0.841	0.954	-13.4	107	0.02

(#) = Out of Range SPCC's out = 0 CCC's out = 0

ANALYTICAL LOG

EMAX LABORATORIES, INC.

ANALYSIS LOG FOR SEMIVOLATILES

SOP ☑ EMAX-8270 Rev. No. 3 ☐ EMAX-8270SIM Rev. No. 1 ☐ EMAX-CLPSVOA ☐ EMAX-M8270SIM Rev. No. 1 ☐

Book #AE4- 002

Method File: SV~~48~~D15S E4 DC 4/15/09 Tune File: DFTPP Start Date/Time: 4/15/09 17:20 End Date/Time: 4/16/09 4:28

Preparative Batch	Data File Name	Run ID DC 4/15/09	DF	Matrix S	Matrix W	Notes
	RDJ195	IBE4D~~1403~~1501				
	196	DFTE4D~~1403~~1501				
NA	197	SVE4D151				2 PPM BENZIDINE
	198	2				5
	199	3				10
	200	4				50
	201	5				100
	202	6				120
	203	7				160
	204	ISVE4D151				
	205	SVE4D15A1				20 PPM APP9 ADD
	206	2				40
	207	3				50
	208	4				80
	209	5				100
	210	6				120
	211	7				140
	212	ISVE4D15A1				
	213	SVE4D15B1				2 PPM APP9*
	214	2				5
	215	3				10
	216	4				20
	217	5				50
	218	6				80
	219	7				100
	220	ISVE4D15B1				
	221	SVE4D15C1				0.075 PPM 8270+SIM
	222	2				0.15
	223	3				1
	224	4				2

ANALYTICAL BATCH SVE4D15C7

3027

Instrument No:	E4
INITIAL CALIBRATION REFERENCE	
Date	4/15/09
ICAL ID	SVE4D15/15A/15B/15C/15D/15S

Standards		
Name	ID	Conc. (mg/L)
DFTPP	SS2C-08-10-1	50
DCC	SS2C-08-10-2	50
INT. STD.	SS2B-07-7-3	2000
BENZIDINE	SS2C-08-14-2	50

Solvent	ID
CH_2Cl_2	48340

DATA FILE	09D15

Electronic Data Archival	
Location	Date
HPCHEM_SVOA/T0E4	

Comments: APP 9 ICAL: SS2C-08-12-1
APP 9 ADD ICAL: SS2C-08-12-3
3-ANALYTES ICAL: SS2C-08-15-1
8270+SIM ICV: SS2C-08-11-1, 3-ANALYTES ICV: SS2C-08-15-2
BENZIDINE ICV: SS2C-08-14-3
APP9 ICV: SS2C-08-12-2, APP9 ADD ICV: SS2C-08-13-2

Analyzed By: XV

Date Disposed: NA

Disposed by: NA

This page is checked during data review.

* DATA NOT USED

EMAX LABORATORIES, INC.

ANALYSIS LOG FOR SEMIVOLATILES

SOP ☑ EMAX-8270 Rev. No. 3 ☐ EMAX-8270SIM Rev. No. 1 ☐ EMAX-CLPSVOA ☐ EMAX-M8270SIM Rev. No. 1 ☐

Book #AE4- 002

Method File: SV~~48~~D15S E4 DC 4/15/09 Tune File: DFTPP Start Date/Time: 4/15/09 17:20 & 4/16/09 4:45 End Date/Time: 4/16/09 4:28 & 4/16/09 6:46

Preparative Batch	Data File Name	Run ID	DF	Matrix S	Matrix W	Notes
NA	RDT225	SVE4D15C5				5 PPM 8270+SIM
	226	6				10
	227	7				50
	228	8				80
	229	9				100
	230	10				120
	231	11				160
	232	1SVE4D15C1				
	233	DFTE4D1502				
	234	SVE4D15D1				2 PPM 3-ANALYTES
	235	2				5
	236	3				10
	237	4				50
	238	5				80
	239	6				100
	240	1SVE4D15D1				

ANALYTICAL BATCH SVE4D15C7

Instrument No:	E4
INITIAL CALIBRATION REFERENCE	
Date	4/15/09
ICAL ID	SVE4D15/15A/15B/15C/15D/15S

Standards		
Name	ID	Conc. (mg/L)
DFTPP	SS2C-08-10-1	50
DCC	SS2C-08-10-2	50
INT. STD.	SS2B-07-7-3	20000
BENZIDINE	SS2C-08-14-2	50

Solvent	ID
CH_2Cl_2	48340

DATA FILE	09D15

Electronic Data Archival	
Location	Date
HPCHEM_SVOA/T0E4	

Comments: 8270+SIM ICV: SS2C-08-11-1
APP9 ICAL: SS2C-08-12-1, APP9 ICV: SS2C-08-12-2
APP9 ADD ICAL: SS2C-08-12-3, APP9 ADD ICV: SS2C-08-13-2
3-ANALYTES ICAL: SS2C-08-15-1, 3-ANALYTES ICV: SS2C-08-15-2
BENZIDINE ICV: SS2C-08-14-3

Analyzed By: KV

Date Disposed: NA

Disposed by: NA

This page is checked during data review.

3028

EMAX LABORATORIES, INC.

ANALYSIS LOG FOR SEMIVOLATILES

SOP ☑ EMAX-8270 Rev. No. 3 ☐ EMAX-8270SIM Rev. No. 1 ☐ EMAX-CLPSVOA ☐ EMAX-M8270SIM Rev. No. 1 ☐

Book #AE4- 003

Method File: SVE4D15S Tune File: DFTPP Start Date/Time: 5/6/09 11:10 End Date/Time: 5/6/09 22:49

Preparative Batch	Data File Name	Run ID	DF	Matrix S	Matrix W	Notes
	REJ135	IBE4D1516				
	136	DFTE4D1516				
	137	CSVE4D15C16				Not used
	138	CSVE4D15C16A				
	139	CSVE4D1516				Benzidine
SVE003W	140	SVE003WB	1		X	
	141	WL				
	142	WC				
	143	09E011-01				
	144	09E033-01				
SVE005S	145	SVE005SB		X		
	146	SL				
	147	SC				
	148	09D251-06				
	149	19				
	150	20				
	151	21				
	152	09E039-01	2			DCS
SVE004S	153	SVE004SB	1			
	154	SL				
	155	SC				
	156	09E028-01				
	157	02				
SVD054W	158	09D164-01R			X	
	159	02R				
	160	03R				
	161	04R				
	162	05R				
	163	06R				
	164	09D183-04R				
	165	05R				
	166	06R				

Instrument No:	E4
INITIAL CALIBRATION REFERENCE	
Date	4/15/09
ICAL ID	SVE4D15/15C/15S

Standards		
Name	ID	Conc. (mg/L)
DFTPP/BFB	SS2C·08·16·2	50
INT. STD.	SS2B·07·7·3	2000
ICV		
DCC	SS2C·08·10·2	50
BENZIDINE	SS2C·08·14·2	50
APP 9		
APP 9 ADD		

Solvent	ID
CH_2Cl_2	248340

DATA FILE	09E06

Electronic Data Archival	
Location	Date
HPCHEM_SVOA/T0E4	

Comments:
DCS = dark color samples

Analyzed By: gl / KV
Date Disposed: 5/7/09
Disposed by: DC

This page is checked during data review.

ANALYTICAL BATCH CSVE4D15C16A

3029

EMAX LABORATORIES, INC.

ANALYSIS LOG FOR SEMIVOLATILES

SOP ☑ EMAX-8270 Rev. No. 3 ☐ EMAX-8270SIM Rev. No. 1 ☐ EMAX-CLPSVOA ☐ EMAX-M8270SIM Rev. No. 1 ☐ Book #AE4- 003

Method File: SVE4D15S Tune File: DFTPP Start Date/Time: 5/6/09 11:10 End Date/Time: 5/6/09 22:49

Preparative Batch	Data File Name	Run ID	DF	Matrix S	Matrix W	Notes
SVD054W	REJ167	09D183-07R	1		X	
	168	07U				
	169	07V				
SVD048W	170	09D237-01R				
SVE003W	171	090312-01				
SVE002S	172	09D293-09T	10	X		
SVE003W	173	09D292-01	1		X	
	174	BLANK			X	
						gl 5/6/09

ANALYTICAL BATCH CSVE4D15C16A

Instrument No:	E4
INITIAL CALIBRATION REFERENCE	
Date	4/15/09
ICAL ID	SVE4D15/15C/15S

Standards		
Name	ID	Conc. (mg/L)
DFTPP/BFB	SS2C·08·16·2	50
INT. STD.	SS2B·07·7·3	2000
ICV		
DCC	SS2C·08·10·2	50
BENZIDINE	SS2C·08·14·2	50
APP 9		
APP 9 ADD		

Solvent	ID
CH_2Cl_2	48340

DATA FILE	09E06

Electronic Data Archival	
Location	Date
HPCHEM_SVOA/T0E4	

Comments:

Analyzed By: gl / KV

Date Disposed: 5/7/09

Disposed by: DC

This page is checked during data review.

EXTRACTION LOG

EMAX LABORATORIES, INC.

EXTRACTION LOG FOR SEMIVOLATILES

SOP ☐ EMAX-3540 Rev. No.: 0 ☐ EMAX-3510 Rev. No.: 1 ☐ EMAX-3550 Rev. No.: 2 ☒ EMAX-3520 Rev. No.: 2 ☐ EMAX-CLP-SVOA ☐ Book # ESV-049

Matrix: WATER Init.Start Date/Time: 5-4-09 ~~14:00~~ 15:30 CD 5-4-09 End Date/Time: 5/5/09 9:30 Final Start Date/Time: 5/5/09 11:00 End Date/Time: 5/6/09 5:00

PREPARATION BATCH: * SVE003W

Sample Prep ID	Lab Sample ID	Sonicator Number	Sample Amount (g/ml)	pH	Extract Volume (ml)	Clean-up [G] [F] [A] [C]	Notes
*01	SVE003 - WB	N/A	1000	-	2		
*02	- WL		1000	-	2		
*03	- WC		1000	-	2		
*04	09D312 - 01		1000	-	2		QC Spiked water SWIA 03-878
*05	09D291 - 01		1060	7	2		Yellow soln.
*06	- 03		1060	6	2		
*07	- 04		1020	7	2		Yellow soln.
*08	- 05		1020	6	2		
*09	- 06		1050	5	2		
*10	- 07		1030	5	2		
*11	09D293 - 06		1050	5	2		
*12	- 07		1050	5	2		
*13	09D294 - 01		1050	7	2		Yellow soln. w/ ~~bubbles~~ w/ brown soil sediments
*14	09D302 - 05		1030	7	2		
*15	09D310 - 03		1020	7	2		Yellow soln.
*16	- 04		1020	7	2		
*17	- 04M	Standard	1020	7	2		
*18	- 04S		1020	7	2		
*19	- 05		1000	7	2		
*20	- 06		1000	5	2		
*21	09E011 - 01		1060	7	2		Yellow soln. w/ floating sediments.
*22	09E033 - 01		1060	8	2		yellow soln
*23	09D237 - 01R		970	5	2		yellow soln.
*24							
*25							
*26			CD 5-6-09				
*27							
*28							

Standards	ID	Amount Added (ml)
Surrogate	SS2A-06-25	1.0
LCS/MS Fmk List	SS2A-06-30	0.4
Micropipette Check		

Reagent	Lot# / ID
CH_2Cl_2	48340
Na_2SO_4	645609
H_2SO_4	46137
NaOH	SPIB-03-112
Silica Sand	

TUNING

Sonicator #	Reading
	N/A

Concentrator	Water Bath Temperature Setting (°C)	Thermometer Reading (°C)
1	35	35
2	35	35
3	35	35
4	35	35
5		
6		

Comments: Thermometer ID = T_1

Prepared By: RK/JM/CD Witnessed By: CD

Standard Added By: JM

Checked By: ML

Extract Received by: 5/6/09 Location: SE01-4mL-4

Disposed by: Disposed on:

Clean-up Legend :[G]=GPC [A]=Acid [F]=Florisil [S]=Silica

3032

Appendix E

Well Survey Report

SURVEY REPORT

NWS SEAL BEACH
UST SITE 229 – GROUNDWATER MONITORING WELLS
SEAL BEACH, CA

CONTRACT N68711-03-D-4302, T.O. 0120
RBA PROJECT NO. SHAWIN.001.009.00

AUGUST 13, 2009

PREPARED FOR:
RICHARD BRADY & ASSOCIATES
3710 RUFFIN ROAD
SAN DIEGO, CA 92123

PREPARED BY:
GUTIERREZ CANALES ENGINEERING, P.C.
1851 W. 24TH STREET
YUMA, AZ 85364

(GCE PROJECT NO. 09GC008)

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1. PROJECT SCOPE 3

2. GUTIERREZ CANALES ENGINEERING, P.C. CONTACT INFO. 3

3. COORDINATE SYSTEM 4

4. CONTROL POINTS 4

5. SURVEY EQUIPMENT 5

6. DATA COLLECTION RESULTS ..... 5 AND 7

APPENDIX 1 – NATIONAL GEODETIC SURVEY DATA SHEETS

1. PROJECT SCOPE

This project is located at the UST Site 229 project site, within the Naval Weapons Station, in Seal Beach, California. Survey work was conducted on August 6, 2009, and included surveying the location of 6 wells in latitude and longitude, northing and easting, top of casing elevation, top of monitoring well rim, and ground surface elevation of newly installed groundwater monitoring wells. Survey control was established using U.S. State Plane, North American Datum 1983 (NAD83) and North American Vertical Datum 1988 (NAVD88) from National Geodetic Survey data sheets (See Appendix 1). Survey information was collected using Trimble GPS equipment to provide field data accurate to within 0.01 foot.

2. Gutierrez Canales Engineering, P.C. Contact Info.

Gutierrez Canales Engineering, P.C.

Marisol Ayon Canales, PE
Vonne Nicklaus, PE, RLS

1851 W. 24th Street
Yuma, Arizona 85364
Office: (928) 317-1401
Fax: (928) 344-0112
mcanales@neiaw.com

3. COORDINATE SYSTEM

Coordinate System: U.S. State Plane
North American Datum of 1983 (NAD83)
North American Vertical Datum of 1988 (NAVD88)

Coordinate Units: US Survey Feet

Zone: California Zone 6

Project Datum: WGS 84

4. CONTROL POINTS

The following points were used as control for this survey.

Point	Northing	Easting	Elevation	Description
50	2217382.37	6002249.21	33.94	Disk stamped N 766
51	2220185.00	6002705.47	47.30	Disk is stamped SKIPPER

Point	Latitude	Longitude	Elevation	Description
50	33°44'19.64194"N	118°05'24.65869"W	-83.156	Disk stamped N 766
51	33°44'47.44335"N	118°05'19.84233"W	-69.796	Disk is stamped SKIPPER

See Appendix 1:

National Geodetic Survey Data Sheets

- PID-DY0978
- PID-DY0927

5. SURVEY EQUIPMENT

GCE survey equipment used to establish horizontal and vertical data points:

- Trimble R8 base receiver
- Trimble R6 rover
- Trimble HP450 base radio/repeater
- Trimble TSC2 controller
- Trimble Geomatics Office Software
- AutoCAD 2009 Land Development

6. DATA COLLECTION RESULTS

6.1 Northing and Easting for survey locations.

MW01				
Point	**Northing**	**Easting**	**Elevation**	
101	2219079.38	6003027.76	12.20	Top of Casing (2in)
102	2219079.76	6003027.81	12.84	North top of MW Rim
103	2219081.66	6003027.98	12.40	Ground
MW02				
Point	**Northing**	**Easting**	**Elevation**	
201	2219056.78	6002991.22	12.54	Top of Casing (2in)
202	2219057.27	6002990.98	13.12	North top of MW Rim
203	2219058.81	6002990.78	12.83	Ground
MW03				
Point	**Northing**	**Easting**	**Elevation**	
301	2219011.00	6003086.85	11.01	Top of Casing (2in)
302	2219011.45	6003086.96	11.85	North top of MW Rim
303	2219013.57	6003087.67	11.46	Ground
MW04				
Point	**Northing**	**Easting**	**Elevation**	
401	2219119.88	6002990.98	12.43	Top of Casing (2in)
402	2219120.47	6002991.00	12.86	North top of MW Rim
403	2219121.93	6002991.19	12.51	Ground
MW BSW-14-4				
Point	**Northing**	**Easting**	**Elevation**	
501	2219040.12	6003217.05	10.99	Top of Casing (2in)
502	2219040.47	6003217.16	11.34	North top of MW Rim
503	2219041.33	6003217.35	11.12	Ground
MW BSW-14-6				
Point	**Northing**	**Easting**	**Elevation**	
601	2218939.69	6003087.33	11.74	Top of Casing (6in)
602	2218940.04	6003087.41	12.01	North top of MW Rim
603	2218940.73	6003087.56	11.83	Ground

6.2 Latitude and longitude for survey locations.

MW01				
Point	**Latitude**	**Longitude**	**Elevation**	**Description**
101	33°44'36.56351"N	118°05'15.79537"W	-104.897	Top of Casing (2in)
102	33°44'36.56726"N	118°05'15.79483"W	-104.258	North top of MW Rim
103	33°44'36.58613"N	118°05'15.79331"W	-104.697	Ground
MW02				
Point	**Latitude**	**Longitude**	**Elevation**	**Description**
201	33°44'36.33362"N	118°05'16.22326"W	-104.557	Top of Casing (2in)
202	33°44'36.33839"N	118°05'16.22623"W	-103.978	North top of MW Rim
203	33°44'36.35362"N	118°05'16.22893"W	-104.266	Ground
MW03				
Point	**Latitude**	**Longitude**	**Elevation**	**Description**
301	33°44'35.89747"N	118°05'15.08147"W	-106.081	Top of Casing (2in)
302	33°44'35.90194"N	118°05'15.08028"W	-105.242	North top of MW Rim
303	33°44'35.92302"N	118°05'15.07230"W	-105.637	Ground
MW04				
Point	**Latitude**	**Longitude**	**Elevation**	**Description**
401	33°44'36.95772"N	118°05'16.23927"W	-104.662	Top of Casing (2in)
402	33°44'36.96359"N	118°05'16.23924"W	-104.24	North top of MW Rim
403	33°44'36.97804"N	118°05'16.23723"W	-104.588	Ground
MW BSW-14-4				
Point	**Latitude**	**Longitude**	**Elevation**	**Description**
501	33°44'36.20820"N	118°05'13.54598"W	-106.109	Top of Casing (2in)
502	33°44'36.21166"N	118°05'13.54479"W	-105.76	North top of MW Rim
503	33°44'36.22024"N	118°05'13.54272"W	-105.981	Ground
MW BSW-14-6				
Point	**Latitude**	**Longitude**	**Elevation**	**Description**
601	33°44'35.19215"N	118°05'15.06089"W	-105.355	Top of Casing (6in)
602	33°44'35.19569"N	118°05'15.06001"W	-105.088	North top of MW Rim
603	33°44'35.20254"N	118°05'15.05837"W	-105.264	Ground

APPENDIX 1

NATIONAL GEODETIC SURVEY DATA SHEETS

```
DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 7.50
1        National Geodetic Survey,   Retrieval Date = AUGUST  6, 2009
 DY0927 ***********************************************************************
 DY0927  DESIGNATION -  N 766
 DY0927  PID         -  DY0927
 DY0927  STATE/COUNTY-  CA/ORANGE
 DY0927  USGS QUAD   -  SEAL BEACH (1981)
 DY0927
 DY0927                        *CURRENT SURVEY CONTROL
 DY0927  ___________________________________________________________________
 DY0927* NAD 83(1992)    -  33 44 19.62194(N) 118 05 24.64675(W)    ADJUSTED
 DY0927* NAVD 88         -        10.345  (meters)   33.94  (feet)  ADJUSTED
 DY0927  ___________________________________________________________________
 DY0927  EPOCH DATE  -        1991.35
 DY0927  LAPLACE CORR-           2.16  (seconds)                    DEFLEC99
 DY0927  GEOID HEIGHT-         -35.63  (meters)                     GEOID03
 DY0927  DYNAMIC HT  -          10.334 (meters)      33.90  (feet)  COMP
 DY0927  MODELED GRAV-     979,594.0   (mgal)                       NAVD 88
 DY0927
 DY0927  HORZ ORDER  -  SECOND
 DY0927  VERT ORDER  -  FIRST     CLASS I
 DY0927
 DY0927.The horizontal coordinates were established by classical geodetic methods
 DY0927.and adjusted by the National Geodetic Survey in June 1996.
 DY0927.The horizontal coordinates are valid at the epoch date displayed above.
 DY0927.The epoch date for horizontal control is a decimal equivalence
 DY0927.of Year/Month/Day.
 DY0927
 DY0927.The orthometric height was determined by differential leveling
 DY0927.and adjusted by the NATIONAL GEODETIC SURVEY in June 1991.
 DY0927.WARNING-Repeat measurements at this control monument indicate possible
 DY0927.vertical movement.
 DY0927
 DY0927.The Laplace correction was computed from DEFLEC99 derived deflections.
 DY0927
 DY0927.The geoid height was determined by GEOID03.
 DY0927
 DY0927.The dynamic height is computed by dividing the NAVD 88
 DY0927.geopotential number by the normal gravity value computed on the
 DY0927.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 DY0927.degrees latitude (g = 980.6199 gals.).
 DY0927
 DY0927.The modeled gravity was interpolated from observed gravity values.
 DY0927
 DY0927;                    North         East     Units Scale Factor Converg.
 DY0927;SPC CA 6     -   675,859.497 1,829,489.219   MT  0.99997903   -1 00 40.4
 DY0927;SPC CA 6     - 2,217,382.37  6,002,249.21   sFT  0.99997903   -1 00 40.4
 DY0927;UTM  11      - 3,733,727.104   399,014.803   MT  0.99972572   -0 36 20.0
 DY0927
 DY0927!             -  Elev Factor  x  Scale Factor =   Combined Factor
 DY0927!SPC CA 6     -   1.00000397  x   0.99997903  =   0.99998300
 DY0927!UTM  11      -   1.00000397  x   0.99972572  =   0.99972969
 DY0927
 DY0927:                Primary Azimuth Mark                     Grid Az
 DY0927:SPC CA 6     -  BRIDGE                                   157 33 27.4
 DY0927:UTM  11      -  BRIDGE                                   157 09 07.0
 DY0927
 DY0927|-------------------------------------------------------------------|
 DY0927| PID    Reference Object                     Distance      Geod. Az  |
```

```
DY0927|                                                          dddmmss.s |
DY0927| DY0911 BRIDGE                              APPROX. 0.9 KM 1563247.0 |
DY0927|-----------------------------------------------------------------------|
DY0927
DY0927                           SUPERSEDED SURVEY CONTROL
DY0927
DY0927  NAD 83(1986)-  33 44 19.62259(N)    118 05 24.64317(W) AD(1984.00) 2
DY0927  NAD 27      -  33 44 19.55300(N)    118 05 21.40700(W) AD(       ) 2
DY0927  NGVD 29 (??/??/92)    9.615  (m)           31.55   (f) ADJ UNCH    1 1
DY0927
DY0927.Superseded values are not recommended for survey control.
DY0927.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DY0927.See file dsdata.txt to determine how the superseded data were derived.
DY0927
DY0927_U.S. NATIONAL GRID SPATIAL ADDRESS: 11SLT9901533727(NAD 83)
DY0927_MARKER: DB = BENCH MARK DISK
DY0927_SETTING: 31 = SET IN A PAVEMENT SUCH AS STREET, SIDEWALK, CURB, ETC.
DY0927_SP_SET: CURB
DY0927_STAMPING: N 766 1945
DY0927_MARK LOGO: CGS
DY0927_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
DY0927_SATELLITE: THE SITE LOCATION WAS REPORTED AS NOT SUITABLE FOR
DY0927+SATELLITE: SATELLITE OBSERVATIONS - April 06, 1989
DY0927
DY0927  HISTORY     - Date     Condition        Report By
DY0927  HISTORY     - 1956     MONUMENTED       CGS
DY0927  HISTORY     - 1954     GOOD             NGS
DY0927  HISTORY     - 1960     SEE DESCRIPTION  CGS
DY0927  HISTORY     - 1971     SEE DESCRIPTION  NGS
DY0927  HISTORY     - 1973     GOOD             CA-059
DY0927  HISTORY     - 1978     GOOD             NGS
DY0927  HISTORY     - 19890406 GOOD             NGS
DY0927  HISTORY     - 20010809 GOOD             JCLS
DY0927
DY0927                           STATION DESCRIPTION
DY0927
DY0927'DESCRIBED BY COAST AND GEODETIC SURVEY 1956 (RCB)
DY0927'THE STATION IS LOCATED ON THE N END OF THE FIRST OVERPASS SE OF
DY0927'SEAL BEACH ON U.S. HIGHWAY 101.
DY0927'
DY0927'THE STATION MARK, A STANDARD BENCH-MARK DISK, IS CEMENTED IN A
DY0927'DRILL HOLE IN THE CONCRETE SIDEWALK OF THE OVERPASS.
DY0927'
DY0927'THIS STATION WAS OBSERVED ECCENTRIC AND WAS NOT REFERENCED.
DY0927'
DY0927'HEIGHT OF LIGHT ABOVE STATION MARK - 1 METER.
DY0927
DY0927                           STATION RECOVERY (1954)
DY0927
DY0927'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1954
DY0927'0.7 MI E FROM SEAL BEACH.
DY0927'0.7 MILE EAST ALONG THE PACIFIC COAST HIGHWAY (U.S. 101 ALT.)
DY0927'FROM THE ELEMENTARY SCHOOL AT SEAL BEACH, AT THE CONCRETE BRIDGE
DY0927'OVER THE NAVAL AMMUNITION DEPOT ROAD, IN THE TOP OF THE
DY0927'NORTHWEST CURB, 44 1/2 FEET NORTHWEST OF THE CENTER LINE OF THE
DY0927'HIGHWAY, 0.7 FOOT SOUTHWEST OF THE SOUTHWEST FACE OF THE BRIDGE
DY0927'RAILING, 0.6 FOOT SOUTHEAST OF THE NORTHWEST END OF THE CURB, AND
DY0927'1 FOOT HIGHER THAN THE HIGHWAY.
DY0927
DY0927                           STATION RECOVERY (1960)
```

```
DY0927
DY0927'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1960 (FN)
DY0927'THE STATION WAS RECOVERED IN GOOD CONDITION.  THE STATION IS
DY0927'LOCATED ON THE NORTH END OF THE FIRST OVERPASS SOUTHEAST OF
DY0927'SEAL BEACH ON U.S. HIGHWAY 101 ALTERNATE, AND IS 44 FEET NORTHEAST
DY0927'OF THE CENTERLINE OF THE HIGHWAY.
DY0927'
DY0927'THE STATION IS A STANDARD BENCH MARK DISK STAMPED N 766 1945
DY0927'CEMENTED IN A DRILL HOLE IN THE CONCRETE SIDEWALK OF THE
DY0927'OVERPASS.
DY0927
DY0927                          STATION RECOVERY (1971)
DY0927
DY0927'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1971 (RBM)
DY0927'THE STATION WAS RECOVERED AS DESCRIBED BY F.N. IN 1960.
DY0927'
DY0927'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN--AT SEAL BEACH
DY0927
DY0927                          STATION RECOVERY (1973)
DY0927
DY0927'RECOVERY NOTE BY ORANGE COUNTY CALIFORNIA 1973
DY0927'RECOVERED IN GOOD CONDITION.
DY0927
DY0927                          STATION RECOVERY (1978)
DY0927
DY0927'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1978
DY0927'RECOVERED IN GOOD CONDITION.
DY0927
DY0927                          STATION RECOVERY (1989)
DY0927
DY0927'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1989
DY0927'RECOVERED IN GOOD CONDITION.  A NEW DESCRIPTION FOLLOWS.  0.5 KM
DY0927'(0.30 MI) SOUTHERLY ALONG STATE HIGHWAY 1 FROM THE JUNCTION OF SEAL
DY0927'BEACH BOULEVARD IN SEAL BEACH, IN THE NORTHWEST END OF THE NORTHWEST
DY0927'CONCRETE CURB OF A HIGHWAY BRIDGE LEADING TO THE NAVAL AMMUNITION
DY0927'DEPOT, 7.7 M (25.3 FT) NORTHEAST OF THE CENTERLINE OF THE NORTHBOUND
DY0927'LANES OF THE HIGHWAY, 0.3 M (1.0 FT) SOUTHEAST OF THE NORTHWEST END
DY0927'OF THE CURB, AND 0.3 M (1.0 FT) ABOVE THE LEVEL OF THE HIGHWAY.
DY0927
DY0927                          STATION RECOVERY (2001)
DY0927
DY0927'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2001
DY0927'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:00
```

```
DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 7.50
1        National Geodetic Survey,   Retrieval Date = AUGUST  6, 2009
 DY0978 ***********************************************************************
 DY0978  DESIGNATION -  SKIPPER
 DY0978  PID         -  DY0978
 DY0978  STATE/COUNTY-  CA/ORANGE
 DY0978  USGS QUAD   -  SEAL BEACH (1981)
 DY0978
 DY0978                        *CURRENT SURVEY CONTROL
 DY0978  ___________________________________________________________________
 DY0978* NAD 83(1992)    -  33 44 47.42359(N) 118 05 19.83008(W)    ADJUSTED
 DY0978* NAVD 88         -        14.43   (+/-2cm)   47.3   (feet)  VERTCON
 DY0978  ___________________________________________________________________
 DY0978  EPOCH DATE  -        1991.35
 DY0978  LAPLACE CORR-           2.13  (seconds)                    DEFLEC99
 DY0978  GEOID HEIGHT-         -35.64  (meters)                     GEOID03
 DY0978  HORZ ORDER  -  SECOND
 DY0978  VERT ORDER  -  FIRST     CLASS II (See Below)
 DY0978
 DY0978.The horizontal coordinates were established by classical geodetic methods
 DY0978.and adjusted by the National Geodetic Survey in June 1996.
 DY0978.The horizontal coordinates are valid at the epoch date displayed above.
 DY0978.The epoch date for horizontal control is a decimal equivalence
 DY0978.of Year/Month/Day.
 DY0978
 DY0978.The NAVD 88 height was computed by applying the VERTCON shift value to
 DY0978.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)
 DY0978.The vertical order pertains to the NGVD 29 superseded value.
 DY0978
 DY0978.The Laplace correction was computed from DEFLEC99 derived deflections.
 DY0978
 DY0978.The geoid height was determined by GEOID03.
 DY0978
 DY0978;                    North         East     Units Scale Factor Converg.
 DY0978;SPC CA 6     -   676,713.741 1,829,628.287   MT  0.99997999   -1 00 37.7
 DY0978;SPC CA 6     - 2,220,185.00  6,002,705.47   sFT  0.99997999   -1 00 37.7
 DY0978;UTM  11      - 3,734,582.094   399,147.787   MT  0.99972539   -0 36 17.7
 DY0978
 DY0978!             -  Elev Factor  x  Scale Factor =   Combined Factor
 DY0978!SPC CA 6     -   1.00000333  x   0.99997999  =   0.99998332
 DY0978!UTM  11      -   1.00000333  x   0.99972539  =   0.99972872
 DY0978
 DY0978:                Primary Azimuth Mark                     Grid Az
 DY0978:SPC CA 6     -  SUNSET BEACH ABAN MILITARY TK            134 06 37.9
 DY0978:UTM  11      -  SUNSET BEACH ABAN MILITARY TK            133 42 17.9
 DY0978
 DY0978|-------------------------------------------------------------------|
 DY0978| PID    Reference Object                     Distance      Geod. Az  |
 DY0978|                                                           dddmmss.s |
 DY0978| DY2611 SUNSET BEACH ABAN MILITARY TK       APPROX. 6.1 KM 1330600.2 |
 DY0978| DY2612 SEAL BEACH NAVY DEPOT S TANK        101.217 METERS 14440     |
 DY0978| DY2607 SEAL BEACH NAVY DEPOT N TANK        170.115 METERS 32935     |
 DY0978|-------------------------------------------------------------------|
 DY0978
 DY0978                           SUPERSEDED SURVEY CONTROL
 DY0978
 DY0978  NAD 83(1986)-  33 44 47.42406(N)    118 05 19.82664(W) AD(1984.00) 2
 DY0978  NAD 27      -  33 44 47.36930(N)    118 05 16.60420(W) AD(       ) 2
 DY0978  NGVD 29 (??/??/92)   13.70   (m)           44.9    (f) COMPUTED    1 2
```

```
DY0978
DY0978.Superseded values are not recommended for survey control.
DY0978.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DY0978.See file dsdata.txt to determine how the superseded data were derived.
DY0978
DY0978_U.S. NATIONAL GRID SPATIAL ADDRESS: 11SLT9914834582(NAD 83)
DY0978_MARKER: DD = SURVEY DISK
DY0978_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
DY0978_SP_SET: SET IN TOP OF CONCRETE MONUMENT
DY0978_STAMPING: SKIPPER 1956
DY0978_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
DY0978+STABILITY: SURFACE MOTION
DY0978
DY0978  HISTORY     - Date     Condition        Report By
DY0978  HISTORY     - 1956     MONUMENTED       CGS
DY0978  HISTORY     - 1960     SEE DESCRIPTION  CGS
DY0978  HISTORY     - 1965     GOOD             NGS
DY0978  HISTORY     - 1968     GOOD             NGS
DY0978  HISTORY     - 1974     SEE DESCRIPTION  NGS
DY0978
DY0978                          STATION DESCRIPTION
DY0978
DY0978'DESCRIBED BY COAST AND GEODETIC SURVEY 1956 (RCB)
DY0978'THE STATION IS LOCATED IN THE S PART OF THE ADMINISTRATION
DY0978'AREA OF THE U.S. NAVY SEAL BEACH AMMUNITION AND NET DEPOT.
DY0978'
DY0978'THE STATION MARK, A STANDARD DISK, STAMPED SKIPPER 1956, IS
DY0978'SET IN A CONCRETE POST FLUSH WITH THE GROUND LEVEL IN A LAWN,
DY0978'108 FT. SE OF THE CENTERLINE OF HUSSEY ROAD, 99.6 FT. E OF A
DY0978'CORNER POWERLINE POLE, AND 43.5 FT. SE OF AN EVERGREEN TREE.
DY0978'
DY0978'THIS MARK WAS SET BY THE NAVY DEPARTMENT AND IS NOT REFERENCED.
DY0978'
DY0978'HEIGHT OF LIGHT ABOVE STATION MARK - 1 METER.
DY0978
DY0978                          STATION RECOVERY (1960)
DY0978
DY0978'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1960 (FN)
DY0978'THE STATION WAS RECOVERED IN GOOD CONDITION.  A NEW DESCRIPTION
DY0978'FOLLOWS--
DY0978'
DY0978'STATION IS LOCATED ON THE U.S. NAVAL AMMUNITION AND NET DEPOT
DY0978'AT SEAL BEACH, ABOUT 350 FEET NORTHWEST OF THE SOUTHEAST ONE
DY0978'OF TWO ELEVATED METAL TANKS, 108 FEET SOUTHEAST OF THE
DY0978'CENTERLINE OF HUSSEY ROAD, 99.6 FEET EAST OF A CORNER
DY0978'POWERLINE POLE, AND 43.5 FEET SOUTHEAST OF AN EVERGREEN TREE.
DY0978'
DY0978'THE STATION MARK, A STANDARD DISK STAMPED SKIPPER 1956, IS SET
DY0978'IN THE TOP OF A 10-INCH SQUARE CONCRETE MONUMENT SET FLUSH
DY0978'WITH THE GROUND.
DY0978
DY0978                          STATION RECOVERY (1965)
DY0978
DY0978'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1965
DY0978'AT SEAL BEACH.
DY0978'0.1 MILE SOUTHEAST ALONG FORRESTAL LANE FROM THE MAIN (NORTHWEST)
DY0978'ENTRANCE TO THE U.S. NAVAL WEAPONS STATION AT SEAL BEACH, THENCE
DY0978'0.05 MILE SOUTHWEST ALONG HUSSEY ROAD, 107 FEET EAST OF THE CENTER
DY0978'OF HUSSEY ROAD, 99.6 FEET NORTHEAST OF POWERLINE POLE NO.
DY0978'222-44-50F, 44 FEET EAST OF A PINE TREE AND SET IN THE TOP OF
```

```
DY0978'A 10-INCH SQUARE CONCRETE MONUMENT WHICH IS 1 INCH BELOW THE
DY0978'SURFACE OF THE GROUND.
DY0978
DY0978                          STATION RECOVERY (1968)
DY0978
DY0978'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1968
DY0978'RECOVERED IN GOOD CONDITION.
DY0978
DY0978                          STATION RECOVERY (1974)
DY0978
DY0978'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1974 (JLC)
DY0978'THE STATION WAS RECOVERED IN GOOD CONDITION AS DESCRIBED IN
DY0978'THE 1956 DESCRIPTION.  ALL MEASUREMENTS CHECKED.
DY0978'
DY0978'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN--IN SEAL BEACH.

*** retrieval complete.
Elapsed Time = 00:00:01
```

Appendix F

Groundwater Sample Data Validation Narratives

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Richard Brady & Associates
3710 Ruffin Road
San Diego, CA 92123
ATTN: Mr. Jesse MacNeill

June 19, 2009

SUBJECT: NWS Seal Beach, UST Site 229, Data Validation

Dear Mr. MacNiell,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on June 3, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 20899:

SDG #	Fraction
09D293	Volatiles, Polynuclear Aromatic Hydrocarbons, TPH as Diesel

The data validation was performed under EPA Level III and Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

ERauto

Erlinda T. Rauto
Operations Manager/Senior Chemist

V:\LOGIN\RBA\Seal\20899COV.wpd

Attachment 1

EDD & Verification

LDC #20899 (Richard Brady & Associates / NWS Seal Beach, UST Site 229)

Project #SHAWIN.001.009.00

LDC	SDG#	DATE REC'D	(3) DATE DUE	VOA (8260B)		PAHs (8270C -SIM)		TPH-D (8015)																													
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	09D293	06/03/09	06/24/09	3	8	2	7	2	6																												
A	09D293	06/03/09	06/24/09	0	1	0	1	0	1																												
Total	T/LR			3	9	2	8	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

20899ST.wpd

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC# 20899

Volatiles

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS Seal Beach, UST Site 229

Collection Date: April 29, 2009

LDC Report Date: June 17, 2009

Matrix: Soil\Water

Parameters: Volatiles

Validation Level: NFESC Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 09D293

Sample Identification

SB229-08-W-01
SB229-08-S-01
SB229-01-S-01**
SB229-01-S-02
SB229-02-S-01
SB229-02-W-01
SB229-02-W-02
SB229-10-S-01
SB229-21-S-01
SB229-21-S-01DL
SB229-19-S-01
SB229-19-S-01DL
SB229-08-S-01MS
SB229-08-S-01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 11 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent a NFESC Level IV review. A NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds were within method and validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

The percent difference (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were within method and validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Sample SB229-08-W-01 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample SB229-02-W-01 was identified as an equipment blank. No volatile contaminants were found in this blank.

Sample SB229-02-W-02 was identified as a field blank. No volatile contaminants were found in this blank.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
SB229-19-S-01	Bromofluorobenzene	384 (70-150)	Benzene Toluene Ethylbenzene m,p-Xylenes o-Xylene Naphthalene	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a NFESC Level IV review was performed with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
SB229-21-S-01	Benzene Ethylbenzene m,p-Xylenes Naphthalene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects) J (all detects)	A
SB229-19-S-01	Naphthalene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
SB229-21-S-01	Benzene Ethylbenzene m,p-Xylenes Naphthalene	R R R R	A

Sample	Compound	Flag	A or P
SB229-21-S-01DL	All TCL compounds except Benzene Ethylbenzene m,p-Xylenes Naphthalene	R	A
SB229-19-S-01	Naphthalene	R	A
SB229-19-S-01DL	All TCL compounds Naphthalene	R	A

Data flags have been summarized at the end of the report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

NAWS Seal Beach, UST Site 229
Volatiles - Data Qualification Summary - SDG 09D293

SDG	Sample	Compound	Flag	A or P	Reason
09D293	SB229-19-S-01	Benzene Toluene Ethylbenzene m,p-Xylenes o-Xylene Naphthalene	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A	Surrogate spikes (%R)
09D293	SB229-21-S-01	Benzene Ethylbenzene m,p-Xylenes Naphthalene	J (all detects) J (all detects) J (all detects) J (all detects)	A	Compound quantitation and CRQLs
09D293	SB229-19-S-01	Naphthalene	J (all detects)	A	Compound quantitation and CRQLs
09D293	SB229-21-S-01	Benzene Ethylbenzene m,p-Xylenes Naphthalene	R R R R	A	Overall assessment of data
09D293	SB229-21-S-01DL	All TCL compounds except Benzene Ethylbenzene m,p-Xylenes Naphthalene	R	A	Overall assessment of data
09D293	SB229-19-S-01	Naphthalene	R	A	Overall assessment of data
09D293	SB229-19-S-01DL	All TCL compounds Naphthalene	R	A	Overall assessment of data

NAWS Seal Beach, UST Site 229
Volatiles - Laboratory Blank Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Volatiles - Field Blank Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 04:14
Sample ID:	SB229-08-W-01	Date Analyzed:	05/01/09 04:14
Lab Samp ID:	D293-01	Dilution Factor:	1
Lab File ID:	RDQ919	Matrix :	WATER
Ext Btch ID:	V005D40	% Moisture :	NA
Calib. Ref.:	RDQ115	Instrument ID :	T-005

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
BENZENE	ND U	1.0	0.20
ETHYLBENZENE	ND	1.0	0.20
M/P-XYLENES	ND	2.0	0.50
NAPHTHALENE	ND	2.0	0.50
O-XYLENE	ND	1.0	0.20
TOLUENE	ND	1.0	0.20

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	92	70-140
4-BROMOFLUOROBENZENE	99	70-130
TOLUENE-D8	97	70-140

6-18-09

2004

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 14:03
Sample ID:	SB229-08-S-01	Date Analyzed:	05/01/09 14:03
Lab Samp ID:	D293-02	Dilution Factor:	0.91
Lab File ID:	REB012	Matrix :	SOIL
Ext Btch ID:	V003E02	% Moisture :	22.8
Calib. Ref.:	RDB577	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	ND U	5.9	2.4
ETHYLBENZENE	ND	5.9	2.4
M/P-XYLENES	ND	12	2.4
NAPHTHALENE	ND	5.9	2.4
O-XYLENE	ND	5.9	2.4
TOLUENE	ND	5.9	2.4

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	97	60-160
4-BROMOFLUOROBENZENE	100	70-150
TOLUENE-D8	98	70-140

6-18-09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 15:34
Sample ID:	S8229-01-S-01	Date Analyzed:	05/01/09 15:34
Lab Samp ID:	D293-03	Dilution Factor:	1.1
Lab File ID:	REB015	Matrix :	SOIL
Ext Btch ID:	V003E02	% Moisture :	2.2
Calib. Ref.:	RDB577	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	ND U	5.6	2.2
ETHYLBENZENE	ND	5.6	2.2
M/P-XYLENES	ND	11	2.2
NAPHTHALENE	ND	5.6	2.2
O-XYLENE	ND	5.6	2.2
TOLUENE	ND	5.6	2.2

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	101	60-160
4-BROMOFLUOROBENZENE	97	70-150
TOLUENE-D8	97	70-140

KJ 6-18-09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 18:08
Sample ID:	SB229-01-S-02	Date Analyzed:	05/01/09 18:08
Lab Samp ID:	D293-04	Dilution Factor:	0.91
Lab File ID:	REB020	Matrix :	SOIL
Ext Btch ID:	V003E02	% Moisture :	19.0
Calib. Ref.:	RDB577	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	6.7	5.6	2.2
ETHYLBENZENE	6.8	5.6	2.2
M/P-XYLENES	ND U	11	2.2
NAPHTHALENE	17	5.6	2.2
O-XYLENE	ND U	5.6	2.2
TOLUENE	ND U	5.6	2.2

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	98	60-160
4-BROMOFLUOROBENZENE	100	70-150
TOLUENE-D8	96	70-140

6-18-09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 090293	Date Extracted:	05/04/09 14:55
Sample ID:	SB229-02-S-01	Date Analyzed:	05/04/09 14:55
Lab Samp ID:	D293-05R	Dilution Factor:	0.94
Lab File ID:	REB062	Matrix :	SOIL
Ext Btch ID:	V003E04	% Moisture :	17.6
Calib. Ref.:	RDB577	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	7.0	5.7	2.3
ETHYLBENZENE	38	5.7	2.3
M/P-XYLENES	ND U	11	2.3
NAPHTHALENE	21	5.7	2.3
O-XYLENE	2.7J	5.7	2.3
TOLUENE	ND U	5.7	2.3

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	99	60-160
4-BROMOFLUOROBENZENE	134	70-150
TOLUENE-D8	98	70-140

6-18-09

METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 04:43
Sample ID:	SB229-02-W-01	Date Analyzed:	05/01/09 04:43
Lab Samp ID:	D293-06	Dilution Factor:	1
Lab File ID:	RDQ920	Matrix	: WATER
Ext Btch ID:	VOO5D40	% Moisture	: NA
Calib. Ref.:	RDQ115	Instrument ID	: T-005

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
BENZENE	ND U	1.0	0.20
ETHYLBENZENE	ND	1.0	0.20
M/P-XYLENES	ND	2.0	0.50
NAPHTHALENE	ND	2.0	0.50
O-XYLENE	ND	1.0	0.20
TOLUENE	ND	1.0	0.20

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	90	70-140
4-BROMOFLUOROBENZENE	100	70-130
TOLUENE-D8	98	70-140

6-18-09

2008

METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 05:12
Sample ID:	SB229-02-W-02	Date Analyzed:	05/01/09 05:12
Lab Samp ID:	D293-07	Dilution Factor:	1
Lab File ID:	RDQ921	Matrix :	WATER
Ext Btch ID:	VOO5D40	% Moisture :	NA
Calib. Ref.:	RDQ115	Instrument ID :	T-005

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
BENZENE	ND U	1.0	0.20
ETHYLBENZENE	ND	1.0	0.20
M/P-XYLENES	ND	2.0	0.50
NAPHTHALENE	ND	2.0	0.50
O-XYLENE	ND	1.0	0.20
TOLUENE	ND	1.0	0.20

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	91	70-140
4-BROMOFLUOROBENZENE	99	70-130
TOLUENE-D8	97	70-140

JG 6-18-09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 16:05
Sample ID:	SB229-10-S-01	Date Analyzed:	05/01/09 16:05
Lab Samp ID:	D293-08	Dilution Factor:	0.83
Lab File ID:	REB016	Matrix :	SOIL
Ext Btch ID:	V003E02	% Moisture :	20.8
Calib. Ref.:	RDB577	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	ND U	5.2	2.1
ETHYLBENZENE	ND	5.2	2.1
M/P-XYLENES	ND	10	2.1
NAPHTHALENE	ND	5.2	2.1
O-XYLENE	ND	5.2	2.1
TOLUENE	ND	5.2	2.1

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	103	60-160
4-BROMOFLUOROBENZENE	96	70-150
TOLUENE-D8	94	70-140

6/18-09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/05/09 00:08
Sample ID:	SB229-21-S-01	Date Analyzed:	05/05/09 00:08
Lab Samp ID:	D293-09T	Dilution Factor:	48
Lab File ID:	REB080	Matrix :	SOIL
Ext Btch ID:	V003E05	% Moisture :	15.6
Calib. Ref.:	RDB605	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)		RL (ug/kg)	MDL (ug/kg)
BENZENE	36000E	R	280	110
ETHYLBENZENE	30000E		280	110
M/P-XYLENES	39000E		570	110
NAPHTHALENE	17000E		280	110
O-XYLENE	2500		280	110
TOLUENE	2200		280	110

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	111	60-160
4-BROMOFLUOROBENZENE	130	70-150
TOLUENE-D8	106	70-140

Methanol Extraction Date: 05/04/09 12:20

6/19/09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 23:37
Sample ID:	SB229-21-S-01DL	Date Analyzed:	05/04/09 23:37
Lab Samp ID:	D293-09I	Dilution Factor:	480
Lab File ID:	REB079	Matrix :	SOIL
Ext Btch ID:	V003E05	% Moisture :	15.6
Calib. Ref.:	RDB605	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	43000	2800	1100
ETHYLBENZENE	48000	2800	1100
M/P-XYLENES	63000	5700	1100
NAPHTHALENE	20000	2800	1100
O-XYLENE	2200J	2800	1100
TOLUENE	2000J	2800	1100

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	113	60-160
4-BROMOFLUOROBENZENE	126	70-150
TOLUENE-D8	95	70-140

Methanol Extraction Date: 05/04/09 12:20

6-18-09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 19:10
Sample ID:	SB229-19-S-01	Date Analyzed:	05/01/09 19:10
Lab Samp ID:	D293-10	Dilution Factor:	1.0
Lab File ID:	REB022	Matrix :	SOIL
Ext Btch ID:	V003E02	% Moisture :	14.6
Calib. Ref.:	RDB577	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	ND	5.9	2.3
ETHYLBENZENE	190	5.9	2.3
M/P-XYLENES	300	12	2.3
NAPHTHALENE	400E	5.9	2.3
O-XYLENE	20	5.9	2.3
TOLUENE	5.0J	5.9	2.3

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	101	60-160
4-BROMOFLUOROBENZENE	384*	70-150
TOLUENE-D8	102	70-140

RJ 6-18-09

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 23:06
Sample ID:	SB229-19-S-01DL	Date Analyzed:	05/04/09 23:06
Lab Samp ID:	D293-10T	Dilution Factor:	48
Lab File ID:	REB078	Matrix :	SOIL
Ext Btch ID:	V003E05	% Moisture :	14.6
Calib. Ref.:	RDB605	Instrument ID :	T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
BENZENE	ND U R	280	110
ETHYLBENZENE	390	280	110
M/P-XYLENES	560	560	110
NAPHTHALENE	920	280	110
O-XYLENE	ND U R	280	110
TOLUENE	ND U	280	110

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	109	60-160
4-BROMOFLUOROBENZENE	122	70-150
TOLUENE-D8	103	70-140

Methanol Extraction Date: 05/04/09 12:20

6-18-09

LDC #: 20899A1

SDG #: 09D293

Laboratory: EMAX Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 6/16/09

Page: 1 of 1

Reviewer: JVC

2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4/29/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	RRF/non-SPCC
IV.	Continuing calibration/ICV	A	ICV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	SW	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	N	Not reviewed for Level III validation.
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	N	
XVII.	Field blanks	ND	TB = 1 EB = 6 FB = 7

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Water + Soil

1	SB229-08-W-01	W	11	SB229-19-S-01	S	21	MBLK1W	31	
2	SB229-08-S-01	S	12	SB229-19-S-01DL		22	MBLK1S	32	
3	SB229-01-S-01**		13	SB229-08-S-01MS		23	MBLK2S	33	
4	SB229-01-S-02		14	SB229-08-S-01MSD		24	MBLK4S	34	
5	SB229-02-S-01		15			25		35	
6	SB229-02-W-01	W	16			26		36	
7	SB229-02-W-02		17			27		37	
8	SB229-10-S-01	S	18			28		38	
9	SB229-21-S-01		19			29		39	
10	SB229-21-S-01DL		20			30		40	

(V, CC, EE, RRR, SSS, MMM) (no r2)

LDC #: 208994 1
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JC
2nd Reviewer: [illegible]

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation?	✓	✓		
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) > 0.05?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) < 25% and relative response factors (RRF) > 0.05?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓	✓		
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?	✓			
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 20899 A1
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVL
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		✓		
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XVII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene**	BB. 1,1,2,2-Tetrachloroethane*	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane*	CC. Toluene**	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene*	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN.
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane**	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

* = System performance check compounds (SPCC) for RRF ; ** = Calibration check compounds (CCC) for %RSD.

LDC #: 20899A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all surrogate %R within QC limits?

(Y) N N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications
		11	BFB	384 (70-150)	J dets /A
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	QC Limits (Soil)	QC Limits (Water)
SMC1 (TOL) = Toluene-d8	81-117	88-110
SMC2 (BFB) = Bromofluorobenzene	74-121	86-115
SMC3 (DCE) = 1,2-Dichloroethane-d4	80-120	80-120
SMC4 (DFM) = Dibromofluoromethane	80-120	86-118

LDC #: 20899 A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		9	V, EE, RRR, MMM	> cal range	J detects /A
					↑
		11	MMM > cal range		↓

Comments: See sample calculation verification worksheet for recalculations

COMQUA.1SB

LDC #: 20899A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		9	V, TE, RRR, MMM > cal range		R/A
		10	All except above	di)	
		11	MMM > cal range		
		12	All except MMM	di)	✓

Comments: _____

OVR.1SB

LDC #: 20899 A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JVL
2nd Reviewer: ✓

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (50 std)	Recalculated RRF (50 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	1CAL	4/28/09	~~MTBE~~ (1st internal standard)	~~0.524~~		~~0.573~~		~~5.07~~	
			Benzene (2nd internal standard)	1.226	1.226	1.258	1.258	4.63	4.61
			Naphthalene (3rd internal standard)	2.360	2.360	2.378	2.378	4.09	4.09
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 20879A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: DVG
2nd Reviewer: e

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	REB 007	5/01/09	(1st internal standard)					
			✓ (2nd internal standard)	1.258	1.274	1.274	1.3	1.3
			MMM (3rd internal standard)	2.378	2.464	2.464	3.6	3.6
2			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 20899 A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #3

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8	50	48.37	97	97	0
Bromofluorobenzene		48.60	97	97	
1,2-Dichloroethane-d4		50.35	101	101	
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

LDC #: 20899 A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD = I MSC - MSDC I * 2/(MSC + MSDC) MSC = Matrix spike percent recovery MSDC = Matrix spike duplicate percent recovery

MS/MSD sample: 13/14

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	-----	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene											
Trichloroethene											
Benzene	64.8	64.8	0	63.0	65.6	97	97	101	101	4	4
Toluene	↓	↓	↓	64.5	65.5	100	100	101	101	1	1
Chlorobenzene											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 20899 A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: JVL
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: REB 058 /060

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene										
Trichloroethene										
Benzene	50	50	49.0	52.0	98	98	104	104	6	6
Toluene	↓	↓	48.8	51.9	98	98	104	104	6	6
Chlorobenzene										

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 20899A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?

Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
RRF	=	Relative response factor of the calibration standard.
V_o	=	Volume or weight of sample pruged in milliliters (ml) or grams (g).
Df	=	Dilution factor.
%S	=	Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. _____ , ND

Conc. = ( ) ( ) ( ) / ( ) ( ) ( ) ( )

=

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC# 20899

Polynuclear Aromatic Hydrocarbons

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS Seal Beach, UST Site 229

Collection Date: April 29, 2009

LDC Report Date: June 17, 2009

Matrix: Soil/Water

Parameters: Polynuclear Aromatic Hydrocarbons

Validation Level: NFESC Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 09D293

Sample Identification

SB229-08-S-01
SB229-01-S-01**
SB229-01-S-02
SB229-02-S-01
SB229-02-W-01
SB229-02-W-02
SB229-10-S-01
SB229-21-S-01
SB229-21-S-01DL
SB229-19-S-01
SB229-08-S-01MS
SB229-08-S-01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 10 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per a modification of EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent a NFESC Level IV review. A NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r^2) was greater than or equal to 0.990 .

Average relative response factors (RRF) for all target compounds and system monitoring compounds were within validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% .

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks.

Sample SB229-02-W-01was identified as an equipment blank. No polynuclear aromatic hydrocarbon contaminants were found in this blank.

Sample SB229-02-W-02 was identified a field blank. No polynuclear aromatic hydrocarbon contaminants were found in this blank.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a NFESC Level IV review was performed with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
SB229-21-S-01	Naphthalene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
SB229-21-S-01	Naphthalene	R	A
SB229-21-S-01DL	All TCL compounds except Naphthalene	R	A

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 09D293

SDG	Sample	Compound	Flag	A or P	Reason
09D293	SB229-21-S-01	Naphthalene	J (all detects)	A	Compound quantitation and CRQLs
09D293	SB229-21-S-01	Naphthalene	R	A	Overall assessment of data
09D293	SB229-21-S-01DL	All TCL compounds except Naphthalene	R	A	Overall assessment of data

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 10:45
Sample ID:	SB229-08-S-01	Date Analyzed:	05/05/09 15:16
Lab Samp ID:	D293-02	Dilution Factor:	1
Lab File ID:	REJ111	Matrix :	SOIL
Ext Btch ID:	SVE002S	% Moisture :	22.8
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	ND U	39	13
ACENAPHTHYLENE	ND	39	13
ANTHRACENE	ND	39	13
BENZO(A)ANTHRACENE	ND	39	13
BENZO(A)PYRENE	ND	39	13
BENZO(B)FLUORANTHENE	ND	39	13
BENZO(K)FLUORANTHENE	ND	39	13
BENZO(G,H,I)PERYLENE	ND	39	13
CHRYSENE	ND	39	13
DIBENZO(A,H)ANTHRACENE	ND	39	13
FLUORANTHENE	ND	39	13
FLUORENE	ND	39	13
INDENO(1,2,3-CD)PYRENE	ND	39	13
NAPHTHALENE	ND	39	13
PHENANTHRENE	ND	39	13
PYRENE	ND	39	13

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	90	40-130

JG 6-18-09

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 04/29/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 04/29/09
Batch No. : 09D293	Date Extracted: 05/04/09 10:45
Sample ID: SB229-01-S-01	Date Analyzed: 05/05/09 16:11
Lab Samp ID: D293-03	Dilution Factor: 1
Lab File ID: REJ114	Matrix : SOIL
Ext Btch ID: SVE002S	% Moisture : 2.2
Calib. Ref.: RDJ227	Instrument ID : T-0E4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	ND	31	10
ACENAPHTHYLENE	ND	31	10
ANTHRACENE	ND	31	10
BENZO(A)ANTHRACENE	ND	31	10
BENZO(A)PYRENE	ND	31	10
BENZO(B)FLUORANTHENE	ND	31	10
BENZO(K)FLUORANTHENE	ND	31	10
BENZO(G,H,I)PERYLENE	ND	31	10
CHRYSENE	ND	31	10
DIBENZO(A,H)ANTHRACENE	ND	31	10
FLUORANTHENE	ND	31	10
FLUORENE	ND	31	10
INDENO(1,2,3-CD)PYRENE	ND	31	10
NAPHTHALENE	ND	31	10
PHENANTHRENE	ND	31	10
PYRENE	ND	31	10

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	87	40-130

fg 6-18-09

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 10:45
Sample ID:	SB229-01-S-02	Date Analyzed:	05/05/09 16:30
Lab Samp ID:	D293-04	Dilution Factor:	1
Lab File ID:	REJ115	Matrix :	SOIL
Ext Btch ID:	SVE002S	% Moisture :	19.0
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	59	37	12
ACENAPHTHYLENE	27J J	37	12
ANTHRACENE	26J J	37	12
BENZO(A)ANTHRACENE	ND U	37	12
BENZO(A)PYRENE	ND	37	12
BENZO(B)FLUORANTHENE	ND	37	12
BENZO(K)FLUORANTHENE	ND	37	12
BENZO(G,H,I)PERYLENE	ND	37	12
CHRYSENE	ND	37	12
DIBENZO(A,H)ANTHRACENE	ND	37	12
FLUORANTHENE	ND	37	12
FLUORENE	ND	37	12
INDENO(1,2,3-CD)PYRENE	ND	37	12
NAPHTHALENE	ND	37	12
PHENANTHRENE	ND	37	12
PYRENE	15J J	37	12

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	92	40-130

6-18-09

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 04/29/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 04/29/09
Batch No. : 09D293	Date Extracted: 05/04/09 10:45
Sample ID: SB229-02-S-01	Date Analyzed: 05/05/09 16:48
Lab Samp ID: D293-05	Dilution Factor: 1
Lab File ID: REJ116	Matrix : SOIL
Ext Btch ID: SVE002S	% Moisture : 17.6
Calib. Ref.: RDJ227	Instrument ID : T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	ND U	36	12
ACENAPHTHYLENE	ND	36	12
ANTHRACENE	ND	36	12
BENZO(A)ANTHRACENE	ND	36	12
BENZO(A)PYRENE	ND	36	12
BENZO(B)FLUORANTHENE	ND	36	12
BENZO(K)FLUORANTHENE	ND	36	12
BENZO(G,H,I)PERYLENE	ND	36	12
CHRYSENE	ND	36	12
DIBENZO(A,H)ANTHRACENE	ND	36	12
FLUORANTHENE	ND	36	12
FLUORENE	ND	36	12
INDENO(1,2,3-CD)PYRENE	ND	36	12
NAPHTHALENE	ND	36	12
PHENANTHRENE	ND	36	12
PYRENE	58	36	12

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	99	40-130

6+18-09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 15:30
Sample ID:	SB229-02-W-01	Date Analyzed:	05/07/09 15:22
Lab Samp ID:	D293-06	Dilution Factor:	.95
Lab File ID:	REJ191	Matrix :	WATER
Ext Btch ID:	SVE003W	% Moisture :	NA
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.95	0.19
ACENAPHTHYLENE	ND	0.95	0.19
ANTHRACENE	ND	0.95	0.19
BENZO(A)ANTHRACENE	ND	0.95	0.19
BENZO(A)PYRENE	ND	0.95	0.19
BENZO(B)FLUORANTHENE	ND	0.95	0.19
BENZO(K)FLUORANTHENE	ND	0.95	0.19
BENZO(G,H,I)PERYLENE	ND	0.95	0.19
CHRYSENE	ND	0.95	0.19
DIBENZO(A,H)ANTHRACENE	ND	0.95	0.19
FLUORANTHENE	ND	0.95	0.19
FLUORENE	ND	0.95	0.19
INDENO(1,2,3-CD)PYRENE	ND	0.95	0.19
NAPHTHALENE	ND	0.95	0.19
PHENANTHRENE	ND	0.95	0.19
PYRENE	ND	0.95	0.19

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	79	30-130

6-18-09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 15:30
Sample ID:	SB229-02-W-02	Date Analyzed:	05/07/09 15:40
Lab Samp ID:	D293-07	Dilution Factor:	.95
Lab File ID:	REJ192	Matrix :	WATER
Ext Btch ID:	SVE003W	% Moisture :	NA
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.95	0.19
ACENAPHTHYLENE	ND	0.95	0.19
ANTHRACENE	ND	0.95	0.19
BENZO(A)ANTHRACENE	ND	0.95	0.19
BENZO(A)PYRENE	ND	0.95	0.19
BENZO(B)FLUORANTHENE	ND	0.95	0.19
BENZO(K)FLUORANTHENE	ND	0.95	0.19
BENZO(G,H,I)PERYLENE	ND	0.95	0.19
CHRYSENE	ND	0.95	0.19
DIBENZO(A,H)ANTHRACENE	ND	0.95	0.19
FLUORANTHENE	ND	0.95	0.19
FLUORENE	ND	0.95	0.19
INDENO(1,2,3-CD)PYRENE	ND	0.95	0.19
NAPHTHALENE	ND	0.95	0.19
PHENANTHRENE	ND	0.95	0.19
PYRENE	ND	0.95	0.19

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	80	30-130

6-18-09

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 10:45
Sample ID:	SB229-10-S-01	Date Analyzed:	05/05/09 17:07
Lab Samp ID:	D293-08	Dilution Factor:	1
Lab File ID:	REJ117	Matrix :	SOIL
Ext Btch ID:	SVE002S	% Moisture :	20.8
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	ND U	38	13
ACENAPHTHYLENE	ND	38	13
ANTHRACENE	ND	38	13
BENZO(A)ANTHRACENE	ND	38	13
BENZO(A)PYRENE	ND	38	13
BENZO(B)FLUORANTHENE	ND	38	13
BENZO(K)FLUORANTHENE	ND	38	13
BENZO(G,H,I)PERYLENE	ND	38	13
CHRYSENE	ND	38	13
DIBENZO(A,H)ANTHRACENE	ND	38	13
FLUORANTHENE	ND	38	13
FLUORENE	ND	38	13
INDENO(1,2,3-CD)PYRENE	ND	38	13
NAPHTHALENE	ND	38	13
PHENANTHRENE	ND	38	13
PYRENE	ND	38	13

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	90	40-130

6-18-09

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 10:45
Sample ID:	SB229-21-S-01	Date Analyzed:	05/05/09 17:25
Lab Samp ID:	D293-09	Dilution Factor:	1
Lab File ID:	REJ118	Matrix :	SOIL
Ext Btch ID:	SVE002S	% Moisture :	15.6
Calib. Ref.:	RDJ227	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	1100	36	12
ACENAPHTHYLENE	ND U	36	12
ANTHRACENE	320	36	12
BENZO(A)ANTHRACENE	55	36	12
BENZO(A)PYRENE	ND U	36	12
BENZO(B)FLUORANTHENE	ND	36	12
BENZO(K)FLUORANTHENE	ND	36	12
BENZO(G,H,I)PERYLENE	12J J	36	12
CHRYSENE	ND U	36	12
DIBENZO(A,H)ANTHRACENE	ND	36	12
FLUORANTHENE	84	36	12
FLUORENE	2100	36	12
INDENO(1,2,3-CD)PYRENE	ND U	36	12
NAPHTHALENE	54000E ~~E~~ R	36	12
PHENANTHRENE	3700	36	12
PYRENE	270	36	12

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	104	40-130

BJ 6-18-09

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 04/29/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 04/29/09
Batch No. : 09D293	Date Extracted: 05/04/09 10:45
Sample ID: SB229-21-S-01DL	Date Analyzed: 05/06/09 22:30
Lab Samp ID: D293-09T	Dilution Factor: 10
Lab File ID: REJ172	Matrix : SOIL
Ext Btch ID: SVE002S	% Moisture : 15.6
Calib. Ref.: RDJ227	Instrument ID : T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	1200	360	120
ACENAPHTHYLENE	ND	360	120
ANTHRACENE	330J	360	120
BENZO(A)ANTHRACENE	ND	360	120
BENZO(A)PYRENE	ND	360	120
BENZO(B)FLUORANTHENE	ND	360	120
BENZO(K)FLUORANTHENE	ND	360	120
BENZO(G,H,I)PERYLENE	ND	360	120
CHRYSENE	ND	360	120
DIBENZO(A,H)ANTHRACENE	ND	360	120
FLUORANTHENE	ND	360	120
FLUORENE	2100	360	120
INDENO(1,2,3-CD)PYRENE	ND	360	120
NAPHTHALENE	63000	360	120
PHENANTHRENE	3700	360	120
PYRENE	260J	360	120

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	DO	40-130

DO : Diluted Out

6-18-09

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 04/29/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 04/29/09
Batch No. : 09D293	Date Extracted: 05/04/09 10:45
Sample ID: SB229-19-S-01	Date Analyzed: 05/05/09 17:44
Lab Samp ID: D293-10	Dilution Factor: 1
Lab File ID: REJ119	Matrix : SOIL
Ext Btch ID: SVE002S	% Moisture : 14.6
Calib. Ref.: RDJ227	Instrument ID : T-OE4

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	250	35	12
ACENAPHTHYLENE	ND U	35	12
ANTHRACENE	77	35	12
BENZO(A)ANTHRACENE	ND U	35	12
BENZO(A)PYRENE	ND	35	12
BENZO(B)FLUORANTHENE	ND	35	12
BENZO(K)FLUORANTHENE	ND	35	12
BENZO(G,H,I)PERYLENE	ND	35	12
CHRYSENE	ND	35	12
DIBENZO(A,H)ANTHRACENE	ND	35	12
FLUORANTHENE	ND	35	12
FLUORENE	660	35	12
INDENO(1,2,3-CD)PYRENE	ND U	35	12
NAPHTHALENE	1900	35	12
PHENANTHRENE	900	35	12
PYRENE	49	35	12

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	99	40-130

6-18-09

LDC #: 20899A2b

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 6/16/09

SDG #: 09D293

Page: 1 of 1

Laboratory: EMAX Laboratories, Inc.

Reviewer: JVG

2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270C-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4/29/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	% RSD r✓ RRF/nm-SPCC
IV.	Continuing calibration/ICV	A	ICV ≤ 25 % ↓
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	SW	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	N	Not reviewed for Level III validation.
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	ND	EB = 5 TB = 6

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Soil + Water

1	SB229-08-S-01 S	11	SB229-08-S-01MS S	21	MBLKIW	31	
2	SB229-01-S-01**	12	SB229-08-S-01MSD	22	MBLKS	32	
3	SB229-01-S-02	13		23		33	
4	SB229-02-S-01	14		24		34	
5	SB229-02-W-01 W	15		25		35	
6	SB229-02-W-02	16		26		36	
7	SB229-10-S-01 S	17		27		37	
8	SB229-21-S-01	18		28		38	
9	SB229-21-S-01DL	19		29		39	
10	SB229-19-S-01	20		30		40	

LDC #: 20899 A26
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: JK
2nd Reviewer: [illegible]

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation?	✓	✓		
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓		NA	
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?	✓			
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 20899A2b
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVB
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds from the associated calibration standard?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		✓		
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		✓		
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XVII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TTT.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	UUU
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	VVV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

Notes:* = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

LDC #: 20899 A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: JVB
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		8	S > cal range		J dets /A

Comments: See sample calculation verification worksheet for recalculations

COMQUA.2S

LDC #: 20899A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: DVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		8	S > cal range		R/A
		9	All except S dil		↓

Comments: _____

OVR.2S

LDC #: 40899A26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JVL
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (50 std)	Recalculated RRF (50 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	4/16/09	Phenol (1st internal standard)						
			Naphthalene (2nd internal standard) 1st	3.336	3.336	3.259	3.259	3.98	3.98
			~~Fluorene~~ Phenanthrene (3rd internal standard) 2nd	1.210	1.210	1.183	1.185	2.26	2.26
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard) 3rd	1.029	1.029	0.890	0.890	13.19	13.18
2			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 20899A26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: JVL
2nd Reviewer: e

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	REJ096	5/05/09	Phenol (1st internal standard)					
			Naphthalene (2nd internal standard) 1st	3.259	3.321	3.321	1.9	1.9
			~~Fluorene~~ Phenanthrene (3rd internal standard) 2nd	1.183	1.156	1.156	2.3	2.3
			~~Pentachlorophenol~~ (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard) 3rd	0.890	0.984	0.984	10.6	10.5
2			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 20899 A26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: SVR
2nd reviewer: [illegible]

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: # 2

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14	2.5	2.18	87	87	0
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 20899A26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: JVR
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 11/12

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	----	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	431	431	0	297	349	68	68	81	81	18	18
Pentachlorophenol											
Pyrene	431	431	↓	399	450	93	93	104	104	12	12

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 70899 A 2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA

Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC)

LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: REJ103/4

Compound	Spike Added (ug/L)		Spike Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	333	333	301	305	90	90	92	92	1	1
Pentachlorophenol										
Pyrene	333	333	330	331	99	99	99	99	0	0

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 20899A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. _____ , ND

Conc. = (_____)(_____)(_____)(_____)(_____) / (_____)(_____)(_____)(_____)(_____)

=

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC# 20899

TPH as Diesel

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS Seal Beach, UST Site 229

Collection Date: April 29, 2009

LDC Report Date: June 18, 2009

Matrix: Soil/Water

Parameters: Total Petroleum Hydrocarbons as Diesel

Validation Level: NFESC Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 09D293

Sample Identification

SB229-08-S-01
SB229-01-S-01**
SB229-01-S-02
SB229-02-S-01
SB229-02-W-01
SB229-02-W-02
SB229-10-S-01
SB229-21-S-01
SB229-19-S-01
SB229-08-S-01MS
SB229-08-S-01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 9 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Diesel.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent NFESC Level IV review. NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as diesel contaminants were found in the method blanks.

Sample SB229-02-W-01 was identified as an equipment blank. No total petroleum hydrocarbons as diesel contaminants were found in this blank.

Sample SB229-02-W-02 was identified as a field blank. No total petroleum hydrocarbons as diesel contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for sample SB229-21-S-01. Since the sample was diluted out, no data were qualified.

b. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags have been summarized at the end of this report if data has been qualified.

IX. Field Duplicates

No field duplicates were identified in this SDG.

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Laboratory Blank Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Field Blank Data Qualification Summary - SDG 09D293

No Sample Data Qualified in this SDG

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-08-S-01	Date Analyzed:	05/01/09 22:13
Lab Samp ID:	D293-02	Dilution Factor:	1
Lab File ID:	LE01037A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	22.8
Calib. Ref.:	LE01028A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	ND U	26	6.5

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	70	40-160
HEXACOSANE	90	70-160

Parameter	H-C Range
Diesel	C10-C24

6-18-09

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-01-S-01	Date Analyzed:	05/01/09 23:51
Lab Samp ID:	D293-03	Dilution Factor:	1
Lab File ID:	LE01043A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	2.2
Calib. Ref.:	LE01041A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	ND U	20	5.1

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	76	40-160
HEXACOSANE	97	70-160

Parameter	H-C Range
Diesel	C10-C24

6-18-09

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-01-S-02	Date Analyzed:	05/02/09 00:08
Lab Samp ID:	D293-04	Dilution Factor:	1
Lab File ID:	LE01044A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	19.0
Calib. Ref.:	LE01041A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	1800	25	6.2

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	72	40-160
HEXACOSANE	100	70-160

Parameter	H-C Range
Diesel	C10-C24

6-18-09

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-02-S-01	Date Analyzed:	05/02/09 00:24
Lab Samp ID:	D293-05	Dilution Factor:	1
Lab File ID:	LE01045A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	17.6
Calib. Ref.:	LE01041A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	2800	24	6.1

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	67	40-160
HEXACOSANE	109	70-160

Parameter	H-C Range
Diesel	C10-C24

6-18-09

5010

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/04/09 13:00
Sample ID:	SB229-02-W-01	Date Analyzed:	05/06/09 01:59
Lab Samp ID:	D293-06	Dilution Factor:	0.96
Lab File ID:	LE05051A	Matrix :	WATER
Ext Btch ID:	DSE003W	% Moisture :	NA
Calib. Ref.:	LE05049A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.48	0.096

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	96	50-130
HEXACOSANE	115	70-140

Parameter	H-C Range
Diesel	C10-C24

BJ 6-18-09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 090293	Date Extracted:	05/04/09 13:00
Sample ID:	SB229-02-W-02	Date Analyzed:	05/06/09 02:15
Lab Samp ID:	D293-07	Dilution Factor:	0.96
Lab File ID:	LE05052A	Matrix :	WATER
Ext Btch ID:	DSE003W	% Moisture :	NA
Calib. Ref.:	LE05049A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.48	0.096

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	92	50-130
HEXACOSANE	115	70-140

Parameter	H-C Range
Diesel	C10-C24

fy 6-18-09

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-10-S-01	Date Analyzed:	05/02/09 00:41
Lab Samp ID:	D293-08	Dilution Factor:	1
Lab File ID:	LE01046A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	20.8
Calib. Ref.:	LE01041A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	10J J	25	6.3

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	62	40-160
HEXACOSANE	90	70-160

Parameter	H-C Range
Diesel	C10-C24

JG 6-18-09

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-21-S-01	Date Analyzed:	05/04/09 19:11
Lab Samp ID:	D293-09T	Dilution Factor:	10
Lab File ID:	LE04012A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	15.6
Calib. Ref.:	LE04002A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	12000	240	59

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	DO	40-160
HEXACOSANE	DO	70-160

Parameter	H-C Range
Diesel	C10-C24

DO: Diluted Out

JG 6-18-09

5018

METHOD 3550B/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	04/29/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	04/29/09
Batch No.	: 09D293	Date Extracted:	05/01/09 12:45
Sample ID:	SB229-19-S-01	Date Analyzed:	05/02/09 01:13
Lab Samp ID:	D293-10	Dilution Factor:	1
Lab File ID:	LE01048A	Matrix :	SOIL
Ext Btch ID:	DSE001S	% Moisture :	14.6
Calib. Ref.:	LE01041A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
DIESEL	1800	23	5.9

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	86	40-160
HEXACOSANE	107	70-160

Parameter	H-C Range
Diesel	C10-C24

BJ 6-18-09

LDC #: 20899A8

SDG #: 09D293

Laboratory: EMAX Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 6/16/09

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC TPH as Diesel (EPA SW 846 Method 8015B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4/29/09
IIa.	Initial calibration	A	RSD
IIb.	Calibration verification/ICV	A	ICV/CCV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	A	~~LCS/LCSD~~
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	EB = 5, FB = 6

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	SB229-08-S-01	S	11	SB229-08-S-01MSD	S	21	MBLK1S	31	
2	SB229-01-S-01**		12			22 2	MBLK1W	32	
3	SB229-01-S-02		13			23		33	
4	SB229-02-S-01		14			24		34	
5 2	SB229-02-W-01	W	15			25		35	
6	SB229-02-W-02		16			26		36	
7	SB229-10-S-01	S	17			27		37	
8	SB229-21-S-01		18			28		38	
9	SB229-19-S-01		19			29		39	
10	SB229-08-S-01MS		20			30		40	

Notes:

LDC #: 20899A8
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: a
2nd Reviewer: [illegible]

Method: 8015B GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation?		✓		
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ ~~15~~ 20%.0 or percent recoveries ~~85-115~~ 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?		✓		
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?		✓		dilution
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 20899 A8
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer:
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

LDC #: 20899A8
SDG #: 09D293

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Reviewer: dy
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC
Are surrogates required by the method? Yes ✓ or No____.
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
(Y) N N/A Were surrogates spiked into all samples and blanks?
Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications
	8	FID	ALL	diluted out ( )	no qual DF≥10x
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene		
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin		
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin		
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate		
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC #: 20899A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC 8015B HPLC

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (20x std)	Recalculated CF (20x std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	1Cal	3/17/09	Diesel C10-C24	20097	20097	20636.6	20636.6	9.3	9.3
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 20899 A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: dl
2nd Reviewer: [illegible]

METHOD: GC 8015 B HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	LE01028A	5/1/09	Diesel C10-C24	500.0	465.48	465.48	7	7
2	LE01041A	↓	↓	↓	468.64	468.64	6	6
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 20899A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: dh
2nd reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 2

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
bromobenzene	FID	100	75.891	76	76	0
hexacosane	↓	25.0	24.272	97	97	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 20899A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; MS = Matrix spike; SC = Sample concentration; MSD = Matrix spike duplicate

RPD =(((SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100

MS/MSD samples: 10/11

Compound	Spike Added (mg/kg)		Sample Conc. (mg/kg)	Spike Sample Concentration (mg/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	—	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	648	648	ND	525	518	81	81	80	80	1	1
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 20899 A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA
RPD = I LCS - LCSD I * 2/(LCS + LCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: LCS

Compound	Spike Added (mg/kg)		Spiked Sample Concentration (mg/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)	500	NA	438	NA	88	88				
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 20899A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 2 Compound Name diesel

Concentration = ND

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Richard Brady & Associates
3710 Ruffin Road
San Diego, CA 92123
ATTN: Mr. Jesse MacNeill

September 21, 2009

SUBJECT: NWS Seal Beach, UST Site 229, Data Validation

Dear Mr. MacNiell,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 4, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 21481:

SDG #	Fraction
09H079, 09H080	Polynuclear Aromatic Hydrocarbons, TPH as Diesel

The data validation was performed under EPA Level III and Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

ERauto

Erlinda T. Rauto
Operations Manager/Senior Chemist

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323 pages-DL

Attachment 1

EDD & Verification

LDC #21481 (Richard Brady & Associates / NWS Seal Beach, UST Site 229)

Project #SHAWIN.001.009.00

LDC	SDG#	DATE REC'D	(3) DATE DUE	PAHs (8270C -SIM)		TPH-D (8015)																																	
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	09H079	09/04/09	09/28/09	8	0	7	0																																
A	09H079	09/04/09	09/28/09	1	0	1	0																																
B	09H080	09/04/09	09/28/09	3	0	2	0																																
Total	T/LR			12	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

21481ST.wpd

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC# 21481

Polynuclear Aromatic Hydrocarbons

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS Seal Beach, UST Site 229

Collection Date: August 6 through August 7, 2009

LDC Report Date: September 16, 2009

Matrix: Water

Parameters: Polynuclear Aromatic Hydrocarbons

Validation Level: NFESC Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 09H079

Sample Identification

SB229MW2-3Q09-GW01
SB229MW2-3Q09-GW02
SB229MW2-3Q09-GW03
SB229MW4-3Q09-GW01
SB229MW4-3Q09-GW02**
SB229MW3-3Q09-GW01
SB229MW3-3Q09-GW02
SB229MW1-3Q09-GW01
SB229MW1-3Q09-GW01DL
SB229MW2-3Q09-GW01MS
SB229MW2-3Q09-GW01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per a modification of EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent a NFESC Level IV review. A NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r^2) was greater than or equal to 0.990 .

Average relative response factors (RRF) for all target compounds and system monitoring compounds were within validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% .

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks.

Samples SB229MW2-3Q09-GW03 and SB229MW3-3Q09-GW02 were identified as equipment blanks. No polynuclear aromatic hydrocarbon contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
SB229MW2-3Q09-GW03	8/6/09	Naphthalene	0.012 ug/L	SB229MW2-3Q09-GW01 SB229MW4-3Q09-GW01 SB229MW4-3Q09-GW02**
SB229MW3-3Q09-GW02	8/7/09	Naphthalene	0.010 ug/L	SB229MW3-3Q09-GW01 SB229MW1-3Q09-GW01 SB229MW1-3Q09-GW01DL

Sample SB229MW2-3Q09-GW02 was identified as a field blank. No polynuclear aromatic hydrocarbon contaminants were found in this blank.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
SB229MW3-3Q09-GW01	Naphthalene	0.047 ug/L	0.047U ug/L

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for sample SB229MW1-3Q09-GW01DL. Since the sample was diluted out, no data were qualified.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SB229MW2-3Q09-GW01MS/MSD (SB229MW2-3Q09-GW01)	Acenaphthene Acenaphthylene Naphthalene	- - -	- - -	41 (≤30) 42 (≤30) 44 (≤30)	J (all detects) J (all detects) J (all detects)	A

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
RHH064/5 (All samples in SDG 09H079)	Acenaphthene	-	-	64 (≤30)	J (all detects)	P
	Acenaphthylene	-	-	66 (≤30)	UJ (all non-detects)	
	Anthracene	-	-	38 (≤30)		
	Fluorene	-	-	60 (≤30)		
	Naphthalene	-	-	68 (≤30)		
	Phenanthrene	-	-	38 (≤30)		

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a NFESC Level IV review was performed with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
SB229MW1-3Q09-GW01	Fluorene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A
	Naphthalene			J (all detects)	
	Phenanthrene			J (all detects)	

Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
SB229MW1-3Q09-GW01	Fluorene Naphthalene Phenanthrene	R R R	A
SB229MW1-3Q09-GW01DL	All TCL compounds except Fluorene Naphthalene Phenanthrene	R	A

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

Samples SB229MW4-3Q09-GW01 and SB229MW4-3Q09-GW02** were identified as field duplicates. No polynuclear aromatic hydrocarbons were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	SB229MW4-3Q09-GW01	SB229MW4-3Q09-GW02**	
Benzo(a)anthracene	0.014	0.014	0

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 09H079

SDG	Sample	Compound	Flag	A or P	Reason
09H079	SB229MW2-3Q09-GW01	Acenaphthene Acenaphthylene Naphthalene	J (all detects) J (all detects) J (all detects)	A	Matrix spike/Matrix spike duplicates (RPD)
09H079	SB229MW2-3Q09-GW01 SB229MW2-3Q09-GW02 SB229MW2-3Q09-GW03 SB229MW4-3Q09-GW01 SB229MW4-3Q09-GW02** SB229MW3-3Q09-GW01 SB229MW3-3Q09-GW02 SB229MW1-3Q09-GW01 SB229MW1-3Q09-GW01DL	Acenaphthene Acenaphthylene Anthracene Fluorene Naphthalene Phenanthrene	J (all detects) UJ (all non-detects)	P	Laboratory control samples (RPD)
09H079	SB229MW1-3Q09-GW01	Fluorene Naphthalene Phenanthrene	J (all detects) J (all detects) J (all detects)	A	Compound quantitation and CRQLs
09H079	SB229MW1-3Q09-GW01	Fluorene Naphthalene Phenanthrene	R R R	A	Overall assessment of data
09H079	SB229MW1-3Q09-GW01DL	All TCL compounds except Fluorene Naphthalene Phenanthrene	R	A	Overall assessment of data

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 09H079

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 09H079

SDG	Sample	Compound	Modified Final Concentration	A or P
09H079	SB229MW3-3Q09-GW01	Naphthalene	0.047U ug/L	A

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/06/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:30
Sample ID:	SB229MW2-3Q09-GW01	Date Analyzed:	08/13/09 15:59
Lab Samp ID:	H079-01	Dilution Factor:	.95
Lab File ID:	RHH068	Matrix :	WATER
Ext Btch ID:	SVH012W	% Moisture :	NA
Calib. Ref.:	RFH030	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND UJ	0.028	0.0095
ACENAPHTHYLENE	ND	0.028	0.0095
ANTHRACENE	ND	0.028	0.0095
BENZO(A)ANTHRACENE	0.015J	0.028	0.0095
BENZO(A)PYRENE	ND	0.028	0.0095
BENZO(B)FLUORANTHENE	ND	0.028	0.0095
BENZO(K)FLUORANTHENE	ND	0.028	0.0095
BENZO(G,H,I)PERYLENE	ND	0.028	0.0095
CHRYSENE	ND	0.028	0.0095
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0095
FLUORANTHENE	ND	0.028	0.0095
FLUORENE	ND UJ	0.028	0.0095
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0095
NAPHTHALENE	ND UJ	0.028	0.0095
PHENANTHRENE	ND	0.028	0.0095
PYRENE	ND	0.028	0.0095

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	62	30-130

9/20/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/06/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:30
Sample ID:	SB229MW2-3Q09-GW02	Date Analyzed:	08/13/09 16:18
Lab Samp ID:	H079-02	Dilution Factor:	.94
Lab File ID:	RHH069	Matrix :	WATER
Ext Btch ID:	SVH012W	% Moisture :	NA
Calib. Ref.:	RFH030	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND UJ	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND UJ	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	ND UJ	0.028	0.0094
PHENANTHRENE	ND	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	69	30-130

9/21/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/06/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:30
Sample ID	: SB229MW2-3Q09-GW03	Date Analyzed:	08/13/09 16:36
Lab Samp ID	: H079-03	Dilution Factor:	.94
Lab File ID	: RHH070	Matrix	: WATER
Ext Btch ID	: SVH012W	% Moisture	: NA
Calib. Ref.	: RFH030	Instrument ID	: T-DE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND UJ	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND UJ	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.012J J	0.028	0.0094
PHENANTHRENE	ND UJ	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	91	30-130

9/8/2009

3011

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/06/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:30
Sample ID:	SB229MW4-3Q09-GW01	Date Analyzed:	08/13/09 16:54
Lab Samp ID:	H079-04	Dilution Factor:	.94
Lab File ID:	RHH071	Matrix :	WATER
Ext Btch ID:	SVH012W	% Moisture :	NA
Calib. Ref.:	RFH030	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND UJ	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	0.014J	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND UJ	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	ND UJ	0.028	0.0094
PHENANTHRENE	ND	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	96	30-130

9/8/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/06/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:30
Sample ID:	SB229MW4-3Q09-GW02	Date Analyzed:	08/13/09 17:12
Lab Samp ID:	H079-05	Dilution Factor:	.95
Lab File ID:	RHH072	Matrix :	WATER
Ext Btch ID:	SVH012W	% Moisture :	NA
Calib. Ref.:	RFH030	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND UJ	0.028	0.0095
ACENAPHTHYLENE	ND	0.028	0.0095
ANTHRACENE	ND	0.028	0.0095
BENZO(A)ANTHRACENE	0.014J	0.028	0.0095
BENZO(A)PYRENE	ND	0.028	0.0095
BENZO(B)FLUORANTHENE	ND	0.028	0.0095
BENZO(K)FLUORANTHENE	ND	0.028	0.0095
BENZO(G,H,I)PERYLENE	ND	0.028	0.0095
CHRYSENE	ND	0.028	0.0095
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0095
FLUORANTHENE	ND	0.028	0.0095
FLUORENE	ND UJ	0.028	0.0095
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0095
NAPHTHALENE	ND UJ	0.028	0.0095
PHENANTHRENE	ND	0.028	0.0095
PYRENE	ND	0.028	0.0095

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	77	30-130

9/22/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/07/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:30
Sample ID:	SB229MW3-3Q09-GW01	Date Analyzed:	08/13/09 17:30
Lab Samp ID:	H079-06	Dilution Factor:	.94
Lab File ID:	RHH073	Matrix :	WATER
Ext Btch ID:	SVH012W	% Moisture :	NA
Calib. Ref.:	RFH030	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)		RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.018J	J	0.028	0.0094
ACENAPHTHYLENE	0.024J	J	0.028	0.0094
ANTHRACENE	ND	UJ	0.028	0.0094
BENZO(A)ANTHRACENE	ND		0.028	0.0094
BENZO(A)PYRENE	ND		0.028	0.0094
BENZO(B)FLUORANTHENE	ND		0.028	0.0094
BENZO(K)FLUORANTHENE	ND		0.028	0.0094
BENZO(G,H,I)PERYLENE	ND		0.028	0.0094
CHRYSENE	ND		0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND		0.028	0.0094
FLUORANTHENE	ND		0.028	0.0094
FLUORENE	0.077	J	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND		0.028	0.0094
NAPHTHALENE	0.047	UJ	0.028	0.0094
PHENANTHRENE	ND	UJ	0.028	0.0094
PYRENE	ND		0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	115	30-130

5/8/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/07/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:30
Sample ID:	SB229MW3-3Q09-GW02	Date Analyzed:	08/13/09 17:48
Lab Samp ID:	H079-07	Dilution Factor:	.94
Lab File ID:	RHH074	Matrix :	WATER
Ext Btch ID:	SVH012W	% Moisture :	NA
Calib. Ref.:	RFH030	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND UJ	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND UJ	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.010J J	0.028	0.0094
PHENANTHRENE	ND UJ	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	91	30-130

9/21/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/07/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:30
Sample ID:	SB229MW1-3Q09-GW01	Date Analyzed:	08/13/09 18:06
Lab Samp ID:	H079-08	Dilution Factor:	.95
Lab File ID:	RHH075	Matrix :	WATER
Ext Btch ID:	SVH012W	% Moisture :	NA
Calib. Ref.:	RFH030	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.93 J	0.028	0.0095
ACENAPHTHYLENE	0.72 J	0.028	0.0095
ANTHRACENE	ND UJ	0.028	0.0095
BENZO(A)ANTHRACENE	0.015J	0.028	0.0095
BENZO(A)PYRENE	ND	0.028	0.0095
BENZO(B)FLUORANTHENE	ND	0.028	0.0095
BENZO(K)FLUORANTHENE	ND	0.028	0.0095
BENZO(G,H,I)PERYLENE	ND	0.028	0.0095
CHRYSENE	ND	0.028	0.0095
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0095
FLUORANTHENE	ND	0.028	0.0095
FLUORENE	4.3E R	0.028	0.0095
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0095
NAPHTHALENE	29E R	0.028	0.0095
PHENANTHRENE	3.4E R	0.028	0.0095
PYRENE	0.037	0.028	0.0095

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	95	30-130

9/21/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/07/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:30
Sample ID:	SB229MW1-3Q09-GW01DL	Date Analyzed:	08/13/09 19:00
Lab Samp ID:	H079-08I	Dilution Factor:	95
Lab File ID:	RHH078	Matrix :	WATER
Ext Btch ID:	SVH012W	% Moisture :	NA
Calib. Ref.:	RFH030	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND R	2.8	0.95
ACENAPHTHYLENE	ND	2.8	0.95
ANTHRACENE	ND	2.8	0.95
BENZO(A)ANTHRACENE	ND	2.8	0.95
BENZO(A)PYRENE	ND	2.8	0.95
BENZO(B)FLUORANTHENE	ND	2.8	0.95
BENZO(K)FLUORANTHENE	ND	2.8	0.95
BENZO(G,H,I)PERYLENE	ND	2.8	0.95
CHRYSENE	ND	2.8	0.95
DIBENZO(A,H)ANTHRACENE	ND	2.8	0.95
FLUORANTHENE	ND	2.8	0.95
FLUORENE	3.3	2.8	0.95
INDENO(1,2,3-CD)PYRENE	ND R	2.8	0.95
NAPHTHALENE	31	2.8	0.95
PHENANTHRENE	3.0	2.8	0.95
PYRENE	ND R	2.8	0.95

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL D14	DO	30-130

DO : Diluted Out.

9/8/09

LDC #: 21481A2b
SDG #: 09H079
Laboratory: EMAX Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 9/09/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270C-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/06 - 07/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	% RSD r✓
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25 %
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	SW	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	N	Not reviewed for Level III validation.
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D = 4, 5
XVII.	Field blanks	SW	EB = 3, 7 *FB = 2

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
*ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

*1	SB229MW2-3Q09-GW1 (water)	11	SB229MW2-3Q09-GW1MSD	21		31	
*2	SB229MW2-3Q09-GW2	12	MBLKW	22		32	
*3	SB229MW2-3Q09-GW3	13		23		33	
4	SB229MW4-3Q09-GW1 D	14		24		34	
5	SB229MW4-3Q09-GW2** D	15		25		35	
6	SB229MW3-3Q09-GW1	16		26		36	
7	SB229MW3-3Q09-GW2	17		27		37	
8	SB229MW1-3Q09-GW1	18		28		38	
9	SB229MW1-3Q09-GW1DL	19		29		39	
10	SB229MW2-3Q09-GW1MS	20		30		40	

LDC #: 21481A26
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: JVG
2nd Reviewer: [illegible]

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation?	✓			
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?		✓		
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?	✓			
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?	✓			
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 21481 A26
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		✓		
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds from the associated calibration standard?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		✓		
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
XVII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TTT.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	UUU
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	VVV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

Notes: * = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

COMPNDL

LDC #: 21481 A 26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/06/09
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1, 4, 5 (ND)

Compound	Blank ID	Sample Identification								
	3									
~~Diethylphthalate~~ S	0.012									
Di-n-butylphthalate										
Bis(2-ethylhexyl)phthalate										
CRQL										

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/07/09
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 6, 8, 9

Compound	Blank ID	Sample Identification								
	7	6	8	9						
~~Diethylphthalate~~ S	0.010	0.047/U	29	31						
Di-n-butylphthalate										
Bis(2-ethylhexyl)phthalate										
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 24981 B26
SDG #: Ca Cetar
METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A	Were percent recoveries (%R) for surrogates within QC limits?
Y N N/A	If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
Y N N/A	If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
		9 (95X)	TPH	DO (20-130)	No qual
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

* QC limits are advisory

	QC Limits (Soil)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5	23-120	35-114
S2 (FBP) = 2-Fluorobiphenyl	30-115	43-116
S3 (TPH) = Terphenyl-d14	18-137	33-141
S4 (PHL) = Phenol-d5	24-113	10-94
S5 (2FP)= 2-Fluorophenol	25-121	21-100
S6 (TBP) = 2,4,6-Tribromophenol	19-122	10-123
S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC #: 21481 A2b
SDG #: See Comm

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: A

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

Y N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		10/11	GG	( )	( )	41 (30)		J all / A
			DD	( )	( )	42 ( )		
			S	( )	( )	44 ( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
E.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	KK.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
J.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	TT.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	ZZ.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 21481 A26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: R

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?

Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		RHH064/5	GG	( )	( )	64 (30)	All + BK	J/UJ/P
			DD	( )	( )	66 ( )		
			VV	( )	( )	38 ( )		
			NN	( )	( )	60 ( )		
			S	( )	( )	68 ( )		
			UU	( )	( )	38 ( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21481A26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: JVG
2nd Reviewer: a

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		8	NN, S, UU > cal range		J dets/A

Comments: See sample calculation verification worksheet for recalculations

COMQUA.2S

LDC #: 21481 A26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		8	NN, S, UU > CW range		R/A
					↓
		9	All except above dil		↓

Comments:

OVR.2S

LDC #: 21481 A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVG
2nd reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds identified in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD
	4	5	
CCC	0.014	0.014	0

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

LDC #: 21481A26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (1000 std)	Recalculated RRF (1000 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	6/24/09	Phenol (1st internal standard)						
			Naphthalene (2nd internal standard) 1st IS	1.071	1.071	1.245	1.245	8.00	8.00
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
2			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 21481A26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: R

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	RHH06V	8/13/09	Phenol (1st internal standard)					
			Naphthalene ~~(2nd~~ internal standard) 1ST	1.245	1.034	1.034	16.9	16.9
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
2			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 21481 A2b
SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: JVG
2nd reviewer: A

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: # 5

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14	500	386.09	77	77	0
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 21481 A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 10 / 11

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration ( )		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	0.470	0.475	0	0.345	0.228	73	73	48	48	41	41
Pentachlorophenol											
Pyrene	0.470	0.475	↓	0.589	0.497	125	125	105	497	17	17

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 21481 A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: RH # 064 [illegible]

Compound	Spike Added (ug/L)		Spike Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	0.500	0.500	0.324	0.166	65	65	33	33	64	64
Pentachlorophenol										
Pyrene	0.500	0.500	0.449	0.392	90	90	78	78	13	13

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 21481A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$$\text{Concentration} = \frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 5, CCC:

$$\text{Conc.} = \frac{(198)(2000)(1\,ml)(\quad)(\quad)}{(45899)(0.601)(1050)(\quad)(\quad)}$$

= 0.0137

≈ 0.014 ug/L

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

RECALC.2S

LDC Report# 21481B2b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS Seal Beach, UST Site 229

Collection Date: August 8, 2009

LDC Report Date: September 16, 2009

Matrix: Water

Parameters: Polynuclear Aromatic Hydrocarbons

Validation Level: NFESC Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 09H080

Sample Identification

BSW-14-6-3Q09-GW01
BSW-14-4-3Q09-GW01
BSW-14-4-3Q09-GW01DL

Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per a modification of EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r^2) was greater than or equal to 0.990 .

Average relative response factors (RRF) for all target compounds and system monitoring compounds were within validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% .

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks.

Sample SB229MW3-3Q09-GW02 (from SDG 09H079) was identified as an equipment blank. No polynuclear aromatic hydrocarbon contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
SB229MW3-3Q09-GW02	8/7/09	Naphthalene	0.010 ug/L	All samples in SDG 09H080

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
BSW-14-6-3Q09-GW01	Naphthalene	0.017 ug/L	0.028U ug/L

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for sample BSW-14-4-3Q09-GW01DL. Since the sample was diluted out, no data were qualified.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
RHH064/5 (All samples in SDG 09H080)	Acenaphthene	-	-	64 (≤30)	J (all detects)	P
	Acenaphthylene	-	-	66 (≤30)	UJ (all non-detects)	
	Anthracene	-	-	38 (≤30)		
	Fluorene	-	-	60 (≤30)		
	Naphthalene	-	-	68 (≤30)		
	Phenanthrene	-	-	38 (≤30)		

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
BSW-14-4-3Q09-GW01	Naphthalene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
BSW-14-4-3Q09-GW01	Naphthalene	R	A
BSW-14-4-3Q09-GW01DL	All TCL compounds except Naphthalene	R	A

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 09H080

SDG	Sample	Compound	Flag	A or P	Reason
09H080	BSW-14-6-3Q09-GW01 BSW-14-4-3Q09-GW01 BSW-14-4-3Q09-GW01DL	Acenaphthene Acenaphthylene Anthracene Fluorene Naphthalene Phenanthrene	J (all detects) UJ (all non-detects)	P	Laboratory control samples (RPD)
09H080	BSW-14-4-3Q09-GW01	Naphthalene	J (all detects)	A	Compound quantitation and CRQLs
09H080	BSW-14-4-3Q09-GW01	Naphthalene	R	A	Overall assessment of data
09H080	BSW-14-4-3Q09-GW01DL	All TCL compounds except Naphthalene	R	A	Overall assessment of data

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 09H080

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 09H080

SDG	Sample	Compound	Modified Final Concentration	A or P
09H080	BSW-14-6-3Q09-GW01	Naphthalene	0.028U ug/L	A

METHOD 3520C/8270C SIM

SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/07/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H080	Date Extracted:	08/12/09 15:30
Sample ID:	BSW-14-6-3Q09-GW01	Date Analyzed:	08/13/09 18:24
Lab Samp ID:	H080-01	Dilution Factor:	.94
Lab File ID:	RHH076	Matrix :	WATER
Ext Btch ID:	SVH012W	% Moisture :	NA
Calib. Ref.:	RFH030	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)	
ACENAPHTHENE	ND UJ	0.028	0.0094	
ACENAPHTHYLENE	ND	0.028	0.0094	
ANTHRACENE	ND	0.028	0.0094	
BENZO(A)ANTHRACENE	ND	0.028	0.0094	
BENZO(A)PYRENE	ND	0.028	0.0094	
BENZO(B)FLUORANTHENE	ND	0.028	0.0094	
BENZO(K)FLUORANTHENE	ND	0.028	0.0094	
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094	
CHRYSENE	ND	0.028	0.0094	
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094	
FLUORANTHENE	ND	0.028	0.0094	
FLUORENE	ND UJ	0.028	0.0094	
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094	
NAPHTHALENE	0.017J	0.028	0.0094	0.028 UJ
PHENANTHRENE	ND UJ	0.028	0.0094	
PYRENE	ND	0.028	0.0094	

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	110	30-130

8/21/09

METHOD 3520C/8270C SIM

SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/07/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H080	Date Extracted:	08/12/09 15:30
Sample ID:	BSW-14-4-3Q09-GW01	Date Analyzed:	08/13/09 18:42
Lab Samp ID:	H080-02	Dilution Factor:	.94
Lab File ID:	RHH077	Matrix :	WATER
Ext Btch ID:	SVH012W	% Moisture :	NA
Calib. Ref.:	RFH030	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)		RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.13	J	0.028	0.0094
ACENAPHTHYLENE	0.062	J	0.028	0.0094
ANTHRACENE	ND	UJ	0.028	0.0094
BENZO(A)ANTHRACENE	0.011J		0.028	0.0094
BENZO(A)PYRENE	ND		0.028	0.0094
BENZO(B)FLUORANTHENE	ND		0.028	0.0094
BENZO(K)FLUORANTHENE	ND		0.028	0.0094
BENZO(G,H,I)PERYLENE	ND		0.028	0.0094
CHRYSENE	ND		0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND		0.028	0.0094
FLUORANTHENE	ND		0.028	0.0094
FLUORENE	0.15	J	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND		0.028	0.0094
NAPHTHALENE	6.6E	R	0.028	0.0094
PHENANTHRENE	0.040	J	0.028	0.0094
PYRENE	ND		0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	83	30-130

9/22/09

METHOD 3520C/8270C SIM

SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/07/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H080	Date Extracted:	08/12/09 15:30
Sample ID:	BSW-14-4-3Q09-GW01DL	Date Analyzed:	08/27/09 16:07
Lab Samp ID:	H080-021	Dilution Factor:	18.8
Lab File ID:	RHH295	Matrix :	WATER
Ext Btch ID:	SVH012W	% Moisture :	NA
Calib. Ref.:	RHH288	Instrument ID :	T-0E7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND R	0.56	0.19
ACENAPHTHYLENE	ND	0.56	0.19
ANTHRACENE	ND	0.56	0.19
BENZO(A)ANTHRACENE	ND	0.56	0.19
BENZO(A)PYRENE	ND	0.56	0.19
BENZO(B)FLUORANTHENE	ND	0.56	0.19
BENZO(K)FLUORANTHENE	ND	0.56	0.19
BENZO(G,H,I)PERYLENE	ND	0.56	0.19
CHRYSENE	ND	0.56	0.19
DIBENZO(A,H)ANTHRACENE	ND	0.56	0.19
FLUORANTHENE	ND	0.56	0.19
FLUORENE	ND	0.56	0.19
INDENO(1,2,3-CD)PYRENE	ND	0.56	0.19
NAPHTHALENE	9.1	0.56	0.19
PHENANTHRENE	ND R	0.56	0.19
PYRENE	ND	0.56	0.19

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	DO	30-130

DO : Diluted Out.

9/30/09

LDC #: 21481B2b

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 9/09/09

SDG #: 09H080

Page: 1 of 1

Laboratory: EMAX Laboratories, Inc.

Reviewer: JVG

2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270C-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/07/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	% RSD r²
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentitatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	EB = SB229MW3-3Q09-GW02 from 09H079

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

Water

1	BSW-14-6-3Q09-GW01	11		21		31	
2	BSW-14-4-3Q09-GW01	12		22		32	
3	BSW-14-4-3Q09-GW01DL	13		23		33	
4	MBLK1W	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TTT.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	UUU
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	VVV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

Notes: * = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

COMPNDL

LDC #: 21481 b 26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?
Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/07/09
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Compound	Blank ID	Sample Identification								
	SB229 MW3-3209-GW01		1	2	3					
~~Diethylphthalate~~ S	0.010		0.017/0.028 U	6.6	9.1					
Di-n-butylphthalate										
Bis(2-ethylhexyl)phthalate										
CRQL										

Blank units: _____ **Associated sample units:** _____
Sampling date: _____
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								
Diethylphthalate										
Di-n-butylphthalate										
Bis(2-ethylhexyl)phthalate										
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 21481 B26
SDG #: See Cover
METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Reviewer: JVG
2nd Reviewer: Q

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were percent recoveries (%R) for surrogates within QC limits?
Y N (N/A) If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
Y N (N/A) If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
		3 (18.8x)	TPH	DO (30-130)	No qual
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

* QC limits are advisory	QC Limits (Soil)	QC Limits (Water)		QC Limits (Soil)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5	23-120	35-114	S5 (2FP)= 2-Fluorophenol	25-121	21-100
S2 (FBP) = 2-Fluorobiphenyl	30-115	43-116	S6 (TBP) = 2,4,6-Tribromophenol	19-122	10-123
S3 (TPH) = Terphenyl-d14	18-137	33-141	S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S4 (PHL) = Phenol-d5	24-113	10-94	S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC #: 21481 B26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?

Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		RHH064/5	GG	( )	( )	69 (30)	All + Blk	J/UJ/P
			DD	( )	( )	66 ( )		
			VV	( )	( )	38 ( )		
			NN	( )	( )	60 ( )		
			S	( )	( )	68 ( )		
			UU	( )	( )	38 ( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21481 B26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		2	S > cal range		J detects /A

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21481B26
SDG #: See Comm

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		2	S > cal range		R/A
		3	All except S dil		

Comments:

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC# 21481

TPH as Diesel

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS Seal Beach, UST Site 229

Collection Date: August 6 through August 7, 2009

LDC Report Date: September 16, 2009

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Diesel

Validation Level: NFESC Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 09H079

Sample Identification

SB229MW2-3Q09-GW01
SB229MW2-3Q09-GW02
SB229MW2-3Q09-GW03
SB229MW4-3Q09-GW01
SB229MW4-3Q09-GW02**
SB229MW3-3Q09-GW01
SB229MW3-3Q09-GW02
SB229MW1-3Q09-GW01
SB229MW2-3Q09-GW01MS
SB229MW2-3Q09-GW01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Diesel.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent NFESC Level IV review. NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as diesel contaminants were found in the method blanks.

Samples SB229MW2-3Q09-GW03 and SB229MW3-3Q09-GW02 were identified as equipment blanks. No total petroleum hydrocarbons as diesel contaminants were found in these blanks.

Sample SB229MW2-3Q09-GW02 was identified as a field blank. No total petroleum hydrocarbons as diesel contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags have been summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples SB229MW4-3Q09-GW01 and SB229MW4-3Q09-GW02** were identified as field duplicates. No total petroleum hydrocarbons as diesel were detected in any of the samples.

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Data Qualification Summary - SDG 09H079

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Laboratory Blank Data Qualification Summary - SDG 09H079

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Field Blank Data Qualification Summary - SDG 09H079

No Sample Data Qualified in this SDG

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/06/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:15
Sample ID:	SB229MW2-3009-GW01	Date Analyzed:	08/13/09 17:05
Lab Samp ID:	H079-01	Dilution Factor:	0.94
Lab File ID:	LH13010A	Matrix :	WATER
Ext Btch ID:	DSH010W	% Moisture :	NA
Calib. Ref.:	LH13008A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	0.85	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	76	50-130
HEXACOSANE	87	70-140

Parameter	H-C Range
Diesel	C10-C24

8/20/09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/06/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:15
Sample ID:	SB229MW2-3Q09-GW02	Date Analyzed:	08/13/09 17:55
Lab Samp ID:	H079-02	Dilution Factor:	0.94
Lab File ID:	LH13013A	Matrix :	WATER
Ext Btch ID:	DSH010W	% Moisture :	NA
Calib. Ref.:	LH13008A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	76	50-130
HEXACOSANE	90	70-140

Parameter	H-C Range
Diesel	C10-C24

9/20/09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/06/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:15
Sample ID:	SB229MW2-3009-GW03	Date Analyzed:	08/13/09 18:12
Lab Samp ID:	H079-03	Dilution Factor:	0.94
Lab File ID:	LH13014A	Matrix :	WATER
Ext Btch ID:	DSH010W	% Moisture :	NA
Calib. Ref.:	LH13008A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	83	50-130
HEXACOSANE	95	70-140

Parameter	H-C Range
Diesel	C10-C24

8/17/2009

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/06/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:15
Sample ID:	SB229MW4-3Q09-GW01	Date Analyzed:	08/13/09 18:29
Lab Samp ID:	H079-04	Dilution Factor:	0.94
Lab File ID:	LH13015A	Matrix :	WATER
Ext Btch ID:	DSH010W	% Moisture :	NA
Calib. Ref.:	LH13008A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	76	50-130
HEXACOSANE	82	70-140

Parameter	H-C Range
Diesel	C10-C24

8/20/09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/06/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:15
Sample ID:	SB229MW4-3Q09-GW02	Date Analyzed:	08/13/09 18:45
Lab Samp ID:	H079-05	Dilution Factor:	0.94
Lab File ID:	LH13016A	Matrix :	WATER
Ext Btch ID:	DSH010W	% Moisture :	NA
Calib. Ref.:	LH13008A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	78	50-130
HEXACOSANE	92	70-140

Parameter	H-C Range
Diesel	C10-C24

9/20/09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/07/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:15
Sample ID:	SB229MW3-3Q09-GW01	Date Analyzed:	08/13/09 19:02
Lab Samp ID:	H079-06	Dilution Factor:	0.94
Lab File ID:	LH13017A	Matrix :	WATER
Ext Btch ID:	DSH010W	% Moisture :	NA
Calib. Ref.:	LH13008A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	0.29J	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	75	50-130
HEXACOSANE	91	70-140

Parameter	H-C Range
Diesel	C10-C24

9/20/09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/07/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:15
Sample ID:	SB229MW3-3Q09-GW02	Date Analyzed:	08/13/09 19:19
Lab Samp ID:	H079-07	Dilution Factor:	0.94
Lab File ID:	LH13018A	Matrix :	WATER
Ext Btch ID:	DSH010W	% Moisture :	NA
Calib. Ref.:	LH13008A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	84	50-130
HEXACOSANE	97	70-140

Parameter	H-C Range
Diesel	C10-C24

9/-2009

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/07/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H079	Date Extracted:	08/12/09 15:15
Sample ID:	SB229MW1-3Q09-GW01	Date Analyzed:	08/13/09 19:35
Lab Samp ID:	H079-08	Dilution Factor:	0.95
Lab File ID:	LH13019A	Matrix :	WATER
Ext Btch ID:	DSH010W	% Moisture :	NA
Calib. Ref.:	LH13008A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	2.4	0.48	0.095

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	73	50-130
HEXACOSANE	94	70-140

Parameter	H-C Range
Diesel	C10-C24

9/20/09

5018

LDC #: 21481A8 **VALIDATION COMPLETENESS WORKSHEET** Date: 9/8/09
SDG #: 09H079 Level III/IV Page: 1 of 1
Laboratory: EMAX Laboratories, Inc. Reviewer: dr
2nd Reviewer: R

METHOD: GC TPH as Diesel (EPA SW 846 Method 8015B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/6/09 - 8/7/09
IIa.	Initial calibration	A	RSD ≤ 20%
IIb.	Calibration verification/ICV	A	ICV/CCV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D = 4+5
X.	Field blanks	ND	FB = 2, EB = 3+7

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Water

1	SB229MW2-3Q09-GW1	11	MBLK 110	21		31	
2	SB229MW2-3Q09-GW2	12		22		32	
3	SB229MW2-3Q09-GW3	13		23		33	
4	SB229MW4-3Q09-GW1	14		24		34	
5	SB229MW4-3Q09-GW2**	15		25		35	
6	SB229MW3-3Q09-GW1	16		26		36	
7	SB229MW3-3Q09-GW2	17		27		37	
8	SB229MW1-3Q09-GW1	18		28		38	
9	SB229MW2-3Q09-GW1MS	19		29		39	
10	SB229MW2-3Q09-GW1MSD	20		30		40	

Notes:

LDC #: 24481A8
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: 8015B GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation?		✓		
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ ~~15~~ 20%.0 or percent recoveries ~~85-115~~ 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 21481A8
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer:
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.		✓		
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

LDC #: 2148/A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC 8015B HPLC

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (100 std)	Recalculated CF (100 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	1Cal	6/23/09	diesel	24402	24402	24699.1	24699.1	5.4	5.4
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 21481 A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: dh
2nd Reviewer: e

METHOD: GC 8015 B HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	L413002A	8/13/09	diesel	500.0	475.30	475.30	5	5
2	L413008A	↓	↓	↓	483.01	483.01	-3	3
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CONCLC.1S

LDC #: 21481A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 5

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
bromobenzene	HP5	100.0	77.616	78	78	
hexacosane	↓	25.0	22.972	92	92	

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 21481A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; MS = Matrix spike; SC = Sample concentration; MSD = Matrix spike duplicate

RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100

MS/MSD samples: 9+10

Compound	Spike Added (mg/L)		Sample Conc. (mg/L)	Spike Sample Concentration (mg/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	4.75	4.70	0.845	5.75	5.41	103	102	97	97	6	6
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 21481A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer: dw
2nd Reviewer: [illegible]

METHOD: ✓ GC ✓ HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA
RPD = | LCS - LCSD | * 2/(LCS + LCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: LCS1W/LCD1W

Compound	Spike Added (mg/L)		Spiked Sample Concentration (mg/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)	5.00	5.00	4.90	5.22	98	98	104	104	6	6
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 21481A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 5 Compound Name _____

Concentration = ND

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS Seal Beach, UST Site 229

Collection Date: August 7, 2009

LDC Report Date: September 16, 2009

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Diesel

Validation Level: NFESC Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 09H080

Sample Identification

BSW-14-6-3Q09-GW01
BSW-14-4-3Q09-GW01

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Diesel.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as diesel contaminants were found in the method blanks.

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

VII. System Performance

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

Data flags have been summarized at the end of this report if data has been qualified.

IX. Field Duplicates

No field duplicates were identified in this SDG.

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Data Qualification Summary - SDG 09H080

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Laboratory Blank Data Qualification Summary - SDG 09H080

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Field Blank Data Qualification Summary - SDG 09H080

No Sample Data Qualified in this SDG

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/07/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: 09H080	Date Extracted:	08/12/09 15:15
Sample ID:	BSW-14-6-3Q09-GW01	Date Analyzed:	08/13/09 20:42
Lab Samp ID:	H080-01	Dilution Factor:	0.94
Lab File ID:	LH13023A	Matrix :	WATER
Ext Btch ID:	DSH010W	% Moisture :	NA
Calib. Ref.:	LH13021A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	79	50-130
HEXACOSANE	94	70-140

Parameter	H-C Range
Diesel	C10-C24

Fa 9/20/09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	08/07/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	08/07/09
Batch No.	: D9H080	Date Extracted:	08/12/09 15:15
Sample ID:	BSW-14-4-3Q09-GW01	Date Analyzed:	08/13/09 20:58
Lab Samp ID:	H080-02	Dilution Factor:	0.94
Lab File ID:	LH13024A	Matrix :	WATER
Ext Btch ID:	DSH010W	% Moisture :	NA
Calib. Ref.:	LH13021A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	0.59	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	85	50-130
HEXACOSANE	101	70-140

Parameter	H-C Range
Diesel	C10-C24

9/20/09

LDC #: 21481B8
SDG #: 09H080
Laboratory: EMAX Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 9/8/09
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC TPH as Diesel (EPA SW 846 Method 8015B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/7/09
IIa.	Initial calibration	A	RSD ≤ 20%
IIb.	Calibration verification/ICV	A	ICV/CCV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	Client specified
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Water

1	BSW-14-6-3Q09-GW01	11	MBLK 1W	21		31	
2	BSW-14-4-3Q09-GW01	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Richard Brady & Associates
3710 Ruffin Road
San Diego, CA 92123
ATTN: Mr. Jesse MacNeill

January 4, 2010

SUBJECT: NWS Seal Beach, UST Site 229, Data Validation

Dear Mr. MacNiell,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on December 7, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 22162:

SDG #	Fraction
09K157	Polynuclear Aromatic Hydrocarbons, TPH as Diesel

The data validation was performed under EPA Level III and Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

V:\LOGIN\RBA\Seal\22162COV.wpd

160 pages-EM

Attachment 1

EDD & Verification

LDC #22162 (Richard Brady & Associates / NWS Seal Beach, UST Site 229)

Project #SHAWIN.001.009.00

LDC	SDG#	DATE REC'D	(3) DATE DUE	PAHs (8270C -SIM)		TPH-D (8015)																																	
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	09K157	12/07/09	12/29/09	10	0	9	0																																
A	09K157	12/07/09	12/29/09	2	0	1	0																																
Total	T/LR			12	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

22162ST.wpd

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC #22162

Polynuclear Aromatic Hydrocarbons

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS Seal Beach, UST Site 229

Collection Date: November 12 through November 13, 2009

LDC Report Date: December 31, 2009

Matrix: Water

Parameters: Polynuclear Aromatic Hydrocarbons

Validation Level: NFESC Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 09K157

Sample Identification

SB229MW2-4Q09-GW01
SB229MW4-4Q09-GW01
SB229MW3-4Q09-GW01
SB229MW3-4Q09-GW02
SB229MW1-4Q09-GW01**
SB229MW1-4Q09-GW01DL**
SB229MW1-4Q09-GW02
SB229MW1-4Q09-GW03
BSW-14-6-4Q09-GW01
BSW-14-4-4Q09-GW01
BSW-14-4-4Q09-GW01DL
BSW-14-4-4Q09-GW02
SB229MW4-4Q09-GW01MS
SB229MW4-4Q09-GW01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 14 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per a modification of EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent a NFESC Level IV review. A NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all compounds.

Average relative response factors (RRF) for all target compounds and system monitoring compounds were within validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% .

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks.

Samples SB229MW1-4Q09-GW03 and BSW-14-4-4Q09-GW02 were identified as equipment blanks. No polynuclear aromatic hydrocarbon contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
SB229MW1-4Q09-GW03	11/12/09	Naphthalene	0.026 ug/L	SB229MW2-4Q09-GW01 SB229MW4-4Q09-GW01 SB229MW3-4Q09-GW01 SB229MW3-4Q09-GW02 SB229MW1-4Q09-GW01** SB229MW1-4Q09-GW01DL**
BSW-14-4-4Q09-GW02	11/13/09	Naphthalene	0.015 ug/L	BSW-14-6-4Q09-GW01 BSW-14-4-4Q09-GW01 BSW-14-4-4Q09-GW01DL

Sample SB229MW1-4Q09-GW02 was identified as a field blank. No polynuclear aromatic hydrocarbon contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
SB229MW1-4Q09-GW02	11/12/09	Naphthalene	0.029 ug/L	SB229MW2-4Q09-GW01 SB229MW4-4Q09-GW01 SB229MW3-4Q09-GW01 SB229MW3-4Q09-GW02 SB229MW1-4Q09-GW01** SB229MW1-4Q09-GW01DL**

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
SB229MW2-4Q09-GW01	Naphthalene	0.042 ug/L	0.042U ug/L
SB229MW4-4Q09-GW01	Naphthalene	0.012 ug/L	0.028U ug/L
SB229MW3-4Q09-GW01	Naphthalene	0.036 ug/L	0.036U ug/L
SB229MW3-4Q09-GW02	Naphthalene	0.016 ug/L	0.028U ug/L
BSW-14-6-4Q09-GW01	Naphthalene	0.035 ug/L	0.035U ug/L

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All

surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SB229MW4-4Q09-GW01MS/MSD (SB229MW4-4Q09-GW01)	Dibenz(a,h)anthracene	153 (30-150)	-	-	J (all detects)	A

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D1W (All samples in SDG 09K157)	Phenanthrene	-	-	31 (≤30)	J (all detects) UJ (all non-detects)	P
	Pyrene	-	-	31 (≤30)	J (all detects) UJ (all non-detects)	

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a NFESC Level IV review was performed with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
SB229MW1-4Q09-GW01**	Fluorene Naphthalene Phenanthrene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects)	A
BSW-14-4-4Q09-GW01	Naphthalene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
SB229MW1-4Q09-GW01**	Fluorene Naphthalene Phenanthrene	R R R	A
SB229MW1-4Q09-GW01DL**	All TCL compounds except Fluorene Naphthalene Phenanthrene	R	A
BSW-14-4-4Q09-GW01	Naphthalene	R	A
BSW-14-4-4Q09-GW01DL	All TCL compounds except Naphthalene	R	A

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

Samples SB229MW3-4Q09-GW01 and SB229MW3-4Q09-GW02 were identified as field duplicates. No polynuclear aromatic hydrocarbons were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	SB229MW3-4Q09-GW01	SB229MW3-4Q09-GW02	
Acenaphthylene	0.013 J	0.012 J	8
Fluorene	0.028 J	0.028U	200
Naphthalene	0.036	0.016 J	77
Benzo(a)anthracene	0.028U	0.010 J	200
Dibenz(a,h)anthracene	0.028U	0.010 J	200
Indeno(1,2,3-cd)pyrene	0.028U	0.0094 J	200

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 09K157

SDG	Sample	Compound	Flag	A or P	Reason
09K157	SB229MW4-4Q09-GW01	Dibenz(a,h)anthracene	J (all detects)	A	Matrix spike/Matrix spike duplicates (%R)
09K157	SB229MW2-4Q09-GW01 SB229MW4-4Q09-GW01 SB229MW3-4Q09-GW01 SB229MW3-4Q09-GW02 SB229MW1-4Q09-GW01** SB229MW1-4Q09-GW01DL** SB229MW1-4Q09-GW02 SB229MW1-4Q09-GW03 BSW-14-6-4Q09-GW01 BSW-14-4-4Q09-GW01 BSW-14-4-4Q09-GW01DL BSW-14-4-4Q09-GW02	Phenanthrene Pyrene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Laboratory control samples (RPD)
09K157	SB229MW1-4Q09-GW01**	Fluorene Naphthalene Phenanthrene	J (all detects) J (all detects) J (all detects)	A	Compound quantitation and CRQLs
09K157	BSW-14-4-4Q09-GW01	Naphthalene	J (all detects)	A	Compound quantitation and CRQLs
09K157	SB229MW1-4Q09-GW01**	Fluorene Naphthalene Phenanthrene	R R R	A	Overall assessment of data
09K157	SB229MW1-4Q09-GW01DL**	All TCL compounds except Fluorene Naphthalene Phenanthrene	R	A	Overall assessment of data
09K157	BSW-14-4-4Q09-GW01	Naphthalene	R	A	Overall assessment of data
09K157	BSW-14-4-4Q09-GW01DL	All TCL compounds except Naphthalene	R	A	Overall assessment of data

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 09K157

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 09K157

SDG	Sample	Compound	Modified Final Concentration	A or P
09K157	SB229MW2-4Q09-GW01	Naphthalene	0.042U ug/L	A
09K157	SB229MW4-4Q09-GW01	Naphthalene	0.028U ug/L	A
09K157	SB229MW3-4Q09-GW01	Naphthalene	0.036U ug/L	A
09K157	SB229MW3-4Q09-GW02	Naphthalene	0.028U ug/L	A
09K157	BSW-14-6-4Q09-GW01	Naphthalene	0.035U ug/L	A

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/12/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/18/09 17:00
Sample ID:	SB229MW2-4Q09-GW01	Date Analyzed:	11/20/09 16:09
Lab Samp ID:	K157-01	Dilution Factor:	.94
Lab File ID:	RKH372	Matrix :	WATER
Ext Btch ID:	SVK041W	% Moisture :	NA
Calib. Ref.:	RJH283	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.053	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	0.013J	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.042 U	0.028	0.0094
PHENANTHRENE	ND UJ	0.028	0.0094
PYRENE	ND UJ	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	74	30-130

12/30/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/12/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/18/09 17:00
Sample ID:	SB229MW4-4Q09-GW01	Date Analyzed:	11/20/09 16:27
Lab Samp ID:	K157-02	Dilution Factor:	.94
Lab File ID:	RKH373	Matrix :	WATER
Ext Btch ID:	SVK041W	% Moisture :	NA
Calib. Ref.:	RJH283	Instrument ID :	T-0E7

PARAMETERS	RESULTS (ug/L)		RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND		0.028	0.0094
ACENAPHTHYLENE	ND		0.028	0.0094
ANTHRACENE	ND		0.028	0.0094
BENZO(A)ANTHRACENE	ND		0.028	0.0094
BENZO(A)PYRENE	ND		0.028	0.0094
BENZO(B)FLUORANTHENE	ND		0.028	0.0094
BENZO(K)FLUORANTHENE	ND		0.028	0.0094
BENZO(G,H,I)PERYLENE	ND		0.028	0.0094
CHRYSENE	ND		0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND		0.028	0.0094
FLUORANTHENE	ND		0.028	0.0094
FLUORENE	ND		0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND		0.028	0.0094
NAPHTHALENE	0.012J	0.028U	0.028	0.0094
PHENANTHRENE	0.049	J	0.028	0.0094
PYRENE	ND	UJ	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	83	30-130

11/30/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 11/12/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 11/13/09
Batch No. : 09K157	Date Extracted: 11/18/09 17:00
Sample ID: SB229MW3-4009-GW01	Date Analyzed: 11/20/09 16:45
Lab Samp ID: K157-03	Dilution Factor: .95
Lab File ID: RKH374	Matrix : WATER
Ext Btch ID: SVK041W	% Moisture : NA
Calib. Ref.: RJH283	Instrument ID : T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND	0.028	0.0095
ACENAPHTHYLENE	0.013J	0.028	0.0095
ANTHRACENE	ND	0.028	0.0095
BENZO(A)ANTHRACENE	ND	0.028	0.0095
BENZO(A)PYRENE	ND	0.028	0.0095
BENZO(B)FLUORANTHENE	ND	0.028	0.0095
BENZO(K)FLUORANTHENE	ND	0.028	0.0095
BENZO(G,H,I)PERYLENE	ND	0.028	0.0095
CHRYSENE	ND	0.028	0.0095
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0095
FLUORANTHENE	ND	0.028	0.0095
FLUORENE	0.028J	0.028	0.0095
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0095
NAPHTHALENE	0.036 U	0.028	0.0095
PHENANTHRENE	ND UJ	0.028	0.0095
PYRENE	ND UJ	0.028	0.0095

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	99	30-130

12/30/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/12/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/18/09 17:00
Sample ID:	SB229MW3-4Q09-GW02	Date Analyzed:	11/20/09 17:03
Lab Samp ID:	K157-04	Dilution Factor:	.94
Lab File ID:	RKH375	Matrix	: WATER
Ext Btch ID:	SVK041W	% Moisture	: NA
Calib. Ref.:	RJH283	Instrument ID	: T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND	0.028	0.0094
ACENAPHTHYLENE	0.012J	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	0.010J	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	0.010J	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	0.0094J	0.028	0.0094
NAPHTHALENE	0.016J 0.028U	0.028	0.0094
PHENANTHRENE	ND UJ	0.028	0.0094
PYRENE	ND UJ	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	105	30-130

12/30/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/12/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/18/09 17:00
Sample ID:	SB229MW1-4Q09-GW01	Date Analyzed:	11/20/09 17:21
Lab Samp ID:	K157-05	Dilution Factor:	.95
Lab File ID:	RKH376	Matrix :	WATER
Ext Btch ID:	SVK041W	% Moisture :	NA
Calib. Ref.:	RJH283	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.95	0.028	0.0095
ACENAPHTHYLENE	0.55	0.028	0.0095
ANTHRACENE	ND	0.028	0.0095
BENZO(A)ANTHRACENE	ND	0.028	0.0095
BENZO(A)PYRENE	ND	0.028	0.0095
BENZO(B)FLUORANTHENE	ND	0.028	0.0095
BENZO(K)FLUORANTHENE	ND	0.028	0.0095
BENZO(G,H,I)PERYLENE	ND	0.028	0.0095
CHRYSENE	ND	0.028	0.0095
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0095
FLUORANTHENE	ND	0.028	0.0095
FLUORENE	1.8E R	0.028	0.0095
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0095
NAPHTHALENE	13E R	0.028	0.0095
PHENANTHRENE	2.8E R	0.028	0.0095
PYRENE	0.032 J	0.028	0.0095

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	77	30-130

12/20/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/12/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/18/09 17:00
Sample ID:	SB229MW1-4Q09-GW01DL	Date Analyzed:	11/23/09 14:39
Lab Samp ID:	K157-05T	Dilution Factor:	47.5
Lab File ID:	RKH391	Matrix :	WATER
Ext Btch ID:	SVK041W	% Moisture :	NA
Calib. Ref.:	RJH283	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)		RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	1.0J	R	1.4	0.48
ACENAPHTHYLENE	0.60J		1.4	0.48
ANTHRACENE	ND		1.4	0.48
BENZO(A)ANTHRACENE	ND		1.4	0.48
BENZO(A)PYRENE	ND		1.4	0.48
BENZO(B)FLUORANTHENE	ND		1.4	0.48
BENZO(K)FLUORANTHENE	ND		1.4	0.48
BENZO(G,H,I)PERYLENE	ND		1.4	0.48
CHRYSENE	ND		1.4	0.48
DIBENZO(A,H)ANTHRACENE	ND		1.4	0.48
FLUORANTHENE	ND		1.4	0.48
FLUORENE	1.9		1.4	0.48
INDENO(1,2,3-CD)PYRENE	ND	R	1.4	0.48
NAPHTHALENE	17		1.4	0.48
PHENANTHRENE	3.3	J	1.4	0.48
PYRENE	ND	R	1.4	0.48

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	DO	30-130

DO : Diluted out.

12/30/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 11/12/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 11/13/D9
Batch No. : 09K157	Date Extracted: 11/18/09 17:00
Sample ID: SB229MW1-4Q09-GW02	Date Analyzed: 11/23/09 14:03
Lab Samp ID: K157-06W	Dilution Factor: .94
Lab File ID: RKH389	Matrix : WATER
Ext Btch ID: SVK041W	% Moisture : NA
Calib. Ref.: RJH283	Instrument ID : T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.029	0.028	0.0094
PHENANTHRENE	ND UJ	0.028	0.0094
PYRENE	ND UJ	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	49	30-130

12/30/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/12/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/18/09 17:00
Sample ID:	SB229MW1-4Q09-GW03	Date Analyzed:	11/20/09 17:57
Lab Samp ID:	K157-07	Dilution Factor:	.94
Lab File ID:	RKH378	Matrix	: WATER
Ext Btch ID:	SVK041W	% Moisture	: NA
Calib. Ref.:	RJH283	Instrument ID	: T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.026J	0.028	0.0094
PHENANTHRENE	ND UJ	0.028	0.0094
PYRENE	ND UJ	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	62	30-130

12/30/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/13/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/18/09 17:00
Sample ID:	BSW-14-6-4Q09-GW01	Date Analyzed:	11/20/09 18:15
Lab Samp ID:	K157-08	Dilution Factor:	.94
Lab File ID:	RKH379	Matrix :	WATER
Ext Btch ID:	SVK041W	% Moisture :	NA
Calib. Ref.:	RJH283	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.035 U	0.028	0.0094
PHENANTHRENE	ND UJ	0.028	0.0094
PYRENE	ND UJ	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	44	30-130

12/30/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/13/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/18/09 17:00
Sample ID:	BSW-14-4-4009-GW01	Date Analyzed:	11/20/09 18:33
Lab Samp ID:	K157-09	Dilution Factor:	.94
Lab File ID:	RKH380	Matrix :	WATER
Ext Btch ID:	SVK041W	% Moisture :	NA
Calib. Ref.:	RJH283	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.13	0.028	0.0094
ACENAPHTHYLENE	0.052	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	0.0094J	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	0.12	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	5.8E R	0.028	0.0094
PHENANTHRENE	0.067 J	0.028	0.0094
PYRENE	ND UJ	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	64	30-130

12/30/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/13/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/18/09 17:00
Sample ID:	BSW-14-4-4Q09-GW01DL	Date Analyzed:	11/23/09 14:57
Lab Samp ID:	K157-09T	Dilution Factor:	9.4
Lab File ID:	RKH392	Matrix :	WATER
Ext Btch ID:	SVK041W	% Moisture :	NA
Calib. Ref.:	RJH283	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.16J R	0.28	0.094
ACENAPHTHYLENE	ND	0.28	0.094
ANTHRACENE	ND	0.28	0.094
BENZO(A)ANTHRACENE	ND	0.28	0.094
BENZO(A)PYRENE	ND	0.28	0.094
BENZO(B)FLUORANTHENE	ND	0.28	0.094
BENZO(K)FLUORANTHENE	ND	0.28	0.094
BENZO(G,H,I)PERYLENE	ND	0.28	0.094
CHRYSENE	ND	0.28	0.094
DIBENZO(A,H)ANTHRACENE	ND	0.28	0.094
FLUORANTHENE	ND	0.28	0.094
FLUORENE	ND	0.28	0.094
INDENO(1,2,3-CD)PYRENE	ND	0.28	0.094
NAPHTHALENE	7.0	0.28	0.094
PHENANTHRENE	ND R	0.28	0.094
PYRENE	ND	0.28	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	66	30-130

12/30/09

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/13/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/18/09 17:00
Sample ID:	BSW-14-4-4Q09-GW02	Date Analyzed:	11/23/09 14:21
Lab Samp ID:	K157-10W	Dilution Factor:	.94
Lab File ID:	RKH390	Matrix :	WATER
Ext Btch ID:	SVK041W	% Moisture :	NA
Calib. Ref.:	RJH283	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.015J	0.028	0.0094
PHENANTHRENE	ND UJ	0.028	0.0094
PYRENE	ND UJ	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	86	30-130

12/30/09

LDC #: 22162A2b

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 12/21/09

SDG #: 09K157

Page: 1 of 1

Laboratory: EMAX Laboratories, Inc.

Reviewer: JVL

2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270C-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11/12 – 13/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	% RSD (no r^2) RRF/non-spec
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25 %
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	SW	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	N	Not reviewed for Level III validation.
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D = 3, 4
XVII.	Field blanks	SW	EB = 8, 12 FB = 7

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Water

1	SB229MW2-4Q09-GW1	11	BSW-14-4-4Q09-GW01DL	21	MB/KIW	31	
2	SB229MW4-4Q09-GW1	12	BSW-14-4-4Q09-GW02	22		32	
3	SB229MW3-4Q09-GW1 P	13	SB229MW4-4Q09-GW1MS	23		33	
4	SB229MW3-4Q09-GW2 D	14	SB229MW4-4Q09-GW1MSD	24		34	
5	SB229MW1-4Q09-GW1**	15		25		35	
6	SB229MW1-4Q09-GW1DL**	16		26		36	
7	SB229MW1-4Q09-GW2	17		27		37	
8	SB229MW1-4Q09-GW3	18		28		38	
9	BSW-14-6-4Q09-GW01	19		29		39	
10	BSW-14-4-4Q09-GW01	20		30		40	

LDC #: 22162 A2b
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: JVG
2nd Reviewer: [illegible]

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation?		✓		
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				✓
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 22162A2b
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: A

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?			✓	
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds from the associated calibration standard?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?			✓	
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
XVII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TTT.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	UUU
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	VVV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

Notes: * = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

COMPNDL

LDC #: 22162A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 11/12/09
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: 1-6

Compound	FB Blank ID	EB Blk ID	Sample Identification							
	7	8	1	2	3	4	5	6		
~~Diethylphthalate~~ S	0.029	0.026	0.042/U	0.012/0.028U	0.036/U	0.016/0.028U	13	17		
Di-n-butylphthalate										
Bis(2-ethylhexyl)phthalate										
CRQL										

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 11/13/09
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 9-11

Compound	Blank ID	Sample Identification								
	12	9	10	11						
0.075 ~~Diethylphthalate~~ S	0.015	0.035/U	5.8	7.0						
Di-n-butylphthalate										
Bis(2-ethylhexyl)phthalate										
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 22163 A2b
SDG #: Sa Cm

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JVL
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

Y N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		13/14	KKK	153 (30-150)	( )	( )	2	J all +/A
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
E.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	KK.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
J.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	TT.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	ZZ.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 22162A36
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?

Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS/D 1W	44	( )	( )	31 (30)	All + Blk	J/UJ/P
			22	( )	( )	31 (↓)	↓	↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

LDC #: 22162 A2b
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		5	NN, S, NN > cal range		J acts A
		10	S > cal range		J

Comments: See sample calculation verification worksheet for recalculations

COMQUA.2S

LDC #: 22162A2b
SDG #: Cu Corr

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		5	NN, S, UU > cal range		R/A
		6	All except NN, S, UU dil		
		10	S > cal range		
		11	All except S dil		

Comments:

OVR.2S

LDC #: 22162A26
SDG #: Ley Creek

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVL
2nd reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds identified in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD
	3	4	
bD	0.013	0.012	8
NN	0.028	0.028U	200
S	0.036	0.016	77
CCC	0.028U	0.010	200
kkk		0.010	
JJJ		0.0094	

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

LDC #: 22162A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: e

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (1st std)	Recalculated RRF (1st std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	10/19/09	Phenol (1st internal standard)						
			Naphthalene (2nd internal standard) 1st IS	1.065	1.065	1.060	1.059	4.01	4.03
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
2			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.
(Lab used only one IS = Phenanthrene-d10)

LDC #: 22962A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: DVB
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	RKH 365	11/20/09	Phenol (1st internal standard)					
			Naphthalene (2nd internal standard) (1st IS)	1.060	0.957	0.957	9.7	9.7
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
2	RKH 386	11/23/09	Phenol (1st internal standard)					
			Naphthalene (2nd internal standard) (1st IS)	1.060	0.998	0.998	5.8	5.8
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 22162 A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer: A

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: # 5

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14	500	384.82	77	77	0
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 22162A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JM
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration, SA = Spike added, SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 13/14

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	0.475	0.475	0	0.331	0.297	70	70	63	63	11	11
Pentachlorophenol											
Pyrene	0.475	0.475		0.465	0.473	98	98	100	100	2	2

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 22162A2b

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: JM

2nd Reviewer: S

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA

Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC)

LCSC = Laboraotry control sample concentration

LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: LCS/D 1W

Compound	Spike Added (ug/L)		Spike Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	0.500	0.500	0.335	0.285	67	67	57	57	16	16
Pentachlorophenol										
Pyrene	0.500	0.500	0.481	0.353	96	96	71	71	31	31

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 22167A26

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1

Reviewer: SVG

2nd reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Y N N/A Were all reported results recalculated and verified for all level IV samples?

Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. # 6, 5:

Conc. = $\frac{(6179)(\cancel{325}\ 2000)(50)(1ml)(\quad)}{(32504)(1.06)(1050)(\quad)(\quad)}$

= ~~[illegible]~~ 17.08

≈ 17 ug/L

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC #22162

TPH as Diesel

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NAWS Seal Beach, UST Site 229

Collection Date: November 12 through November 13, 2009

LDC Report Date: December 31, 2009

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Diesel

Validation Level: NFESC Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 09K157

Sample Identification

SB229MW2-4Q09-GW01
SB229MW4-4Q09-GW01
SB229MW3-4Q09-GW01
SB229MW3-4Q09-GW02
SB229MW1-4Q09-GW01**
SB229MW1-4Q09-GW02
SB229MW1-4Q09-GW03
BSW-14-6-4Q09-GW01
BSW-14-4-4Q09-GW01
BSW-14-4-4Q09-GW02
SB229MW4-4Q09-GW01MS
SB229MW4-4Q09-GW01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Diesel.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent NFESC Level IV review. NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as diesel contaminants were found in the method blanks.

Samples SB229MW1-4Q09-GW03 and BSW-14-4-4Q09-GW02 were identified as equipment blanks. No total petroleum hydrocarbons as diesel contaminants were found in these blanks.

Sample SB229MW1-4Q09-GW02 was identified as a field blank. No total petroleum hydrocarbons as diesel contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags have been summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples SB229MW3-4Q09-GW01 and SB229MW3-4Q09-GW02 were identified as field duplicates. No total petroleum hydrocarbons as diesel were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/L)		RPD
	SB229MW3-4Q09-GW01	SB229MW3-4Q09-GW02	
TPH as diesel	0.23	0.24	4

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Data Qualification Summary - SDG 09K157

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Laboratory Blank Data Qualification Summary - SDG 09K157

No Sample Data Qualified in this SDG

NAWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Field Blank Data Qualification Summary - SDG 09K157

No Sample Data Qualified in this SDG

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 11/12/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 11/13/09
Batch No. : 09K157	Date Extracted: 11/17/09 14:30
Sample ID: SB229MW2-4Q09-GW01	Date Analyzed: 11/19/09 03:17
Lab Samp ID: K157-01	Dilution Factor: 0.94
Lab File ID: LK18051A	Matrix : WATER
Ext Btch ID: DSK028W	% Moisture : NA
Calib. Ref.: LK18046A	Instrument ID : GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	1.3	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	59	50-130
HEXACOSANE	97	70-140

Parameter	H-C Range
Diesel	C10-C24

12/30/09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 11/12/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 11/13/09
Batch No. : 09K157	Date Extracted: 11/17/09 14:30
Sample ID: SB229MW4-4Q09-GW01	Date Analyzed: 11/19/09 03:33
Lab Samp ID: K157-02	Dilution Factor: 0.94
Lab File ID: LK18052A	Matrix : WATER
Ext Btch ID: DSK028W	% Moisture : NA
Calib. Ref.: LK18046A	Instrument ID : GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	73	50-130
HEXACOSANE	98	70-140

Parameter	H-C Range
Diesel	C10-C24

12/30/09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 11/12/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 11/13/09
Batch No. : 09K157	Date Extracted: 11/17/09 14:30
Sample ID: SB229MW3-4Q09-GW01	Date Analyzed: 11/19/09 04:23
Lab Samp ID: K157-03	Dilution Factor: 0.94
Lab File ID: LK18055A	Matrix : WATER
Ext Btch ID: DSK028W	% Moisture : NA
Calib. Ref.: LK18046A	Instrument ID : GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	0.23J	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	63	50-130
HEXACOSANE	96	70-140

Parameter	H-C Range
Diesel	C10-C24

11/30/09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 11/12/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 11/13/09
Batch No. : 09K157	Date Extracted: 11/17/09 14:30
Sample ID: SB229MW3-4Q09-GW02	Date Analyzed: 11/19/09 04:39
Lab Samp ID: K157-04	Dilution Factor: 0.94
Lab File ID: LK18056A	Matrix : WATER
Ext Btch ID: DSK028W	% Moisture : NA
Calib. Ref.: LK18046A	Instrument ID : GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	0.24J	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	69	50-130
HEXACOSANE	97	70-140

Parameter	H-C Range
Diesel	C10-C24

12/30/09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/12/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/17/09 14:30
Sample ID:	SB229MW1-4Q09-GW01	Date Analyzed:	11/19/09 04:56
Lab Samp ID:	K157-05	Dilution Factor:	0.94
Lab File ID:	LK18057A	Matrix :	WATER ✓
Ext Btch ID:	DSK028W	% Moisture :	NA
Calib. Ref.:	LK18046A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	1.7	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	68	50-130
HEXACOSANE	98	70-140

Parameter	H-C Range
Diesel	C10-C24

12/30/09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/12/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/17/09 14:30
Sample ID:	SB229MW1-4009-GW02	Date Analyzed:	11/19/09 06:02
Lab Samp ID:	K157-06	Dilution Factor:	0.94
Lab File ID:	LK18061A	Matrix :	WATER
Ext Btch ID:	DSK028W	% Moisture :	NA
Calib. Ref.:	LK18059A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	71	50-130
HEXACOSANE	101	70-140

Parameter	H-C Range
Diesel	C10-C24

12/30/09

5010

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 11/12/09
Project : NWS SEAL BEACH UST SITE 229	Date Received: 11/13/09
Batch No. : 09K157	Date Extracted: 11/17/09 14:30
Sample ID: SB229MW1-4Q09-GW03	Date Analyzed: 11/19/09 06:19
Lab Samp ID: K157-07	Dilution Factor: 0.94
Lab File ID: LK18062A	Matrix : WATER
Ext Btch ID: DSK028W	% Moisture : NA
Calib. Ref.: LK18059A	Instrument ID : GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	67	50-130
HEXACOSANE	101	70-140

Parameter	H-C Range
Diesel	C10-C24

12/20/09

5011

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/13/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/17/09 14:30
Sample ID:	BSW-14-6-4Q09-GW01	Date Analyzed:	11/19/09 06:35
Lab Samp ID:	K157-08	Dilution Factor:	0.94
Lab File ID:	LK18063A	Matrix :	WATER
Ext Btch ID:	DSK028W	% Moisture :	NA
Calib. Ref.:	LK18059A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	71	50-130
HEXACOSANE	93	70-140

Parameter	H-C Range
Diesel	C10-C24

12/30/09

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/13/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/17/09 14:30
Sample ID:	BSW-14-4-4Q09-GW01	Date Analyzed:	11/19/09 06:52
Lab Samp ID:	K157-09	Dilution Factor:	0.94
Lab File ID:	LK18064A	Matrix :	WATER
Ext Btch ID:	DSK028W	% Moisture :	NA
Calib. Ref.:	LK18059A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	0.77	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	79	50-130
HEXACOSANE	96	70-140

Parameter	H-C Range
Diesel	C10-C24

12/20/09

5013

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	11/13/09
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	11/13/09
Batch No.	: 09K157	Date Extracted:	11/17/09 14:30
Sample ID:	BSW-14-4-4Q09-GW02	Date Analyzed:	11/19/09 07:09
Lab Samp ID:	K157-10	Dilution Factor:	0.95
Lab File ID:	LK18065A	Matrix :	WATER
Ext Btch ID:	DSK028W	% Moisture :	NA
Calib. Ref.:	LK18059A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND	0.48	0.095

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	72	50-130
HEXACOSANE	96	70-140

Parameter	H-C Range
Diesel	C10-C24

FM 20/09

LDC #: 22162A8

SDG #: 09K157

Laboratory: EMAX Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 12/23/09

Page: 1 of 1

Reviewer: JVG

2nd Reviewer: [illegible]

METHOD: GC TPH as Diesel (EPA SW 846 Method 8015B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11/12-13/09
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	CCV/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D = 3,4
X.	Field blanks	ND	EB = 7, 10 FB = 6

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Water

1	SB229MW2-4Q09-GW1	11	SB229MW4-4Q09-GW1MS	21	MBLK18W	31	
2	SB229MW4-4Q09-GW1	12	SB229MW4-4Q09-GW1MSD	22		32	
3	SB229MW3-4Q09-GW1 D	13		23		33	
4	SB229MW3-4Q09-GW2 D	14		24		34	
5	SB229MW1-4Q09-GW1**	15		25		35	
6	SB229MW1-4Q09-GW2	16		26		36	
7	SB229MW1-4Q09-GW3	17		27		37	
8	BSW-14-6-4Q09-GW01	18		28		38	
9	BSW-14-4-4Q09-GW01	19		29		39	
10	BSW-14-4-4Q09-GW02	20		30		40	

Notes:

LDC #: 22162A8
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: JVA
2nd Reviewer: [illegible]

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation?		✓		
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20%.0 or percent recoveries 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 22162A8
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JG
2nd Reviewer: h

Validation Area	Yes	No	NA	Findings/Comments
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

LDC #: 22162A6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVG
2nd reviewer: e

METHOD: ✓ GC __ HPLC

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (mg/L)		%RPD Limit NA	Qualification Parent only / All Samples
	3	4		
Diesel	0.23	0.24	4	

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

LDC #: 22162A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: SVG
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (500 std)	Recalculated CF (500 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	10/29/09	Diesel (C10-C24)	21217	21217	20618.0	20618.0	8.2	8.2
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 32162A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: JM
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC_____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	LK180327A	11/19/09	Diesel (C_{10}-C_{24})	500	521.03	521.029	4	4
2	LK180964A	11/19/09	↓	↓	526.74	526.74	5	5
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CONCLC.1S

LDC #: 22162A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #5

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Bromobenzene	HP5	100	67.541	68	68	0
Hexacosane	↓	25	24.517	98	98	↓

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 22162A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: ✓ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added

RPD =(((SSCMS - SSCMSD) * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 11 / 12

Compound	Spike Added (mg/L)		Sample Conc. (mg/L)	Spike Sample Concentration (mg/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	--	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	4.75	4.75	0	4.79	9.70	101	101	99	99	✓	✓
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 22167A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: ✓ GC __HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA
RPD = I LCS - LCSD I * 2/(LCS + LCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: LCS/D 1W

Compound	Spike Added (mg/L)		Spiked Sample Concentration (mg/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)	5.00	5.00	5.18	5.09	104	104	102 ✓	102 ✓	✓	✓
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 22162A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. #5 Compound Name Diesel

Concentration = (3666565)(10 ml) / (20618.03)(1060 ml) = 1.68

≈ 1.7 mg/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments:

SAMPCALew.wpd

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Richard Brady & Associates
3710 Ruffin Road
San Diego, CA 92123
ATTN: Mr. Jesse MacNeill

August 24, 2010

SUBJECT: NWS Seal Beach, UST Site 229, Data Validation

Dear Mr. MacNiell,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on August 9, 2010. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 23742:

SDG #	Fraction
10G213	Polynuclear Aromatic Hydrocarbons, TPH as Diesel

The data validation was performed under EPA Level III and Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

ERauto

Erlinda T. Rauto
Operations Manager/Senior Chemist

V:\LOGIN\RBA\Seal\23742COV.wpd

156 pages-EM

Attachment 1

EDD & Verification

LDC #23742 (Richard Brady & Associates / NWS Seal Beach, UST Site 229)

Project #SHAWIN.001.009.00

LDC	SDG#	DATE REC'D	(3) DATE DUE	PAHs (8270C -SIM)		TPH-D (8015)																																	
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	10G213	08/09/10	08/30/10	10	0	9	0																																
A	10G213	08/09/10	08/30/10	1	0	1	0																																
Total	T/LR			11	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

23742ST.wpd

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC #23742

Polynuclear Aromatic Hydrocarbons

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NWS Seal Beach, UST Site 229

Collection Date: July 19 through July 20, 2010

LDC Report Date: August 23, 2010

Matrix: Water

Parameters: Polynuclear Aromatic Hydrocarbons

Validation Level: NFESC Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 10G213

Sample Identification

SB229MW2-3Q10-GW01
SB229MW4-3Q10-GW01**
SB229MW4-3Q10-GW02
SB229MW3-3Q10-GW01
SB229MW1-3Q10-GW01
SB229MW1-3Q10-GW02
BSW-14-6-3Q10-GW01
BSW-14-4-3Q10-GW01
BSW-14-4-3Q10-GW01DL
BSW-14-4-3Q10-GW02
BSW-14-4-3Q10-GW03
SB229MW2-3Q10-GW01MS
SB229MW2-3Q10-GW01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 13 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per a modification of EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent a NFESC Level IV review. A NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all compounds.

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

Average relative response factors (RRF) for all compounds were within method and validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs) and 25.0% for all other compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks.

Samples SB229MW1-3Q10-GW02 and BSW-14-4-3Q10-GW03 were identified as equipment blanks. No polynuclear aromatic hydrocarbon contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
SB229MW1-3Q10-GW02	7/19/10	Naphthalene	0.011 ug/L	SB229MW2-3Q10-GW01 SB229MW4-3Q10-GW01** SB229MW4-3Q10-GW02 SB229MW3-3Q10-GW01 SB229MW1-3Q10-GW01
BSW-14-4-3Q10-GW03	7/20/10	Naphthalene	0.014 ug/L	BSW-14-6-3Q10-GW01 BSW-14-4-3Q10-GW01 BSW-14-4-3Q10-GW01DL

Sample BSW-14-4-3Q10-GW02 was identified as a field blank. No polynuclear aromatic hydrocarbon contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
BSW-14-4-3Q10-GW02	7/20/10	Naphthalene	0.015 ug/L	BSW-14-6-3Q10-GW01 BSW-14-4-3Q10-GW01 BSW-14-4-3Q10-GW01DL

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
SB229MW2-3Q10-GW01	Naphthalene	0.016 ug/L	0.028U ug/L
SB229MW4-3Q10-GW01**	Naphthalene	0.013 ug/L	0.028U ug/L

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a NFESC Level IV review was performed with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
BSW-14-4-3Q10-GW01	Naphthalene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
BSW-14-4-3Q10-GW01	Naphthalene	R	A
BSW-14-4-3Q10-GW01DL	All TCL compounds except Naphthalene	R	A

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

Samples SB229MW4-3Q10-GW01** and SB229MW4-3Q10-GW02 were identified as field duplicates. No polynuclear aromatic hydrocarbons were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	SB229MW4-3Q10-GW01**	SB229MW4-3Q10-GW02	
Naphthalene	0.013	0.028	73

NWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 10G213

SDG	Sample	Compound	Flag	A or P	Reason
10G213	BSW-14-4-3Q10-GW01	Naphthalene	J (all detects)	A	Compound quantitation and CRQLs (exceeded range)
10G213	BSW-14-4-3Q10-GW01	Naphthalene	R	A	Overall assessment of data
10G213	BSW-14-4-3Q10-GW01DL	All TCL compounds except Naphthalene	R	A	Overall assessment of data

NWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 10G213

No Sample Data Qualified in this SDG

NWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 10G213

SDG	Sample	Compound	Modified Final Concentration	A or P
10G213	SB229MW2-3Q10-GW01	Naphthalene	0.028U ug/L	A
10G213	SB229MW4-3Q10-GW01**	Naphthalene	0.028U ug/L	A

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/19/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 15:30
Sample ID:	SB229MW2-3Q10-GW01	Date Analyzed:	07/30/10 17:21
Lab Samp ID:	G213-01	Dilution Factor:	.95
Lab File ID:	RGH275	Matrix :	WATER
Ext Btch ID:	SVG035W	% Moisture :	NA
Calib. Ref.:	RFH219	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.028	0.0095
ACENAPHTHYLENE	0.023J J	0.028	0.0095
ANTHRACENE	ND U	0.028	0.0095
BENZO(A)ANTHRACENE	0.013J J	0.028	0.0095
BENZO(A)PYRENE	ND U	0.028	0.0095
BENZO(B)FLUORANTHENE	ND	0.028	0.0095
BENZO(K)FLUORANTHENE	ND	0.028	0.0095
BENZO(G,H,I)PERYLENE	ND	0.028	0.0095
CHRYSENE	ND	0.028	0.0095
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0095
FLUORANTHENE	ND	0.028	0.0095
FLUORENE	ND	0.028	0.0095
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0095
NAPHTHALENE	0.016J 0.028U	0.028	0.0095
PHENANTHRENE	ND U	0.028	0.0095
PYRENE	ND	0.028	0.0095

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	82	30-130

8/23/10

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 07/19/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 07/20/10
Batch No. : 10G213	Date Extracted: 07/26/10 15:30
Sample ID: SB229MW4-3Q10-GW01	Date Analyzed: 07/30/10 17:39
Lab Samp ID: G213-02	Dilution Factor: .95
Lab File ID: RGH276	Matrix : WATER
Ext Btch ID: SVG035W	% Moisture : NA
Calib. Ref.: RFH219	Instrument ID : T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND	0.028	0.0095
ACENAPHTHYLENE	ND	0.028	0.0095
ANTHRACENE	ND	0.028	0.0095
BENZO(A)ANTHRACENE	ND	0.028	0.0095
BENZO(A)PYRENE	ND	0.028	0.0095
BENZO(B)FLUORANTHENE	ND	0.028	0.0095
BENZO(K)FLUORANTHENE	ND	0.028	0.0095
BENZO(G,H,I)PERYLENE	ND	0.028	0.0095
CHRYSENE	ND	0.028	0.0095
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0095
FLUORANTHENE	ND	0.028	0.0095
FLUORENE	ND	0.028	0.0095
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0095
NAPHTHALENE	0.013J 0.028 U	0.028	0.0095
PHENANTHRENE	ND	0.028	0.0095
PYRENE	ND	0.028	0.0095

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	60	30-130

8/23/10

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/19/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 15:30
Sample ID:	SB229MW4-3Q10-GW02	Date Analyzed:	07/30/10 17:58
Lab Samp ID:	G213-03	Dilution Factor:	.94
Lab File ID:	RGH277	Matrix :	WATER
Ext Btch ID:	SVG035W	% Moisture :	NA
Calib. Ref.:	RFH219	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	ND	0.028	0.0094
PHENANTHRENE	ND	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	67	30-130

8/03/10

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/19/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 15:30
Sample ID:	SB229MW3-3Q10-GW01	Date Analyzed:	07/30/10 18:16
Lab Samp ID:	G213-04	Dilution Factor:	.94
Lab File ID:	RGH278	Matrix :	WATER
Ext Btch ID:	SVG035W	% Moisture :	NA
Calib. Ref.:	RFH219	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	ND	0.028	0.0094
PHENANTHRENE	ND	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	77	30-130

8/03/10

3010

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/19/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 15:30
Sample ID:	SB229MW1-3Q10-GW01	Date Analyzed:	07/30/10 18:35
Lab Samp ID:	G213-05	Dilution Factor:	.94
Lab File ID:	RGH279	Matrix :	WATER
Ext Btch ID:	SVG035W	% Moisture :	NA
Calib. Ref.:	RFH219	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.37	0.028	0.0094
ACENAPHTHYLENE	ND U	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	0.49	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND U	0.028	0.0094
NAPHTHALENE	0.13	0.028	0.0094
PHENANTHRENE	ND U	0.028	0.0094
PYRENE	0.018J J	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	72	30-130

8/23/10

3011

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/19/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 15:30
Sample ID:	S8229MW1-3Q10-GW02	Date Analyzed:	07/30/10 18:53
Lab Samp ID:	G213-06	Dilution Factor:	.94
Lab File ID:	RGH280	Matrix :	WATER
Ext Btch ID:	SVG035W	% Moisture :	NA
Calib. Ref.:	RFH219	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.011J J	0.028	0.0094
PHENANTHRENE	ND U	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	70	30-130

8/23/10

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/20/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 15:30
Sample ID:	BSW-14-6-3Q10-GW01	Date Analyzed:	07/30/10 19:12
Lab Samp ID:	G213-07	Dilution Factor:	.94
Lab File ID:	RGH281	Matrix :	WATER
Ext Btch ID:	SVG035W	% Moisture :	NA
Calib. Ref.:	RFH219	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	ND	0.028	0.0094
PHENANTHRENE	ND	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	48	30-130

8/13/10

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/20/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 15:30
Sample ID:	BSW-14-4-3Q10-GW01	Date Analyzed:	07/30/10 19:30
Lab Samp ID:	G213-08	Dilution Factor:	.94
Lab File ID:	RGH282	Matrix :	WATER
Ext Btch ID:	SVG035W	% Moisture :	NA
Calib. Ref.:	RFH219	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)		RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.064		0.028	0.0094
ACENAPHTHYLENE	0.025J	J	0.028	0.0094
ANTHRACENE	ND	U	0.028	0.0094
BENZO(A)ANTHRACENE	ND		0.028	0.0094
BENZO(A)PYRENE	ND		0.028	0.0094
BENZO(B)FLUORANTHENE	ND		0.028	0.0094
BENZO(K)FLUORANTHENE	ND		0.028	0.0094
BENZO(G,H,I)PERYLENE	ND		0.028	0.0094
CHRYSENE	ND		0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND		0.028	0.0094
FLUORANTHENE	ND		0.028	0.0094
FLUORENE	0.064		0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	U	0.028	0.0094
NAPHTHALENE	2.3E	R	0.028	0.0094
PHENANTHRENE	0.016J	J	0.028	0.0094
PYRENE	ND	U	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	47	30-130

8/03/10

3014

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/20/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 15:30
Sample ID:	BSW-14-4-3Q10-GW01DL	Date Analyzed:	08/02/10 16:39
Lab Samp ID:	G213-08T	Dilution Factor:	4.7
Lab File ID:	RHH017	Matrix :	WATER
Ext Btch ID:	SVG035W	% Moisture :	NA
Calib. Ref.:	RFH219	Instrument ID :	T-0E7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.067J R	0.14	0.047
ACENAPHTHYLENE	ND	0.14	0.047
ANTHRACENE	ND	0.14	0.047
BENZO(A)ANTHRACENE	ND	0.14	0.047
BENZO(A)PYRENE	ND	0.14	0.047
BENZO(B)FLUORANTHENE	ND	0.14	0.047
BENZO(K)FLUORANTHENE	ND	0.14	0.047
BENZO(G,H,I)PERYLENE	ND	0.14	0.047
CHRYSENE	ND	0.14	0.047
DIBENZO(A,H)ANTHRACENE	ND	0.14	0.047
FLUORANTHENE	ND	0.14	0.047
FLUORENE	0.058J	0.14	0.047
INDENO(1,2,3-CD)PYRENE	ND	0.14	0.047
NAPHTHALENE	2.6	0.14	0.047
PHENANTHRENE	ND R	0.14	0.047
PYRENE	ND	0.14	0.047

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	48	30-130

8/3/10

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 07/20/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 07/20/10
Batch No. : 10G213	Date Extracted: 07/26/10 15:30
Sample ID: BSW-14-4-3Q10-GW02	Date Analyzed: 07/30/10 19:49
Lab Samp ID: G213-09	Dilution Factor: .94
Lab File ID: RGH283	Matrix : WATER
Ext Btch ID: SVG035W	% Moisture : NA
Calib. Ref.: RFH219	Instrument ID : T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.015J J	0.028	0.0094
PHENANTHRENE	ND U	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	79	30-130

8/03/10

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 07/20/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 07/20/10
Batch No. : 10G213	Date Extracted: 07/26/10 15:30
Sample ID: BSW-14-4-3Q10-GW03	Date Analyzed: 07/30/10 20:07
Lab Samp ID: G213-10	Dilution Factor: .94
Lab File ID: RGH284	Matrix : WATER
Ext Btch ID: SVG035W	% Moisture : NA
Calib. Ref.: RFH219	Instrument ID : T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.014J J	0.028	0.0094
PHENANTHRENE	ND U	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
TERPHENYL-D14	77	30-130

8/23/10

LDC #: 23742A2b
SDG #: 10G213
Laboratory: EMAX Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 8/20/10
Page: 1 of 1
Reviewer: JVL
2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270C-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/19 - 20/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	% RSD ≤ 30% r
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII	Compound quantitation/CRQLs	A	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	N	Not reviewed for Level III validation.
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D = 2, 3
XVII.	Field blanks	SW	EB = 6, 11 FB = 10

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

water

+ 1	SB229MW2-3Q10-GW01	+ 11	BSW-14-4-3Q10-GW03	21	MB blk/W	31	
+ 2	SB229MW4-3Q10-GW01** D	12	SB229MW2-3Q10-GW01MS	22		32	
- 3	SB229MW4-3Q10-GW02 D	13	SB229MW2-3Q10-GW01MSD	23		33	
- 4	SB229MW3-3Q10-GW01	14		24		34	
+ 5	SB229MW1-3Q10-GW01	15		25		35	
+ 6	SB229MW1-3Q10-GW02	16		26		36	
- 7	BSW-14-6-3Q10-GW01	17		27		37	
+ 8	BSW-14-4-3Q10-GW01	18		28		38	
+ 9	BSW-14-4-3Q10-GW01DL	19		29		39	
+ 10	BSW-14-4-3Q10-GW02	20		30		40	

LDC #: 23742 A26
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: JVG
2nd Reviewer: g

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation?	✓			
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?		✓		

LDC #: 23 7fr A 26
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: 26
2nd Reviewer: g

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds from the associated calibration standard?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		✓		
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
XVII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			

LDC #: 23742A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 7/19/10
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1-5

Compound	Blank ID	Sample Identification								
	6	1	2	5						
5x 0.055 ~~Diethylphthalate~~ S	0.011	0.016 / 0.028U	0.013 / 0.028U	0.13						
Di-n-butylphthalate										
Bis(2-ethylhexyl)phthalate										
CRQL										

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 7/20/10
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 7-9

Compound	FB Blank ID	EB	Sample Identification							
	10	11	8	9						
5x 0.075 ~~Diethylphthalate~~ S	0.015	0.014	2.3	2.6						
Di-n-butylphthalate										
Bis(2-ethylhexyl)phthalate										
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 23742 A2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: MB
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		8	S > Cal range		J dets /A

Comments: See sample calculation verification worksheet for recalculations

LDC #: 23747 A26
SDG #: Sa Gm

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: JVb
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		8	S > cal range		R /A
					↓
		9	All except S dil		↓

Comments:

OVR.2S

LDC #: 23747 A2b

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVC
2nd reviewer: 4

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds identified in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD
	2	3	
S	0.013	0.028	73

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

LDC #: 27767 A2b

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS PAH (EPA SW 846 Method 8270C SIM)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of Compound
C_x = Concentration of compound
S= Standard deviation of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 100 std)	Recalculated RRF (RRF1050 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	6/17/2010	Naphthalene (IS1)	1.473	1.473	1.356	1.356	8.65	8.65
2	E7								
3									
4									
5									
6									

Conc IS/Cpd	Response cpd	Response IS
2000/100	5925	80436

Lab used only 1 IS = Phenanthrene d-10

Conc	Naphthalene
20	1.443
40	1.441
80	1.352
100	1.473
500	1.214
1000	1.214
X =	1.356
S =	0.1173

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23747A7h

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS PAH (EPA SW 846 Method 8270C SIM)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound,
Cx = Concentration of compound,
Ais = Area of associated internal standard
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference IS)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported % D	Recalculated % D
1	RGH265	7/30/2010	Naphthalene (IS1)	1.356	1.430	1.430	5.5	5.45
2	E7							
3								
4								
5								
6								

Compound (Reference IS)	Conc Is/Cpd	Area Cpd	Area IS
Naphthalene (IS1)	2000/500	29633	82895

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23 7fr A 2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: JM
2nd reviewer: 9

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: # 7

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	1				
2-Fluorobiphenyl					
Terphenyl-d14	500	301.27	60	60	0
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 23747 A26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA

Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC)

MSC = Matrix spike concentration; MSDC = Matrix spike duplicate concentration

MS/MSD samples: 12/13

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	0.470	0.470	0	0.236	0.283	50	50	60	60	18	18
Pentachlorophenol											
Pyrene	0.470	0.470	↓	0.320	0.354	68	68	75	75	10	10

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 0037r Arb
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: JVL
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA

Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC)

LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: LCS/D 1W

Compound	Spike Added (ug/L)		Spike Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	0.500	0.500	0.346	0.312	69	69	62	62	10	10
Pentachlorophenol										
Pyrene	0.500	0.500	0.321	0.313	64	64	63	63	3	3

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23 7fr A 2h
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JM
2nd reviewer: 9

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$$\text{Concentration} = \frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. #2, S:

Conc. = (708)(2000)(1 ml)( )( )( ) / (12196)(1.356)(1050 ml)( )( )

= 0.0128

≈ 0.013 ug/L

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC #23742

TPH as Diesel

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NWS Seal Beach, UST Site 229

Collection Date: July 19 through July 20, 2010

LDC Report Date: August 23, 2010

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Diesel

Validation Level: NFESC Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 10G213

Sample Identification

SB229MW2-3Q10-GW01
SB229MW4-3Q10-GW01**
SB229MW4-3Q10-GW02
SB229MW3-3Q10-GW01
SB229MW1-3Q10-GW01
SB229MW1-3Q10-GW02
BSW-14-6-3Q10-GW01
BSW-14-4-3Q10-GW01
BSW-14-4-3Q10-GW02
BSW-14-4-3Q10-GW03
SB229MW2-3Q10-GW01MS
SB229MW2-3Q10-GW01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Diesel.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent NFESC Level IV review. NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as diesel contaminants were found in the method blanks.

Samples SB229MW1-3Q10-GW02 and BSW-14-4-3Q10-GW03 were identified as equipment blanks. No total petroleum hydrocarbons as diesel contaminants were found in these blanks.

Sample BSW-14-4-3Q10-GW02 was identified as a field blank. No total petroleum hydrocarbons as diesel contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags have been summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples SB229MW4-3Q10-GW01** and SB229MW4-3Q10-GW02 were identified as field duplicates. No total petroleum hydrocarbons as diesel were detected in any of the samples.

NWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Data Qualification Summary - SDG 10G213

No Sample Data Qualified in this SDG

NWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Laboratory Blank Data Qualification Summary - SDG 10G213

No Sample Data Qualified in this SDG

NWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Field Blank Data Qualification Summary - SDG 10G213

No Sample Data Qualified in this SDG

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/19/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 12:30
Sample ID:	SB229MW2-3Q10-GW01	Date Analyzed:	07/27/10 21:37
Lab Samp ID:	G213-01	Dilution Factor:	.94
Lab File ID:	LG27024A	Matrix :	WATER
Ext Btch ID:	DSG045W	% Moisture :	NA
Calib. Ref.:	LG27015A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	1.9	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	74	50-130
HEXACOSANE	114	70-140

Parameter	H-C Range
Diesel	C10-C24

8/03/10

5004

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/19/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 12:30
Sample ID:	SB229MW4-3Q10-GW01	Date Analyzed:	07/27/10 19:58
Lab Samp ID:	G213-02	Dilution Factor:	.94
Lab File ID:	LG27018A	Matrix :	WATER
Ext Btch ID:	DSG045W	% Moisture :	NA
Calib. Ref.:	LG27015A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	61	50-130
HEXACOSANE	97	70-140

Parameter	H-C Range
Diesel	C10-C24

8/03/10

5005

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/19/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 12:30
Sample ID:	SB229MW4-3Q10-GW02	Date Analyzed:	07/27/10 20:15
Lab Samp ID:	G213-03	Dilution Factor:	.95
Lab File ID:	LG27019A	Matrix :	WATER
Ext Btch ID:	DSG045W	% Moisture :	NA
Calib. Ref.:	LG27015A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.48	0.095

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	71	50-130
HEXACOSANE	95	70-140

Parameter	H-C Range
Diesel	C10-C24

8/23/10

5007

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/19/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 12:30
Sample ID:	SB229MW3-3Q10-GW01	Date Analyzed:	07/27/10 20:31
Lab Samp ID:	G213-04	Dilution Factor:	.94
Lab File ID:	LG27020A	Matrix	: WATER
Ext Btch ID:	DSG045W	% Moisture	: NA
Calib. Ref.:	LG27015A	Instrument ID	: GCT105

PARAMETERS	RESULTS (mg/L)		RL (mg/L)	MDL (mg/L)
DIESEL	0.42J	J	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	65	50-130
HEXACOSANE	91	70-140

Parameter	H-C Range
Diesel	C10-C24

8/03/10

5008

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/19/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 12:30
Sample ID:	SB229MW1-3Q10-GW01	Date Analyzed:	07/27/10 20:48
Lab Samp ID:	G213-05	Dilution Factor:	.94
Lab File ID:	LG27021A	Matrix :	WATER
Ext Btch ID:	DSG045W	% Moisture :	NA
Calib. Ref.:	LG27015A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	1.9	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	68	50-130
HEXACOSANE	98	70-140

Parameter	H-C Range
Diesel	C10-C24

8/23/10

5009

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 07/19/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 07/20/10
Batch No. : 10G213	Date Extracted: 07/26/10 12:30
Sample ID: SB229MW1-3Q10-GW02	Date Analyzed: 07/27/10 21:04
Lab Samp ID: G213-06	Dilution Factor: .94
Lab File ID: LG27022A	Matrix : WATER
Ext Btch ID: DSG045W	% Moisture : NA
Calib. Ref.: LG27015A	Instrument ID : GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	70	50-130
HEXACOSANE	94	70-140

Parameter	H-C Range
Diesel	C10-C24

8/03/10

5010

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/20/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 12:30
Sample ID:	BSW-14-6-3Q10-GW01	Date Analyzed:	07/27/10 21:21
Lab Samp ID:	G213-07	Dilution Factor:	.94
Lab File ID:	LG27023A	Matrix :	WATER
Ext Btch ID:	DSG045W	% Moisture :	NA
Calib. Ref.:	LG27015A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	73	50-130
HEXACOSANE	97	70-140

Parameter	H-C Range
Diesel	C10-C24

8/03/10

5011

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/20/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 12:30
Sample ID:	BSW-14-4-3Q10-GW01	Date Analyzed:	07/27/10 23:17
Lab Samp ID:	G213-08	Dilution Factor:	.94
Lab File ID:	LG27030A	Matrix :	WATER
Ext Btch ID:	DSG045W	% Moisture :	NA
Calib. Ref.:	LG27028A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	0.34J J	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	68	50-130
HEXACOSANE	96	70-140

Parameter	H-C Range
Diesel	C10-C24

8/03/10

5012

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	07/20/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	07/20/10
Batch No.	: 10G213	Date Extracted:	07/26/10 12:30
Sample ID:	BSW-14-4-3Q10-GW02	Date Analyzed:	07/27/10 23:33
Lab Samp ID:	G213-09	Dilution Factor:	.94
Lab File ID:	LG27031A	Matrix :	WATER
Ext Btch ID:	DSG045W	% Moisture :	NA
Calib. Ref.:	LG27028A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.47	0.094

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	71	50-130
HEXACOSANE	94	70-140

Parameter	H-C Range
Diesel	C10-C24

8/03/10

5013

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 07/20/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 07/20/10
Batch No. : 10G213	Date Extracted: 07/26/10 12:30
Sample ID: BSW-14-4-3Q10-GW03	Date Analyzed: 07/27/10 23:50
Lab Samp ID: G213-10	Dilution Factor: .95
Lab File ID: LG27032A	Matrix : WATER
Ext Btch ID: DSG045W	% Moisture : NA
Calib. Ref.: LG27028A	Instrument ID : GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.48	0.095

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
BROMOBENZENE	68	50-130
HEXACOSANE	94	70-140

Parameter	H-C Range
Diesel	C10-C24

8/03/10

5014

LDC #: 23742A8
SDG #: 10G213
Laboratory: EMAX Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 8/20/10
Page: 1 of 1
Reviewer: JG
2nd Reviewer: [illegible]

METHOD: GC TPH as Diesel (EPA SW 846 Method 8015B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/19 - 20/10
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	CW/IW ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D = 2, 3
X.	Field blanks	ND	EB = 6, 10 FB = 9

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Water

+ 1	SB229MW2-3Q10-GW01	11	SB229MW2-3Q10-GW01MS	− 21	MBLK1W	31	
− 2	SB229MW4-3Q10-GW01** D	12	SB229MW2-3Q10-GW01MSD	22		32	
− 3	SB229MW4-3Q10-GW02 D	13		23		33	
+ 4	SB229MW3-3Q10-GW01	14		24		34	
+ 5	SB229MW1-3Q10-GW01	15		25		35	
− 6	SB229MW1-3Q10-GW02	16		26		36	
− 7	BSW-14-6-3Q10-GW01	17		27		37	
+ 8	BSW-14-4-3Q10-GW01	18		28		38	
− 9	BSW-14-4-3Q10-GW02	19		29		39	
− 10	BSW-14-4-3Q10-GW03	20		30		40	

Notes:

LDC #: 23747 A8

VALIDATION FINDINGS CHECKLIST

Reviewer: JVC
2nd Reviewer: [illegible]

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) < 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	N	✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ____ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) < 20%.0 or percent recoveries 80-120%?	✓			
Were all the retention times within the acceptance windows?		✓		
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				

LDC #: 23742A8

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.		✓		
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

LDC #: 23742 A8

VALIDATION FINDINGS WORKSHEET

Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: ✓

METHOD: GC ✓ HPLC _____

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where:
A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound (Internal Standard)	Reported CF (500 std)	Recalculated CF (500 std)	Reported Average CF (Initial)	Recalculated Average CF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	7/17/2010	DRO (C10-C24)	26113.0	26113	25082.3	25082.3	7.5	7.5
	GCT105								

Conc	Area
500	13056294

Conc	DRO
5	25961
10	28056
50	24862
100	24253
500	26113
1500	24272
3000	22059
X =	25082
S =	1880.184

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC # 23742A8

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: ✓

METHOD: GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Percent difference (%D) = 100 * (N - C)/N

Where: N = Initial Calibration Factor or Nominal Amount
C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

#	Standard ID	Calibration Date	Compound	CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
1	LG27002a	7/27/2010	DRO (C10-C24)	500	543.31	543.31	9	8.7
2	LG27015a	7/27/2010	DRO (C10-C24)	500	498.13	498.13	0	0.4
3								

	CCV1		CCV2			
Compound	Area	CF	Area	CF		
DRO	13627393	25082.3	12494266	25082.3		

LDC #: 23742 A8
SDG #: See Cover

METHOD: ✓ GC __ HPLC

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: DVG
2nd reviewer: 9

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #7

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Bromobenzene	HP5	100	61.44	61	61	0
Hexacosane	↓	25	24.206	97	97	↓

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

LDC #: 23742A8

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: JG
2nd Reviewer: R

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

RPD =(((SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100

Where SSC = Spiked sample concentration; SC = Sample concentration; SA = Spike added; MS = Matrix spike; MSD = Matrix spike duplicate

MS/MSD samples: 11/12

Compound	Spike Added (mg/L)		Sample Conc. (mg/L)	Spike Sample Concentration (mg/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	4.70	4.70	1.95	6.01	6.10	87	87	89	89	✓	1.5
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23742A1

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: JVG
2nd Reviewer: R

METHOD: ✓ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration; SA = Spike added; LCS = Laboratory Control Sample; SC = Sample concentration; LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: LCS/D 1W

Compound	Spike Added (mg/L)		Spike Sample Concentration (mg/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)	5.00	5.00	4.93	4.85	99	99	97	97	2	2
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 23742 A1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: / **GC** __ **HPLC**

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID._____ Compound Name MD

Concentration =_____

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALCnew.wpd

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

Richard Brady & Associates
3710 Ruffin Road
San Diego, CA 92123
ATTN: Mr. Jesse MacNeill

January 14, 2011

SUBJECT: NWS Seal Beach, UST Site 229, Data Validation

Dear Mr. MacNiell,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on January 5, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 24676:

SDG #	**Fraction**
10L141	Polynuclear Aromatic Hydrocarbons, TPH as Diesel

The data validation was performed under EPA Level III and Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

V:\LOGIN\RBA\Seal\24676COV.wpd

165 pages-EM

Attachment 1

EDD & Verification

LDC #24676 (Richard Brady & Associates / NWS Seal Beach, UST Site 229)

Project #SHAWIN.001.009.01

LDC	SDG#	DATE REC'D	(3) DATE DUE	PAHs (8270C -SIM)		TPH-D (8015)																																	
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	10L141	01/05/11	01/26/11	12	0	9	0																																
A	10L141	01/05/11	01/26/11	1	0	1	0																																
Total	T/LR			13	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

24676ST.wpd

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC #24676

Polynuclear Aromatic Hydrocarbons

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	NWS Seal Beach, UST Site 229
Collection Date:	December 8 through December 9, 2010
LDC Report Date:	January 12, 2011
Matrix:	Water
Parameters:	Polynuclear Aromatic Hydrocarbons
Validation Level:	NFESC Level III & IV
Laboratory:	EMAX Laboratories, Inc.
Sample Delivery Group (SDG):	10L141

Sample Identification

SB229MW2-4Q10-GW01
SB229MW1-4Q10-GW01
SB229MW1-4Q10-GW01DL
SB229MW4-4Q10-GW01**
SB229MW4-4Q10-GW02
SB229MW4-4Q10-GW03
SB229MW3-4Q10-GW01
BSW-14-6-4Q10-GW01
BSW-14-6-4Q10-GW02
BSW-14-4-4Q10-GW01
BSW-14-4-4Q10-GW01DL
BSW-14-4-4Q10-GW02
BSW-14-4-4Q10-GW02DL
SB229MW2-4Q10-GW01MS
SB229MW2-4Q10-GW01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per a modification of EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a NFESC Level IV review. A NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all compounds.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs) and 25.0% for all other compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks.

Samples SB229MW4-4Q10-GW02 and BSW-14-6-4Q10-GW02 were identified as equipment blanks. No polynuclear aromatic hydrocarbon contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
SB229MW4-4Q10-GW02	12/8/10	Naphthalene	0.034 ug/L	SB229MW2-4Q10-GW01 SB229MW1-4Q10-GW01 SB229MW1-4Q10-GW01DL SB229MW4-4Q10-GW01**
BSW-14-6-4Q10-GW02	12/9/10	Naphthalene	0.017 ug/L	SB229MW3-4Q10-GW01 BSW-14-6-4Q10-GW01 BSW-14-4-4Q10-GW01 BSW-14-4-4Q10-GW01DL BSW-14-4-4Q10-GW02 BSW-14-4-4Q10-GW02DL

Sample SB229MW4-4Q10-GW03 was identified as a field blank. No polynuclear aromatic hydrocarbon contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
SB229MW4-4Q10-GW03	12/8/10	Naphthalene	0.017 ug/L	SB229MW2-4Q10-GW01 SB229MW1-4Q10-GW01 SB229MW1-4Q10-GW01DL SB229MW4-4Q10-GW01**

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
SB229MW2-4Q10-GW01	Naphthalene	0.029 ug/L	0.029U ug/L
SB229MW4-4Q10-GW01**	Naphthalene	0.087 ug/L	0.087U ug/L
SB229MW3-4Q10-GW01	Naphthalene	0.011 ug/L	0.028U ug/L
BSW-14-6-4Q10-GW01	Naphthalene	0.061 ug/L	0.061U ug/L

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for samples BSW-14-4-4Q10-GW01DL and BSW-14-4-4Q10-GW02. Since the samples were diluted out, no data were qualified.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SB229MW2-4Q10-GW01MS/MSD (SB229MW2-4Q10-GW01)	Benzo(a)anthracene	162 (30-150)	164 (30-150)	-	J (all detects)	A
	Benzo(a)pyrene	167 (30-150)	180 (30-150)	-	J (all detects)	
	Benzo(b)fluoranthene	-	164 (30-150)	-	J (all detects)	
	Benzo(k)fluoranthene	185 (30-150)	185 (30-150)	-	J (all detects)	
	Dibenzo(a,h)anthracene	-	168 (30-150)	-	J (all detects)	
	Indeno(1,2,3-cd)pyrene	-	159 (30-150)	-	J (all detects)	

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a NFESC Level IV review was performed with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
SB229MW1-4Q10-GW01	Fluorene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A
BSW-14-4-4Q10-GW01	Naphthalene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Sample	Compound	Finding	Criteria	Flag	A or P
BSW-14-4-4Q10-GW02	Naphthalene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
SB229MW1-4Q10-GW01	Fluorene	R	A
SB229MW1-4Q10-GW01DL	All TCL compounds except Fluorene	R	A
BSW-14-4-4Q10-GW01 BSW-14-4-4Q10-GW02	Naphthalene	R	A
BSW-14-4-4Q10-GW01DL BSW-14-4-4Q10-GW02DL	All TCL compounds except Naphthalene	R	A

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

Samples BSW-14-4-4Q10-GW01 and BSW-14-4-4Q10-GW02 and samples BSW-14-4-4Q10-GW01DL and BSW-14-4-4Q10-GW02DL were identified as field duplicates. No polynuclear aromatic hydrocarbons were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	BSW-14-4-4Q10-GW01	BSW-14-4-4Q10-GW02	
Acenaphthene	0.16	0.13	21
Acenaphthylene	0.060	0.045	29
Benzo(a)anthracene	0.011	0.028U	200
Fluorene	0.17	0.13	27
Naphthalene	24	17	34
Phenanthrene	0.11	0.087	23
Pyrene	0.010	0.028U	200

Compound	Concentration (ug/L)		RPD
	BSW-14-4-4Q10-GW01DL	BSW-14-4-4Q10-GW02DL	
Naphthalene	30	22	31

NWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 10L141

SDG	Sample	Compound	Flag	A or P	Reason
10L141	SB229MW2-4Q10-GW01	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)
10L141	SB229MW1-4Q10-GW01	Fluorene	J (all detects)	A	Compound quantitation and CRQLs (exceeded range)
10L141	BSW-14-4-4Q10-GW01 BSW-14-4-4Q10-GW02	Naphthalene	J (all detects)	A	Compound quantitation and CRQLs (exceeded range)
10L141	SB229MW1-4Q10-GW01	Fluorene	R	A	Overall assessment of data
10L141	SB229MW1-4Q10-GW01DL	All TCL compounds except Fluorene	R	A	Overall assessment of data
10L141	BSW-14-4-4Q10-GW01 BSW-14-4-4Q10-GW02	Naphthalene	R	A	Overall assessment of data
10L141	BSW-14-4-4Q10-GW01DL BSW-14-4-4Q10-GW02DL	All TCL compounds except Naphthalene	R	A	Overall assessment of data

NWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 10L141

No Sample Data Qualified in this SDG

NWS Seal Beach, UST Site 229
Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 10L141

SDG	Sample	Compound	Modified Final Concentration	A or P
10L141	SB229MW2-4Q10-GW01	Naphthalene	0.029U ug/L	A
10L141	SB229MW4-4Q10-GW01**	Naphthalene	0.087U ug/L	A

SDG	Sample	Compound	Modified Final Concentration	A or P
10L141	SB229MW3-4Q10-GW01	Naphthalene	0.028U ug/L	A
10L141	BSW-14-6-4Q10-GW01	Naphthalene	0.061U ug/L	A

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 12/08/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 12/09/10
Batch No. : 10L141	Date Extracted: 12/13/10 10:15
Sample ID: SB229MW2-4Q10-GW01	Date Analyzed: 12/14/10 18:38
Lab Samp ID: L141-01	Dilution Factor: .94
Lab File ID: RLH038	Matrix : WATER
Ext Btch ID: SVL012W	% Moisture : NA
Calib. Ref.: RKH032	Instrument ID : T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.029 U	0.028	0.0094
PHENANTHRENE	ND U	0.028	0.0094
PYRENE	0.014J J	0.028	0.0094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TERPHENYL-D14	0.497	0.470	106	30-130

Pg 17-11

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	12/08/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	12/09/10
Batch No.	: 10L141	Date Extracted:	12/13/10 10:15
Sample ID:	SB229MW1-4Q10-GW01	Date Analyzed:	12/14/10 18:57
Lab Samp ID:	L141-02	Dilution Factor:	.94
Lab File ID:	RLH039	Matrix	: WATER
Ext Btch ID:	SVL012W	% Moisture	: NA
Calib. Ref.:	RKH032	Instrument ID	: T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.44	0.028	0.0094
ACENAPHTHYLENE	0.21	0.028	0.0094
ANTHRACENE	0.059	0.028	0.0094
BENZO(A)ANTHRACENE	ND U	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	0.96E R	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND U	0.028	0.0094
NAPHTHALENE	0.44	0.028	0.0094
PHENANTHRENE	0.11	0.028	0.0094
PYRENE	0.029	0.028	0.0094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TERPHENYL-D14	0.472	0.470	100	30-130

fg 1-17-11

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 12/08/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 12/09/10
Batch No. : 10L141	Date Extracted: 12/13/10 10:15
Sample ID: SB229MW1-4Q10-GW01DL	Date Analyzed: 12/15/10 17:08
Lab Samp ID: L141-02T	Dilution Factor: 4.7
Lab File ID: RLH055	Matrix : WATER
Ext Btch ID: SVL012W	% Moisture : NA
Calib. Ref.: RKH032	Instrument ID : T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.46 R	0.14	0.047
ACENAPHTHYLENE	0.23	0.14	0.047
ANTHRACENE	0.059J	0.14	0.047
BENZO(A)ANTHRACENE	ND	0.14	0.047
BENZO(A)PYRENE	ND	0.14	0.047
BENZO(B)FLUORANTHENE	ND	0.14	0.047
BENZO(K)FLUORANTHENE	ND	0.14	0.047
BENZO(G,H,I)PERYLENE	ND	0.14	0.047
CHRYSENE	ND	0.14	0.047
DIBENZO(A,H)ANTHRACENE	ND	0.14	0.047
FLUORANTHENE	ND	0.14	0.047
FLUORENE	1.0	0.14	0.047
INDENO(1,2,3-CD)PYRENE	ND R	0.14	0.047
NAPHTHALENE	0.51	0.14	0.047
PHENANTHRENE	0.11J	0.14	0.047
PYRENE	ND	0.14	0.047

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TERPHENYL-D14	0.445	0.470	94.7	30-130

fy 1-17-11

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 12/08/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 12/09/10
Batch No. : 10L141	Date Extracted: 12/13/10 10:15
Sample ID: SB229MW4-4Q10-GW01	Date Analyzed: 12/14/10 19:15
Lab Samp ID: L141-03	Dilution Factor: .94
Lab File ID: RLH040	Matrix : WATER
Ext Btch ID: SVL012W	% Moisture : NA
Calib. Ref.: RKH032	Instrument ID : T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.087 U	0.028	0.0094
PHENANTHRENE	ND U	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TERPHENYL-D14	0.487	0.470	104	30-130

1-17-11

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	12/08/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	12/09/10
Batch No.	: 10L141	Date Extracted:	12/13/10 10:15
Sample ID:	SB229MW4-4Q10-GW02	Date Analyzed:	12/14/10 19:34
Lab Samp ID:	L141-04	Dilution Factor:	.94
Lab File ID:	RLH041	Matrix	: WATER
Ext Btch ID:	SVL012W	% Moisture	: NA
Calib. Ref.:	RKH032	Instrument ID	: T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.034	0.028	0.0094
PHENANTHRENE	ND U	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TERPHENYL-D14	0.460	0.470	97.9	30-130

1-17-11

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	12/08/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	12/09/10
Batch No.	: 10L141	Date Extracted:	12/13/10 10:15
Sample ID:	SB229MW4-4Q10-GW03	Date Analyzed:	12/14/10 19:52
Lab Samp ID:	L141-05	Dilution Factor:	.94
Lab File ID:	RLH042	Matrix :	WATER
Ext Btch ID:	SVL012W	% Moisture :	NA
Calib. Ref.:	RKH032	Instrument ID :	T-0E7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND U	0.028	0.0094
NAPHTHALENE	0.017J J	0.028	0.0094
PHENANTHRENE	ND U	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TERPHENYL-D14	0.575	0.470	122	30-130

BJ 1-17-11

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 12/09/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 12/09/10
Batch No. : 10L141	Date Extracted: 12/13/10 10:15
Sample ID: S8229MW3-4Q10-GW01	Date Analyzed: 12/15/10 16:50
Lab Samp ID: L141-06W	Dilution Factor: .94
Lab File ID: RLH054	Matrix : WATER
Ext Btch ID: SVL012W	% Moisture : NA
Calib. Ref.: RKH032	Instrument ID : T-0E7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.011J 0.028U	0.028	0.0094
PHENANTHRENE	ND U	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TERPHENYL-D14	0.537	0.470	114	30-130

KJ 1-17-11

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 12/09/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 12/09/10
Batch No. : 10L141	Date Extracted: 12/13/10 10:15
Sample ID: BSW-14-6-4Q10-GW01	Date Analyzed: 12/14/10 20:30
Lab Samp ID: L141-07	Dilution Factor: .94
Lab File ID: RLH044	Matrix : WATER
Ext Btch ID: SVL012W	% Moisture : NA
Calib. Ref.: RKH032	Instrument ID : T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.061 U	0.028	0.0094
PHENANTHRENE	ND U	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TERPHENYL-D14	0.453	0.470	96.5	30-130

1-17-11

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 12/09/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 12/09/10
Batch No. : 10L141	Date Extracted: 12/13/10 10:15
Sample ID: BSW-14-6-4Q10-GW02	Date Analyzed: 12/14/10 20:48
Lab Samp ID: L141-08	Dilution Factor: .94
Lab File ID: RLH045	Matrix : WATER
Ext Btch ID: SVL012W	% Moisture : NA
Calib. Ref.: RKH032	Instrument ID : T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND U	0.028	0.0094
ACENAPHTHYLENE	ND	0.028	0.0094
ANTHRACENE	ND	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	ND	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND	0.028	0.0094
NAPHTHALENE	0.017J J	0.028	0.0094
PHENANTHRENE	ND U	0.028	0.0094
PYRENE	ND	0.028	0.0094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TERPHENYL-D14	0.407	0.470	86.7	30-130

1-17-11

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	12/09/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	12/09/10
Batch No.	: 10L141	Date Extracted:	12/13/10 10:15
Sample ID:	BSW-14-4-4Q10-GW01	Date Analyzed:	12/14/10 21:07
Lab Samp ID:	L141-09	Dilution Factor:	.94
Lab File ID:	RLH046	Matrix :	WATER
Ext Btch ID:	SVL012W	% Moisture :	NA
Calib. Ref.:	RKH032	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.16	0.028	0.0094
ACENAPHTHYLENE	0.060	0.028	0.0094
ANTHRACENE	ND U	0.028	0.0094
BENZO(A)ANTHRACENE	0.011J J	0.028	0.0094
BENZO(A)PYRENE	ND U	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	0.17	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND U	0.028	0.0094
NAPHTHALENE	24E R	0.028	0.0094
PHENANTHRENE	0.11	0.028	0.0094
PYRENE	0.010J J	0.028	0.0094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TERPHENYL-D14	0.524	0.470	111	30-130

RJ 1-17-11

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	12/09/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	12/09/10
Batch No.	: 10L141	Date Extracted:	12/13/10 10:15
Sample ID:	BSW-14-4-4Q10-GW01DL	Date Analyzed:	12/15/10 17:26
Lab Samp ID:	L141-09T	Dilution Factor:	47
Lab File ID:	RLH056	Matrix :	WATER
Ext Btch ID:	SVL012W	% Moisture :	NA
Calib. Ref.:	RKH032	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND R	1.4	0.47
ACENAPHTHYLENE	ND	1.4	0.47
ANTHRACENE	ND	1.4	0.47
BENZO(A)ANTHRACENE	ND	1.4	0.47
BENZO(A)PYRENE	ND	1.4	0.47
BENZO(B)FLUORANTHENE	ND	1.4	0.47
BENZO(K)FLUORANTHENE	ND	1.4	0.47
BENZO(G,H,I)PERYLENE	ND	1.4	0.47
CHRYSENE	ND	1.4	0.47
DIBENZO(A,H)ANTHRACENE	ND	1.4	0.47
FLUORANTHENE	ND	1.4	0.47
FLUORENE	ND	1.4	0.47
INDENO(1,2,3-CD)PYRENE	ND	1.4	0.47
NAPHTHALENE	30	1.4	0.47
PHENANTHRENE	ND R	1.4	0.47
PYRENE	ND	1.4	0.47

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TERPHENYL-D14	DO	0.470	DO	30-130

DO: Diluted Out

1-17-11

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	12/09/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	12/09/10
Batch No.	: 10L141	Date Extracted:	12/13/10 10:15
Sample ID:	BSW-14-4-4Q10-GW02	Date Analyzed:	12/14/10 21:26
Lab Samp ID:	L141-10	Dilution Factor:	.94
Lab File ID:	RLH047	Matrix :	WATER
Ext Btch ID:	SVL012W	% Moisture :	NA
Calib. Ref.:	RKH032	Instrument ID :	T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	0.13	0.028	0.0094
ACENAPHTHYLENE	0.045	0.028	0.0094
ANTHRACENE	ND U	0.028	0.0094
BENZO(A)ANTHRACENE	ND	0.028	0.0094
BENZO(A)PYRENE	ND	0.028	0.0094
BENZO(B)FLUORANTHENE	ND	0.028	0.0094
BENZO(K)FLUORANTHENE	ND	0.028	0.0094
BENZO(G,H,I)PERYLENE	ND	0.028	0.0094
CHRYSENE	ND	0.028	0.0094
DIBENZO(A,H)ANTHRACENE	ND	0.028	0.0094
FLUORANTHENE	ND	0.028	0.0094
FLUORENE	0.13	0.028	0.0094
INDENO(1,2,3-CD)PYRENE	ND U	0.028	0.0094
NAPHTHALENE	17E R	0.028	0.0094
PHENANTHRENE	0.087	0.028	0.0094
PYRENE	ND U	0.028	0.0094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TERPHENYL-D14	0.595	0.470	127	30-130

fy 1-17-11

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 12/09/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 12/09/10
Batch No. : 10L141	Date Extracted: 12/13/10 10:15
Sample ID: BSW-14-4-4Q10-GW02DL	Date Analyzed: 12/15/10 17:44
Lab Samp ID: L141-10T	Dilution Factor: 47
Lab File ID: RLH057	Matrix : WATER
Ext Btch ID: SVL012W	% Moisture : NA
Calib. Ref.: RKH032	Instrument ID : T-OE7

PARAMETERS	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
ACENAPHTHENE	ND R	1.4	0.47
ACENAPHTHYLENE	ND	1.4	0.47
ANTHRACENE	ND	1.4	0.47
BENZO(A)ANTHRACENE	ND	1.4	0.47
BENZO(A)PYRENE	ND	1.4	0.47
BENZO(B)FLUORANTHENE	ND	1.4	0.47
BENZO(K)FLUORANTHENE	ND	1.4	0.47
BENZO(G,H,I)PERYLENE	ND	1.4	0.47
CHRYSENE	ND	1.4	0.47
DIBENZO(A,H)ANTHRACENE	ND	1.4	0.47
FLUORANTHENE	ND	1.4	0.47
FLUORENE	ND	1.4	0.47
INDENO(1,2,3-CD)PYRENE	ND	1.4	0.47
NAPHTHALENE	22	1.4	0.47
PHENANTHRENE	ND R	1.4	0.47
PYRENE	ND	1.4	0.47

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TERPHENYL-D14	DO	0.470	DO	30-130

DO: Diluted Out

1-17-11

3020

LDC #: 24676A2b

SDG #: 10L141

Laboratory: EMAX Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 1/10/11

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270C-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 12/8 — 12/9/10
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	% RSD ≤ 30
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 25
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS/LP
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	SW	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	N	Not reviewed for Level III validation.
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D = 10, 12 11, 13
XVII.	Field blanks	SW	EB = 5, 9 FB = 6

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Water

1	SB229MW2-4Q10-GW01	11	BSW-14-4-4Q10-GW01DL D1	21	MBLKIW	31	
2	SB229MW1-4Q10-GW01	12	BSW-14-4-4Q10-GW02 D	22		32	
3	SB229MW1-4Q10-GW01DL	13	BSW-14-4-4Q10-GW02DL D1	23		33	
4	SB229MW4-4Q10-GW01**	14	SB229MW2-4Q10-GW01MS	24		34	
5	SB229MW4-4Q10-GW02 EB	15	SB229MW2-4Q10-GW01MSD	25		35	
6	SB229MW4-4Q10-GW03 FB	16		26		36	
7	SB229MW3-4Q10-GW01	17		27		37	
8	BSW-14-6-4Q10-GW01 EB	18		28		38	
9	BSW-14-6-4Q10-GW02 EB	19		29		39	
10	BSW-14-4-4Q10-GW01 D	20		30		40	

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS BNA (EPA Method 8270)

A. Phenol	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol	III. Benzo(a)pyrene
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene	T. 4-Chloroaniline	II. 4-Nitrophenol	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene	JJ. Dibenzofuran	YY. Fluoranthene	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine	Y. 2,4,6-Trichlorophenol	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TTT. 1-Methylnaphthalene
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)	FFF. Di-n-octylphthalate	UUU.
N. 2-Nitrophenol	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	VVV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

LDC #: 24676A2b

VALIDATION FINDINGS CHECKLIST

Page: 1 of 1
Reviewer: FT
2nd Reviewer: g

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation?		✓		
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05?	✓			
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?	✓			
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
Were all surrogate %R within QC limits?		✓		
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
Was an LCS analyzed for this SDG?	✓			

LDC #: 24676A2b

VALIDATION FINDINGS CHECKLIST

Reviewer: FT
2nd Reviewer: a

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds from the associated calibration standard?	✓			
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?			✓	
System performance was found to be acceptable.	✓			
Overall assessment of data was found to be acceptable.	✓			
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	

LDC #: 24676A2b
SDG #: all cont

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?
Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 12/8/10
Field blank type: (circle one) Field Blank / Rinsate / Other: 5= EB 6= FB 1 → 4

Compound	Blank ID	BLK 1P	Sample Identification							
	5	6	5X	1	4					
~~Diethylphthalate~~ S	0.034	0.017	0.17	0.029/U	0.087/U					
Di-n-butylphthalate										
~~Bis(2-ethylhexyl)phthalate~~										
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 24676A2b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: PT
2nd Reviewer: S

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?
Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 12/9/10
Field blank type: (circle one) Field Blank / Rinsate / Other: 9 = EB

7, 8, 10 → 13

Compound	Blank ID	Sample Identification									
	9	5x		7	8						
~~Diethylphthalate~~ S	0.017	0.085		0.011/0.055 U	0.069/U						
Di-n-butylphthalate											
~~Bis(2-ethylhexyl)phthalate~~											
CRQL											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 24676A2b

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were percent recoveries (%R) for surrogates within QC limits?
Y N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
Y N N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
		11, 12	TPH	DO (30-134)	no qual 47X DL
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
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				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

* QC limits are advisory	QC Limits (Soil)	QC Limits (Water)		QC Limits (Soil)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5	23-120	35-114	S5 (2FP)= 2-Fluorophenol	25-121	21-100
S2 (FBP) = 2-Fluorobiphenyl	30-115	43-116	S6 (TBP) = 2,4,6-Tribromophenol	19-122	10-123
S3 (TPH) = Terphenyl-d14	18-137	33-141	S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S4 (PHL) = Phenol-d5	24-113	10-94	S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC #: 24676A2b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: FT
2nd Reviewer: R

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

Y N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		14 + 15	CCC	162 (30-150)	164 (30-150)	( )	#1	J/A det
			III	167 ( )	180 ( )	( )		
			GGG	( )	164 ( )	( )		
			HHH	185 ( )	185 ( )	( )		
			KKK	( )	168 ( )	( )		
			JJJ	( )	159 ( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
E.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	KK.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
J.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	TT.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	ZZ.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 24676A2b

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?
Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Compound	Finding	Associated Samples	Qualifications
		NN	x'd cal Range	2	J/A det
		5	↓	10, 12	↓

Comments: See sample calculation verification worksheet for recalculations

LDC #: 24676A2b

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: FT
2nd Reviewer: R

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Compound	Finding	Associated Samples	Qualifications
		NN	x'd cal Range	2	R/A
		all except above	diluted	3	R/A
		S	x'd cal Range	10, 12	R/A
		all except above	diluted	11, 13	R/A

Comments:

OVR.2S

LDC#:24676A2b

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: EJ
2nd Reviewer: [illegible]

METHOD: GC/MS PAH (EPA Method 8270C-SIM)
Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD	
	10	12		
GG	0.16	0.13	21	
DD	0.060	0.045	29	
CCC	0.011	0.028U	200	
NN	0.17	0.13	27	
S	24	17	34	
UU	0.11	0.087	23	
ZZ	0.010	0.028U	200	

Compound	Concentration (ug/L)		RPD	
	11	13		
S	30	22	31	

V:\FIELD DUPLICATES\templates\24676A2b.wpd

LDC #: 24676A2b

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (100 std)	Recalculated RRF (100 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	SVE 7K19	11/19/10	~~Phenol (1st internal standard)~~	1					
			Naphthalene (~~2nd~~ 1st internal standard)	1.625	1.625	1.484	1.484	8.78	8.78
			~~Fluorene (3rd internal standard)~~						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			~~Benzo(a)pyrene (6th internal standard)~~						
2			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24676A2b

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: FT
2nd Reviewer: R

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	RLH030	12/14/10	~~Phenol (1st internal standard)~~					
			Naphthalene (2nd internal standard)	1.484	1.292	1.292	12.9	12.9
			~~Fluorene (3rd internal standard)~~					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			~~Benzo(a)pyrene (6th internal standard)~~					
2			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24676A2b

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: FT

2nd reviewer: [illegible]

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 4

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14	0.470	0.487	104	104	0
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 24676A2b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: FT
2nd Reviewer: R

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 14 + 15

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD		MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	0.470	0.470	ND	0.343	0.295	73	73	63	63	15	15
Pentachlorophenol											
Pyrene	↓	↓	0.0140	0.624	0.600	130	130	125	125	4	4

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24676A2P

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: FT

2nd Reviewer: R

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA

Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC)

LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: LCS 10

Compound	Spike Added (ug/L)		Spike Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	0.50	0.50	0.278	0.296	56	56	59	59	6	6
Pentachlorophenol										
Pyrene	0.50	0.50	0.378	0.402	76	76	80	80	6	6

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24676A2b

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT

2nd reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Y N N/A Were all reported results recalculated and verified for all level IV samples?

Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. #4, S:

Conc. = $\frac{(6953)(2000)(1)(\quad)(\quad)}{(10698)(1.484)(1060)(\quad)(\quad)}$

= 0.087 ug/L

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

NWS Seal Beach, UST Site 229
Data Validation Reports
LDC #24676

TPH as Diesel

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	NWS Seal Beach, UST Site 229
Collection Date:	December 8 through December 9, 2010
LDC Report Date:	January 12, 2011
Matrix:	Water
Parameters:	Total Petroleum Hydrocarbons as Diesel
Validation Level:	NFESC Level III & IV
Laboratory:	EMAX Laboratories, Inc.
Sample Delivery Group (SDG):	10L141

Sample Identification

SB229MW2-4Q10-GW01
SB229MW1-4Q10-GW01
SB229MW4-4Q10-GW01**
SB229MW4-4Q10-GW02
SB229MW4-4Q10-GW03
SB229MW3-4Q10-GW01
BSW-14-6-4Q10-GW01
BSW-14-6-4Q10-GW02
BSW-14-4-4Q10-GW01
BSW-14-4-4Q10-GW02
SB229MW2-4Q10-GW01MS
SB229MW2-4Q10-GW01MSD

**Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015M for Total Petroleum Hydrocarbons (TPH) as Diesel.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent NFESC Level IV review. NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

III. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as diesel contaminants were found in the method blanks.

Samples SB229MW4-4Q10-GW02 and BSW-14-6-4Q10-GW02 were identified as equipment blanks. No total petroleum hydrocarbons as diesel contaminants were found in these blanks.

Sample SB229MW4-4Q10-GW03 was identified as a field blank. No total petroleum hydrocarbons as diesel contaminants were found in this blank.

V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Target Compound Identification

All target compound identifications were within validation criteria for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

IX. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

X. System Performance

The system performance was acceptable for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XI. Overall Assessment of Data

Data flags have been summarized at the end of this report if data has been qualified.

XII. Field Duplicates

Samples BSW-14-4-4Q10-GW01 and BSW-14-4-4Q10-GW02 were identified as field duplicates. No total petroleum hydrocarbons as diesel were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/L)		RPD
	BSW-14-4-4Q10-GW01	BSW-14-4-4Q10-GW02	
TPH as diesel	1.1	0.83	28

NWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Data Qualification Summary - SDG 10L141

No Sample Data Qualified in this SDG

NWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Laboratory Blank Data Qualification Summary - SDG 10L141

No Sample Data Qualified in this SDG

NWS Seal Beach, UST Site 229
Total Petroleum Hydrocarbons as Diesel - Field Blank Data Qualification Summary - SDG 10L141

No Sample Data Qualified in this SDG

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	12/08/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	12/09/10
Batch No.	: 10L141	Date Extracted:	12/13/10 11:30
Sample ID:	S8229MW2-4010-GW01	Date Analyzed:	12/14/10 15:14
Lab Samp ID:	L141-01	Dilution Factor:	0.94
Lab File ID:	LL14012A	Matrix :	WATER
Ext Btch ID:	DSL013W	% Moisture :	NA
Calib. Ref.:	LL14003A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	1.6	0.47	0.094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	0.677	0.9400	72.0	50-130
HEXACOSANE	0.218	0.2350	92.8	70-140

Parameter	H-C Range
Diesel	C10-C24

ff 1-17-10

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	12/08/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	12/09/10
Batch No.	: 10L141	Date Extracted:	12/13/10 11:30
Sample ID:	S8229MW1-4Q10-GW01	Date Analyzed:	12/14/10 18:03
Lab Samp ID:	L141-02	Dilution Factor:	0.94
Lab File ID:	LL14022A	Matrix :	WATER
Ext Btch ID:	OSL013W	% Moisture :	NA
Calib. Ref.:	LL14016A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	1.4	0.47	0.094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	0.698	0.9400	74.2	50-130
HEXACOSANE	0.192	0.2350	81.9	70-140

Parameter	H-C Range
Diesel	C10-C24

1-17-10

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 12/08/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 12/09/10
Batch No. : 10L141	Date Extracted: 12/13/10 11:30
Sample ID: SB229MW4-4Q10-GW01	Date Analyzed: 12/14/10 18:20
Lab Samp ID: L141-03	Dilution Factor: 0.94
Lab File ID: LL14023A	Matrix : WATER
Ext Btch ID: DSL013W	% Moisture : NA
Calib. Ref.: LL14016A	Instrument ID : GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.47	0.094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	0.689	0.9400	73.3	50-130
HEXACOSANE	0.178	0.2350	75.7	70-140

Parameter	H-C Range
Diesel	C10-C24

1-17-10

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 12/08/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 12/09/10
Batch No. : 10L141	Date Extracted: 12/13/10 11:30
Sample ID: SB229MW4-4Q10-GW02	Date Analyzed: 12/14/10 18:37
Lab Samp ID: L141-04	Dilution Factor: 0.94
Lab File ID: LL14024A	Matrix : WATER
Ext Btch ID: DSL013W	% Moisture : NA
Calib. Ref.: LL14016A	Instrument ID : GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.47	0.094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	0.698	0.9400	74.2	50-130
HEXACOSANE	0.183	0.2350	77.7	70-140

Parameter	H-C Range
Diesel	C10-C24

1-17-10

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 12/08/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 12/09/10
Batch No. : 10L141	Date Extracted: 12/13/10 11:30
Sample ID: S8229MW4-4Q10-GW03	Date Analyzed: 12/14/10 18:53
Lab Samp ID: L141-05	Dilution Factor: 0.94
Lab File ID: LL14025A	Matrix : WATER
Ext Btch ID: DSL013W	% Moisture : NA
Calib. Ref.: LL14016A	Instrument ID : GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.47	0.094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	0.707	0.9400	75.2	50-130
HEXACOSANE	0.183	0.2350	77.8	70-140

Parameter	H-C Range
Diesel	C10-C24

1-17-10

5009

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	12/09/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	12/09/10
Batch No.	: 10L141	Date Extracted:	12/13/10 11:30
Sample ID:	SB229MW3-4Q10-GW01	Date Analyzed:	12/14/10 19:10
Lab Samp ID:	L141-06	Dilution Factor:	0.94
Lab File ID:	LL14026A	Matrix :	WATER
Ext Btch ID:	DSL013W	% Moisture :	NA
Calib. Ref.:	LL14016A	Instrument ID :	GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	0.29J J	0.47	0.094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	0.718	0.9400	76.4	50-130
HEXACOSANE	0.195	0.2350	82.8	70-140

Parameter	H-C Range
Diesel	C10-C24

fg 1-17-10

5010

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 12/09/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 12/09/10
Batch No. : 10L141	Date Extracted: 12/13/10 11:30
Sample ID: BSW-14-6-4Q10-GW01	Date Analyzed: 12/14/10 19:27
Lab Samp ID: L141-07	Dilution Factor: 0.94
Lab File ID: LL14027A	Matrix : WATER
Ext Btch ID: DSL013W	% Moisture : NA
Calib. Ref.: LL14016A	Instrument ID : GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.47	0.094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	0.741	0.9400	78.9	50-130
HEXACOSANE	0.192	0.2350	81.5	70-140

Parameter	H-C Range
Diesel	C10-C24

1-17-10

5011

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: RICHARD BRADY & ASSOCIATES	Date Collected:	12/09/10
Project	: NWS SEAL BEACH UST SITE 229	Date Received:	12/09/10
Batch No.	: 10L141	Date Extracted:	12/13/10 11:30
Sample ID:	BSW-14-6-4Q10-GW02	Date Analyzed:	12/14/10 19:44
Lab Samp ID:	L141-08	Dilution Factor:	0.94
Lab File ID:	LL14028A	Matrix :	WATER
Ext Btch ID:	DSL013W	% Moisture :	NA
Calib. Ref.:	LL14016A	Instrument ID :	GCT10S

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	ND U	0.47	0.094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	0.746	0.9400	79.3	50-130
HEXACOSANE	0.189	0.2350	80.6	70-140

Parameter	H-C Range
Diesel	C10-C24

1-17-10

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 12/09/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 12/09/10
Batch No. : 10L141	Date Extracted: 12/13/10 11:30
Sample ID: BSW-14-4-4Q10-GW01	Date Analyzed: 12/14/10 20:51
Lab Samp ID: L141-09	Dilution Factor: 0.94
Lab File ID: LL14032A	Matrix : WATER
Ext Btch ID: DSL013W	% Moisture : NA
Calib. Ref.: LL14030A	Instrument ID : GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	1.1	0.47	0.094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	0.773	0.9400	82.3	50-130
HEXACOSANE	0.192	0.2350	81.6	70-140

Parameter	H-C Range
Diesel	C10-C24

H 1-17-10

METHOD 3520C/M8015
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : RICHARD BRADY & ASSOCIATES	Date Collected: 12/09/10
Project : NWS SEAL BEACH UST SITE 229	Date Received: 12/09/10
Batch No. : 10L141	Date Extracted: 12/13/10 11:30
Sample ID: BSW-14-4-4Q10-GW02	Date Analyzed: 12/14/10 21:08
Lab Samp ID: L141-10	Dilution Factor: 0.94
Lab File ID: LL14033A	Matrix : WATER
Ext Btch ID: DSL013W	% Moisture : NA
Calib. Ref.: LL14030A	Instrument ID : GCT105

PARAMETERS	RESULTS (mg/L)	RL (mg/L)	MDL (mg/L)
DIESEL	0.83	0.47	0.094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	0.756	0.9400	80.4	50-130
HEXACOSANE	0.187	0.2350	79.5	70-140

Parameter	H-C Range
Diesel	C10-C24

fy 1-17-10

LDC #: 24676A8

SDG #: 10L141

Laboratory: EMAX Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 1/10/11

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: GC TPH as Diesel (EPA SW 846 Method 8015M)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 12/8 – 12/9/10
IIa.	Initial calibration	A	%RSD ≤ 20
IIb.	Calibration verification/ICV	A	ICV/CCV ≤ 20
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D = 9, 10
X.	Field blanks	ND	EB = 4, 8 FB = 5

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Water

1 +	SB229MW2-4Q10-GW01	11	SB229MW2-4Q10-GW01MS	21	MBLK1W	31	
2 +	SB229MW1-4Q10-GW01	12	SB229MW2-4Q10-GW01MSD	22		32	
3 –	SB229MW4-4Q10-GW01**	13		23		33	
4 –	SB229MW4-4Q10-GW02 EB	14		24		34	
5 –	SB229MW4-4Q10-GW03 FB	15		25		35	
6 +	SB229MW3-4Q10-GW01	16		26		36	
7 –	BSW-14-6-4Q10-GW01	17		27		37	
8 –	BSW-14-6-4Q10-GW02 EB	18		28		38	
9 +	BSW-14-4-4Q10-GW01 D	19		29		39	
10 +	BSW-14-4-4Q10-GW02 D	20		30		40	

Notes:

LDC #: 24676A8
SDG #: per cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation?		✓		
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20%.0 or percent recoveries 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 24676A8
SDG #: per cover

VALIDATION FINDINGS CHECKLIST

Reviewer: FJ
2nd Reviewer: JC

Validation Area	Yes	No	NA	Findings/Comments
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	

LDC #: 24676A8

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: FT
2nd reviewer: e

METHOD: ✓ GC __ HPLC

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (mg/L)		%RPD Limit_____	Qualification Parent only / All Samples
	9	10		
Diesel	1.1	0.83	28	

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

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LDC #: 24676A8
SDG #: per varies

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: F7
2nd Reviewer: e

METHOD: GC ✓ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (1500 std)	Recalculated CF (1500 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	12/01/10	Dieldrin	21860	21860	17878.2	17878.2	16.9	16.9
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24676A8
SDG #: pw cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: EJ
2nd Reviewer: R

METHOD: GC ✓ HPLC_____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	LL14003A	12/14/10	Diesel C10-C24	500.0	517.49	517.49	3	3
	LL14016A	12/14/10	↓	↓	532.49	532.49	6	6
2								
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24676A8
SDG #: see cover

METHOD: ✓ GC __ HPLC

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: FT
2nd reviewer: R

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 3

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Bromobenzene	NS	10U	73.279	73.3	73.3	0
Hexacosane	↓	25	18.913	75.7	75.7	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 24676A8
SDG #: per cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: FZ
2nd Reviewer: R

METHOD: ✓ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added

RPD =(((SSCMS - SSCMSD) * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 11 + 12

Compound	Spike Added (mg/L)		Sample Conc. (mg/L)	Spike Sample Concentration (mg/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	--	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	4.70	4.70	1.63	~~4.70~~ 5.79	5.98	89	89	93	93	3	3
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 2467A8
SDG #: µ covers

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Reviewer: F
2nd Reviewer: S

METHOD: __ GC __HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA
RPD = I LCS - LCSD I * 2/(LCS + LCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: lcs ID

Compound	Spike Added (mg/L)		Spiked Sample Concentration (mg/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)	5.0	5.0	4.92	4.80	98	98	96	96	2	2
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 24676Ag
SDG #: [illegible]

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID._____ Compound Name _____

Concentration =_____

NP

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

Appendix G

Data Quality Review

1.0 INTRODUCTION

BRADY performed field activities and collected soil samples during the initial SCAPS LIF Investigation, and collected groundwater samples during four samping events at UST Site 229, NAVWPNSTA Seal Beach, California. The purpose of this review is to evaluate the data collected and determine whether they meet the quality objectives outlined in the Final SAP dated March 16, 2009 (BRADY, 2009a) and the Final Addendum 01 to the Final SAP dated August 17, 2009 (BRADY, 2009b).

The investigation included the collection and analyses of 24 groundwater and 7 soil samples, along with the associated quality control (QC) samples, during the initial and quarterly events. The analyses were performed by the following methods:

- Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B
- Polynuclear Aromatic Hydrocarbons (PAHs) by EPA SW 846 Method 8270C-SIM
- Total Petroleum Hydrocarbons as Diesel by EPA SW 846 Method 8015B.

The data quality review is based on verification of field and laboratory Quality Assurance (QA) measures to determine the overall quality and validity of analytical results. QA for field activities was managed through appropriate documentation, collection of field quality control (FQC) samples, and oversight of field procedures. A number of QA/QC measures were employed in the field to ensure that the collected samples were representative of site conditions at the time of sampling. Prior to the collection of any sample, all reusable sampling equipment was decontaminated to minimize the chance of cross-contamination. Field documentation protocols included the use of field logbooks and chain-of-custody (COC) forms.

QA/QC measures were employed by the laboratory to determine the precision and accuracy of the analytical system as measured by laboratory control samples (LCS), matrix spike/matrix spike duplicates (MS/MSD), surrogate spikes, and internal standards (where applicable). Results from the equipment blanks, field blanks, and method blanks were also evaluated to assess the possibility of external contamination of environmental samples during field and laboratory activities.

1.1 Field Quality Control

Analyte detections in field quality control samples such as blanks were evaluated with respect to their associated environmental samples to make an overall judgment regarding whether or not constituents detected in the environmental samples are representative of site conditions. Field contamination was assessed by the simultaneous evaluation of the equipment blanks and field blanks. In accordance with validation guidelines, sample concentrations were compared to concentrations detected in the blanks to determine whether sample qualification was deemed necessary.

1.2 Laboratory Quality Control

Laboratory quality control is designed to detect, reduce, and correct deficiencies in a laboratory's internal analytical process prior to the release of results, and to improve the quality of the results reported by the laboratory. A discussion regarding the precision and accuracy of the laboratory's analytical systems is included in the following sections. Analytical services for soil and groundwater samples were provided by EMAX Laboratories, Inc. in Torrance, California. A total of 31 environmental samples and associated QC samples were submitted to this California-certified and DoD ELAP accredited laboratory for analyses.

In general, QC sample results that were outside the laboratory acceptance criteria for data accuracy and precision were flagged by the laboratory and further qualified during data validation. Results for laboratory QC samples and reporting limits (RLs) will be discussed in the data validation section below.

1.3 Data Validation

The collected data were validated by Laboratory Data Consultants Inc. (LDC) in Carlsbad, California. Validation was performed under the EPA Level III and IV guidelines. For this investigation, data validation was performed to Level III criteria on 90% of the data, and Level IV on 10% of the data. Both levels of validation include the review of laboratory quality control summaries (blank, calibrations, spike recoveries, duplicates, etc.). Level IV process incorporates a review of raw data including chromatograms and quantitation reports. This additional information is utilized in the Level IV data validation process for checking calculations of quantified analytical data.

The analytical data were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007.

Data that did not meet the applicable validation criteria were flagged with the qualifiers listed below.

U – Indicates the compound or analyte was analyzed for but not detected at or above the associated reporting limit.

J – The associated value is an estimated quantity.

UJ – Indicates the compound or analyte was analyzed for but was not detected. The associated reporting limit is an estimated value.

R – The data are unusable.

Once the data are reviewed and qualified according to the documents mentioned above, the data set is then evaluated using precision, accuracy, representativeness, completeness, and comparability (PARCC) criteria. PARCC criteria provide an evaluation of overall data usability. The following is a discussion about PARCC criteria as it relates to the project data quality objectives (DQOs).

Precision is a measure of the agreement or reproducibility of analytical results under a given set of conditions. It is a quantity that cannot be measured directly but is calculated from percent recovery data. Precision is expressed as the relative percent difference (RPD):

$$RPD = (D1-D2)/\{1/2(D1+D2)\} \times 100$$

where D1 and D2 are the reported concentrations for sample and duplicate analyses.

Precision is primarily assessed by calculating a RPD from the percent recoveries of the spiked compounds for each sample in the matrix spike/matrix spike duplicate (MS/MSD) pair. In the absence of an MS/MSD pair, a laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) pair can be analyzed as an alternative means of assessing precision. In some cases, samples from multiple chain-of-custodies or sample delivery groups (SDGs) were within one QC batch and therefore are associated with the same laboratory QC samples.

An additional measure of sampling precision was obtained by collecting and analyzing field duplicate samples, which were compared using the RPD result as the evaluation criteria. The blind duplicate groundwater sample consists of preparing a second set of sample containers for all analyses and directing well water from the pump into these containers at the same time the primary containers are being filled. As with the field blank samples, all of these duplicate samples are then handled, transported and analyzed in the same manner as each of their respective primary samples, but with different sample identification numbers. These duplicate analytical results are then compared with the results from the primary samples and any differences are utilized as an independent check of the reproducibility of the analytical method and laboratory procedures related to the actual sample matrix.

MS and MSD samples are field samples spiked by the laboratory with target analytes prior to preparation and analysis. These samples measure the overall efficiency of the analytical method in recovering target analytes from an environmental matrix. A LCS is similar to an MS/MSD sample in that the LCS is spiked with the same target analytes prior to preparation and analysis. However, the LCS is prepared using a controlled interference-free matrix instead of a field sample aliquot. Laboratory reagent water is used to prepare aqueous LCSs. Non-aqueous LCSs are prepared using solid media approved by the American Society for Testing and Materials

(ASTM) for their homogeneity. The LCS measures laboratory efficiency in recovering target analytes from either a solid or aqueous matrix in the absence of matrix interferences.

An RPD outside the numerical QC limit in either the duplicate, MS/MSD or LCS/LCSD samples indicates imprecision. Imprecision is the variance in the consistency with which the laboratory arrives at a particular reported result. Thus, the actual analyte concentration may be higher or lower than the reported result.

Possible causes of poor precision include sample matrix interference, improper sample collection or handling, inconsistent sample preparation, and poor instrument stability. In some duplicate pairs, results may be reported in either the primary or duplicate samples at levels below the reporting limit or non-detected. Since these values are considered to be estimates, RPD exceedances from these duplicates pairs do not suggest a significant impact on the data quality.

Accuracy is a measure of the agreement of an experimental determination and the true value of the parameter being measured. It is used to identify bias in a given measurement system. Recoveries outside acceptable QC limits may be caused by factors such as instrumentation, analyst error or matrix interference. Accuracy is assessed through the analysis of MS, MSD, LCS and samples containing surrogate spikes. In some cases, samples from multiple chain-of-custodies or SDGs were within one QC batch and therefore are associated with the same laboratory QC samples. Surrogate spikes are either isotopically labeled compounds or compounds that are not typically detected in the samples. Surrogate spikes are added to every blank, environmental sample, MS/MSD and standard for all organic analyses.

Percent recovery (%R) is calculated using the following equation:

$$\%R = (A-B)/C \times 100$$

where:
A = measured concentration in the spiked sample
B = measured concentration of the spike compound in the non-spiked sample
C = concentration of the spike

The %R of each analyte spiked in MS/MSD and LCS samples, and the %R of each surrogate compound added to environmental samples is evaluated with the acceptance criteria specified by the previously noted documents. Spike recoveries outside the acceptable QC accuracy limits provide an indication of bias, where the reported data may overestimate or underestimate the actual concentration of compounds detected or quantitation limits reported for environmental samples.

Representativeness is a qualitative parameter that expresses the degree to which the sample data are characteristic of a population. It is evaluated by reviewing the QC results of blank samples and holding times. Positive detects of compounds in the blank samples identify compounds that may have been introduced into the samples during sample collection, transport, preparation or

analysis. The QA/QC blanks collected and analyzed are method blanks, equipment blanks, source blanks and trip blanks.

The *method blank* is a laboratory blank that is prepared from laboratory grade water or solid matrix that contains the method reagents. It is prepared/extracted/digested and analyzed exactly like the field samples. The method blank provides a measure of the combined contamination derived from the laboratory source water, glassware, instruments, reagents and sample preparation steps. Method blanks generally occur at a frequency of one blank per batch of samples.

The *trip blank* is a sample bottle filled in the lab with reagent-grade water and preserved to a pH less than 2 with hydrochloric acid. It is taken from the laboratory to the sampling site and transported back to the laboratory without having been exposed to sampling procedures. The purpose is to assess contamination introduced during shipping and field handling procedures.

The *equipment blank* (or rinsate blank) is a sample of analyte-free water poured over or through decontaminated field sampling equipment prior to the collection of environmental samples. The purpose is to assess the adequacy of the decontamination process. Equipment blanks were collected and analyzed for all target analytes.

The *field blank* (or source blank) is a sample of analyte-free water poured into the sample container in the field, which is preserved and shipped to the laboratory with the field samples. These blanks are used to assess contamination from field conditions during sampling. Generally, one field blank is collected for each new source of water utilized for the decontamination process. Field blanks were collected and analyzed for all target analytes.

Contaminants found in both the environmental sample and a blank sample are assumed to be laboratory artifacts if the concentration in the environmental sample is less than ten times the blank value for common laboratory contaminants such as methylene chloride, acetone, 2-butanone, and phthalate esters; or five times the blank value for other lab contaminants.

Holding times are evaluated to assure that the sample integrity is intact for accurate sample preparation and analysis. Holding times are specific for each method and matrix analyzed. Holding time exceedances can cause loss of sample constituents due to biodegradation, precipitation, volatilization, and chemical degradation.

Comparability is a qualitative expression of the confidence with which one data set may be compared to another. It provides an assessment of the equivalence of the analytical results to data obtained from other analyses. It is important that data sets be comparable if they are used in conjunction with other data sets. The factors affecting comparability include the following: sample collection and handling techniques, matrix type and analytical method. If these aspects of sampling and analysis are carried out according to standard operating and analytical procedures, the data are considered comparable. Comparability is also dependent upon other

PARCC criteria, because only when precision, accuracy and representativeness are known can data sets be compared with confidence.

Completeness is defined as the percentage of acceptable sample results compared to the total number of sample results. Completeness is evaluated to determine if an acceptable amount of usable data were obtained so that a valid scientific investigation can be completed.

Percent completeness is calculated using the following equation:

$$\%C = (T-R)/T \times 100$$

where:
%C = percent completeness
T = total number of sample results
R = total number of rejected sample results

Sensitivity is the ability of the method or instrument to detect the contaminant of concern or other target compounds at the level of interest. Adequate sensitivity was assured in some cases by selecting analytical methods that provided the lowest laboratory reporting limits available. The reporting limits and method detection limits (MDLs) for each matrix and analyte are presented in worksheet #15 of the SAP (BRADY, 2009a).

The following sections present a review of QC data for each analytical method.

1.4 Volatile Organic Compounds – (VOCs by EPA Method 8260B)

All soil samples analyzed for VOCs were received by the laboratory in good condition. From the initial SCAPS LIF Investigation, a total of seven soil samples, as well as the associated dilutions and FQC samples were analyzed for VOCs. All VOC results were assessed to be valid since none of the results were rejected based on QC exceedances.

The gas chromatography-mass spectrometry (GC/MS) instrument performance was checked at 12 hour intervals, and all ion abundance requirements were met.

1.4.1 Precision and Accuracy

1.4.1.1 Instrument Calibration

Initial and continuing calibration results provide a means of evaluating accuracy within a particular SDG. Relative response factor (RRF), percent relative standard deviation (%RSD) and percent difference (%D) are the three major parameters used to measure the effectiveness of instrument calibration. RRF is a measure of the relative spectral response of an analyte compared to its internal standard. %RSD is an expression of the linearity of instrument response. %D is a comparison of a continuing calibration instrumental response with its initial response. %RSD and %D exceedances suggest routine instrumental anomalies, which typically

impact all sample results for the affected compounds. All VOC data were within method and validation criteria during the initial and continuing calibration.

1.4.1.2 Surrogates, MS/MSD samples and LCS Samples

Surrogates were added to all samples and blanks as required by the method. With the exception of *bromofluorobenzene*, all surrogate recoveries were within QC limits. In sample SB229-19-S-01, the surrogate exceeded the range of limits outlined in the SAP (BRADY, 2009a). As a result of the exceedance, all detected compounds in that sample were qualified as estimated (J).

Matrix spike and matrix spike duplicate samples were reviewed for each SDG as applicable. One set of MS/MSD soil samples was submitted to the fixed-base lab for analysis by EPA Method 8260B to determine any bias associated with the matrix. All percent recoveries (%R) and relative percent differences (RPD) were within the QC limits outlined in the SAP (BRADY, 2009a).

Laboratory control samples were also reviewed for each SDG as applicable. The %Rs and RPDs were evaluated against the acceptance criteria and were within QC limits.

1.4.2 Representativeness

1.4.2.1 Holding Times

The evaluation of holding times to verify compliance with the method was conducted. All volatile samples met the holding time criteria and all cooler temperature requirements were also met.

1.4.2.2 Method Blanks, Trip Blanks, Equipment Blanks and Field Blanks

Method blank analyses were performed at the required frequencies. One trip blank, one equipment blank and one field blank were submitted with the environmental samples for VOC analysis. No detections of VOC contaminants were found in any of these blank samples.

1.4.3 Comparability

The laboratory used a standard analytical method for all of the VOC analyses (EPA Method 8260B). Sample collection and handling techniques were carried out according to BRADY's standard operating procedures to ensure consistency and comparability, and analytical results were reported in the appropriate units. In addition, based on the evaluation of the data with respect to precision, accuracy and representativeness, the comparability of the data is regarded as acceptable.

1.4.4 Completeness

The completeness level attained for VOC field samples was 100 percent. This percentage was calculated by the number of accepted sample results divided by the total number of sample results, then multiplied by 100. There were cases where more than one result was reported for an individual sample, such as in the event of a sample dilution. Two soil samples from this investigation (SB229-19-S-01 and SB229-21-S-01) required dilutions to be performed due to

VOC compounds exceeding the calibration range. In these cases, the least technically acceptable results were rejected in order to eliminate duplicate results. These rejected results do not factor into the calculation for completeness.

1.4.5 Sensitivity

For this project, soil screening levels (SSL) published in the Region 9 Preliminary Remediation Goal (PRG) list (US EPA, 2008) were used as project action limits (PAL) for VOCs in soil. Adequate sensitivity was assured by selecting the analytical method that provided the lowest laboratory RLs available. For some VOCs, the PALs were lower than the RLs. RLs and MDLs were reviewed in the laboratory data to determine whether project-specific limits were met. For all samples analyzed, the RLs and MDLs met the limits outlined in the SAP (BRADY, 2009a), with the exception of the dilutions for analytes with elevated concentrations.

1.5 Polynuclear Aromatic Hydrocarbons – (PAHs by EPA Method 8270C-SIM)

All soil and groundwater samples analyzed for PAHs were received by the laboratory in good condition. A total of 7 soil samples and 24 groundwater samples, as well as the associated dilutions and FQC samples, were analyzed for PAHs. All results were assessed to be valid since none of the results were rejected based on QC exceedances.

The gas chromatography-mass spectrometry (GC/MS) instrument performance was checked at appropriate intervals, and all ion abundance requirements were met.

1.5.1 Precision and Accuracy

1.5.1.1 Instrument Calibration

As previously discussed in Section 1.4.1.1, initial and continuing calibration results provide a means of evaluating accuracy. All soil and groundwater data from this investigation were within method and validation criteria during the initial and continuing calibrations.

1.5.1.2 Surrogates, MS/MSD samples and LCS Samples

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries were within QC limits, with the exception of samples SB229MW1-3Q09-GW01DL, BSW-14-4-4Q10-GW01DL and BSW-14-4-4Q10-GW02. Since each of these samples was diluted out, no data were qualified.

Matrix spike and matrix spike duplicate samples were reviewed for each SDG as applicable. One set of MS/MSD samples was submitted from each sampling event to the fixed-base lab for analysis by EPA Method 8270C-SIM to determine any bias associated with the matrices. All %R and RPD values were within the QC limits outlined in the SAP (BRADY, 2009a), with the following exceptions. In the MS/MSD pair from sample SB229MW2-3Q09-GW01, *acenaphthene*, *acenaphthylene* and *naphthalene* had RPDs above the threshold of 30%. No data were qualified since there were no detections for these compounds in the associated sample. In

the MS/MSD pair from sample SB229MW4-4Q09-GW01, the recovery for *dibenzo(a,h)anthracene* was slightly above the acceptable limits. No results were qualified from this exceedance since this compound was not detected in the associated sample. In the MS/MSD pair from sample SB229MW2-4Q10-GW01, *benzo(a)anthracene*, *benzo(a)pyrene*, *benzo(b)fluoranthene*, *benzo(k)fluoranthene*, *dibenzo(a,h)anthracene* and *indeno(1,2,3-cd)pyrene* had recoveries that were above the acceptable limits. No data were qualified since there were no detections for these compounds in the associated sample.

Laboratory control samples were also reviewed for each SDG as applicable. The %R and RPD were evaluated against the acceptance criteria and were within QC limits with the following exceptions. In the third quarter of 2009, the LCS associated with SDG 09H079 had six compounds (*acenaphthene*, *acenaphthylene*, *anthracene*, *fluorene*, *naphthalene* and *phenanthrene*) with RPD values that exceeded the acceptable limits. All detects in this SDG were qualified as estimated (J), and all non-detects were qualified as non-detected estimated (UJ). In the fourth quarter of 2009, the RPD between the LCS and LCSD was slightly above the limit of 30% for *phenanthrene* and *pyrene*. All samples in SDG 09K157 had results for these two compounds qualified as estimated (J) or non-detected estimated (UJ).

1.5.1.3 Field Duplicates

For groundwater duplicate samples, a threshold of 30% is listed for the RPD in Table 1 of the SAP. During this investigation, duplicate groundwater samples were collected and analyzed for each quarterly event. The first pair of samples, SB229MW4-3Q09-GW01 (primary) and SB229MW4-3Q09-GW02 (duplicate), had only one compound detected. *Benzo(a)anthracene* was detected at the same concentration in both samples below the RL. During the second sampling event, samples SB229MW3-4Q09-GW01 (primary) and SB229MW3-4Q09-GW02 (duplicate) had five compounds detected in one or both samples. *Acenaphthylene* was detected below the RL, with an RPD of 8. The remaining four compounds (*fluorene*, *benzo(a)anthracene*, *dibenzo(a,h)anthracene* and *indeno(1,2,3-cd)pyrene*) were only detected in one of the samples from the pair, and each of these were below the reporting limit. Since these values are considered to be estimates, RPD exceedances from these duplicates pairs do not suggest a significant impact on the data quality.

No compounds were detected in either the primary or duplicate sample from the third sampling event. From the fourth sampling event, five compounds were detected in both the primary and duplicate sample. *Acenaphthene*, *Acenaphthylene*, *fluorene* and *phenanthrene* had RPDs below the 30% threshold. Naphthalene initially exceeded the calibration range in both samples. From the dilutions performed on the primary and duplicate samples, naphthalene's RPD was 30.8%; slightly above the 30% limit.

In addition to the detections mentioned for each duplicate pair, all of the remaining PAHs (from a list of 16 total analytes) which were measured as non-detects in the primary samples were also reported as non-detects in the duplicates. All of this information together indicates acceptable precision in the analytical method.

1.5.2 Representativeness

1.5.2.1 Holding Times

The evaluation of holding times to verify compliance with the method was conducted. All samples met the holding time criteria and all cooler temperature requirements were also met.

1.5.2.2 Method Blanks, Equipment Blanks and Field Blanks

Method blank analyses were performed as required. No PAH contaminants were detected in the method blanks associated with this analysis. Two equipment blanks were submitted during each quarterly groundwater sampling event. *Naphthalene* was detected at low levels in each of these samples. *Naphthalene* was also detected at low levels in three of four field blank samples. Due to these occurrences of blank contamination, 12 samples had final concentrations of *naphthalene* modified during data validation. Five results were qualified as non-detect (U) at the RL, and 7 results were qualified as non-detect (U) at the reported concentration. The affected samples are identified in the data validation reports in the data qualification summaries.

1.5.3 Comparability

The laboratory used a standard analytical method for all of the PAH analyses (EPA Method 8270C-SIM). Sample collection and handling techniques were carried out according to BRADY's standard operating procedures to ensure consistency and comparability, and analytical results were reported in the appropriate units. In addition, based on the evaluation of the data with respect to precision, accuracy and representativeness, the comparability of the data is regarded as acceptable.

1.5.4 Completeness

The completeness level attained for PAH field samples was 100 percent. This percentage was calculated by the number of accepted sample results divided by the total number of sample results, then multiplied by 100. There were cases where more than one result was reported for an individual sample, such as in the event of a sample dilution. One soil sample from this investigation (SB229-21-S-01) and six groundwater samples associated with two sampling locations (SB229MW1 and BSW-14-4) required dilutions to be performed due to PAH compounds exceeding the calibration range. In these cases, the least technically acceptable results were rejected in order to eliminate duplicate results. These rejected results do not factor into the calculation for completeness. The details regarding the qualification of results are provided in the data validation reports.

1.5.5 Sensitivity

Once again, SSLs published in the Region 9 PRG list (US EPA, 2008) were used as PALs for PAHs in soil. For groundwater samples, the State of California Maximum Contaminant Levels (MCLs) for drinking water (Cal-EPA, 2008) were selected as project screening levels. For analytes with no established MCL, the CRWQCB environmental screening levels (ESLs) (CRWQCB, 2008) were used. Adequate sensitivity was assured by selecting the analytical method that provided the lowest laboratory RLs available. For some PAHs however, the PALs

were lower than the RLs. RLs and MDLs were reviewed in the laboratory data to determine whether project-specific limits were met. For all samples analyzed, the RLs and MDLs met the limits outlined in the SAP (BRADY, 2009a), with the exception of the dilutions for analytes with elevated concentrations.

1.6 Total Petroleum Hydrocarbons as Diesel – (TPH-d by EPA 8015B)

All soil and groundwater samples analyzed for TPH-d were received by the laboratory in good condition. A total of 7 soil samples and 24 groundwater samples, and the associated FQC samples, were analyzed for TPH-d by EPA Method 8015B. All samples analyzed for TPH-d were received by the laboratory in good condition. All TPH-d results were assessed to be valid since none of the results were rejected based on QC exceedances.

1.6.1 Precision and Accuracy

1.6.1.1 Instrument Calibration

Initial calibration of compounds was performed as required by the method and the calibration verification was performed at the required frequencies. All calibration requirements were within acceptance criteria.

1.6.1.2 Surrogates, MS/MSD samples and LCS Samples

Surrogates were added to all samples and blanks as required by the method. All surrogate %R values were within QC limits, with the exception of sample SB229-21-S-01. Since the sample was diluted out however, no data were qualified. No other data were qualified based on surrogate non-conformance.

Matrix spike and matrix spike duplicate samples were reviewed for each SDG as applicable. One set of MS/MSD samples was submitted from each sampling event to the fixed-base lab for analysis by EPA Method 8015B to determine any bias associated with the matrix. All %R and RPD values were within the QC limits outlined in the SAP (BRADY, 2009a).

Laboratory control samples were also reviewed for each SDG as applicable. The %R and RPD were evaluated against the acceptance criteria and were within QC limits.

1.6.1.3 Field Duplicates

Once again, a RPD threshold of 30% is listed in Table 1 of the SAP. Duplicate groundwater samples were collected and analyzed for each sampling event. No TPH-d was detected in the first pair of samples. During the second sampling event, samples SB229MW3-4Q09-GW01 (primary) and SB229MW3-4Q09-GW02 (duplicate) had TPH-d detected in both samples below the RL. Although these values are considered estimated (J), a RPD of 4 was calculated.

No compounds were detected in either the primary or duplicate sample from the third sampling event. From the fourth sampling event, samples BSW-14-4-4Q10-GW01 (primary) and BSW-14-4-4Q10-GW02 (duplicate) had TPH-d detected in both samples above the RL. A RPD of 28

was calculated for this duplicate pair. Based on the information provided, the results indicate good precision in the analytical method.

1.6.2 Representativeness

1.6.2.1 Holding Times

The evaluation of holding times to verify compliance with the method was conducted. All samples met the holding time criteria and all cooler temperature requirements were also met.

1.6.2.2 Method Blanks, Equipment Blanks and Field Blanks

Method blank analyses were performed as required. No TPH-d contaminants were detected in the method blanks associated with this analysis. Two equipment blanks and one field blank were submitted during each quarterly groundwater sampling event. No TPH-d contaminants were detected in any of these samples either.

1.6.3 Comparability

The laboratory used a standard analytical method for all of the TPH-d analyses (EPA Method 8015B). Sample collection and handling techniques were carried out according to BRADY's standard operating procedures to ensure consistency and comparability, and analytical results were reported in the appropriate units. In addition, based on the evaluation of the data with respect to precision, accuracy and representativeness, the comparability of the data is regarded as acceptable.

1.6.4 Completeness

The completeness level attained for TPH-d field samples was 100 percent. This percentage was calculated by the number of accepted sample results divided by the total number of sample results, then multiplied by 100.

1.6.5 Sensitivity

The recommended soil cleanup level for TPH-d, stated in the California LUFT Manual, was used as the PAL for soil. For groundwater samples, since TPH-d has no established MCL, the CRWQCB environmental screening level (ESL) (CRWQCB, 2008) was used. Adequate sensitivity was assured by selecting the analytical method that provided the appropriate laboratory RLs. For TPH-d in groundwater, the ESL was lower than the RL. RLs and MDLs were reviewed in the laboratory data to determine whether project-specific limits were met. For all samples analyzed, the RL and MDL met the limits outlined in the SAP (BRADY, 2009a), with the exception of the dilutions for analytes with elevated concentrations.

1.7 Data Usability

Field and laboratory QC elements were assessed for conformance with project DQOs. Precision and accuracy were evaluated using data quality indicators such as calibration, MS/MSD, LCS, field duplicates and surrogates. The *precision* and *accuracy* of the data set were considered acceptable after the integration of data qualifiers for estimated results.

In order to evaluate the representativeness of the project data, all samples for each method and matrix were evaluated for holding time compliance. All samples in each SDG were also associated with the appropriate blank samples (method blanks, trip blanks, equipment blanks and field blanks) in accordance with the SAP. Based on the overall assessment of the blank samples and the fact that all holding times were met, the *representativeness* of the project data is considered acceptable.

Sampling frequency requirements for all field QC samples were met in accordance with the SAP. The laboratory used standard analytical methods for their analyses, and the analytical results were reported in correct standard units. Holding times, sample preservation and sample integrity were all within QC criteria. Based on the collective performance of the project data quality indicators against the precision, accuracy and representativeness criteria, the overall *comparability* is considered acceptable.

The *completeness* percentage for the project was 100 percent. From all the data reported for this investigation, none were rejected. There were cases where more than one result was reported for an individual sample, such as in the event of a sample dilution. In these cases, the least technically acceptable results were rejected in order to eliminate duplicate results. The effected samples and associated analytes are identified in the data validation reports in the data qualification summaries.

The *sensitivity* (i.e., reporting limits) of the analytical methods is driven by the project-specific DQOs. All reporting limits met the project-specific requirements. The overall assessment based on these data quality indicators is that the data are acceptable. Although a few QC elements associated with the analytical procedures have been identified during the data quality review, a thorough assessment of the data indicates that these discrepancies do not adversely affect the quality, validity, usability, and overall data interpretation presented in this report. Therefore, the data presented herein are considered valid and usable as indicated by their specific qualifiers.

Appendix H

Ecological Risk Screening Evaluation

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Appendix H

Ecological Risk Screening Evaluation for Potential Impacts to Seal Beach National Wildlife Refuge from UST 229 Site Naval Weapons Station Seal Beach

13 May 2011

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Attachment A: DILUTION ATTENUATION FACTOR ANALYSIS UST 229/Site 14

1. INTRODUCTION

This appendix to the Extended Site Assessment (ESA) Report for former Underground Storage Tank (UST) Site 229 presents the results of an Ecological Risk Screening Evaluation of groundwater data collected from UST Site 229 ("Site") at the Naval Weapons Station (NAVWPNSTA) Seal Beach. The purpose of this evaluation is to determine if groundwater constituents from the Site have the potential to impact the surface water body associated with the Seal Beach National Wildlife Refuge (SBNWR). The NAVWPNSTA and SBNWR are located on the California coast adjacent to Anaheim Bay and in an area known as the Sunset Gap (ESA Report, BRADY, 2011; **Figure 2-1**). The ESA Report provides a detailed project background for this Site. A brief Site background is provided in this report.

The methodology used in this screening evaluation is consistent with ecological risk assessment guidance from the Department of the Navy entitled *Navy Policy for Conducting Ecological Risk Assessment* (DON, 1999) and the California Department of Toxic Substance Control *Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities, Parts A and B* (DTSC, 1996a,b). In order to complete this evaluation, ecologically-based groundwater screening levels were derived and compared to the maximum concentrations of constituents detected in groundwater from sampling events conducted in 2009 and 2010 from six wells at the Site (**Table A-1**). The results of this evaluation will be used to determine the need for, and extent of, further assessment and remediation activities, if any.

The following 10 chemicals were detected in groundwater at the Site:

- Acenaphthene
- Acenaphthylene
- Anthracene
- Benzo[a]anthracene
- Chrysene
- Fluorene
- Naphthalene
- Phenanthrene
- Pyrene
- Total petroleum hydrocarbons (TPH), as diesel.

1.1 Identification of Ecological Screening Levels

Consistent with the Sampling and Analysis Plan (Brady, 2009), ecological risk-based screening levels for surface water were located for all constituents detected in groundwater at UST Site 229 from the following document:

- *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*, Interim Final-November 2007, revised May 2008. California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region (SFRWQCB, 2008).

The Environmental Screening Levels (ESLs) identified from this source were generally derived through the quantitative evaluation of aquatic toxicity databases in a manner consistent with procedures used by the United States Environmental Protection Agency (USEPA) for developing chronic ambient water quality criteria for marine surface waters. As the salt marsh is an estuarine system, the estuary habitat goal ESLs were selected for use in this evaluation. The estuary ESLs presented in SFRWQCB (2008) are the lower of the marine and freshwater habitat goals presented in the report. This ensures conservatism, since estuarine systems can have varying degrees of salinity, trending towards either marine or freshwater depending on proximity to the ocean. Likewise, some organisms in an estuarine system may exist in both predominantly salt water and predominantly fresh water, spanning the spectrum of salinity in the overall habitat coverage.

1.2 Dilution Attenuation Factor Evaluation

Applying surface water ESLs to groundwater data, and thereby assuming that groundwater concentrations correspond to surface water concentrations, would be an erroneous extrapolation approach because groundwater is diluted as it enters surface water bodies. Because the ESLs that were identified for the constituents at this Site apply to surface water bodies, a dilution factor should be taken into account. It should not be assumed that benthic flora and fauna communities situated below or at the groundwater/surface water interface are exposed to the full concentration of constituents in groundwater prior to mixing of the groundwater with surface water. Therefore, an adjustment of the surface water ESLs is appropriate to derive a groundwater screening level (GSL) for protection of a marine aquatic habitat.

The Technical Memorandum for NAVWPNSTA Installation Restoration Site 14 prepared in January 2005 (MARRS/Geosyntec, 2005) and approved by the RWQCB and California Department of Toxic Substances Control (DTSC), specifically Appendix B (MARRS/Geosyntec, 2005), provides a brief calculation of the dilution attenuation factor (DAF) based on local tidal effects, calculated hydraulic conductivities, existing

hydraulic gradients, and an estimate of the plume area at the tidal basin interface. Because UST 229 and Site 14 are adjacent and Site 14 lies between UST 229 and the SBNWR it is appropriate to consider the sites linked (Figure 2, Attachment A). A revised Attachment A is attached to this document which incorporates UST 229 and Site 14 data to support the use of a DAF for groundwater constituents of concern.

The DAF calculations were based on Site 14 and UST 229 data and on representative values and observed conditions at local sites in the vicinity. This data is applicable to UST 229 because the groundwater gradient and flow from the UST 229 Site trends directly through Site 14 (See Figures 5-4 through 5-7 in the Technical Memorandum, BRADY, 2011). A combination of a flat groundwater gradient (0.001 ft/ft) and a relatively low permeability value for local soils suggest a slow groundwater flow rate of 1 to 10 ft per year, thus, the UST 229 dissolved phase plume is not expected to migrate or change rapidly. The narrow, 100-foot wide plume front is based on the control wells BSW-14-6 (south) and SB 229-MW04 to the north (Figure 1 and 3, Attachment A). Previous calculations indicated that the mixing associated with the tidal influence observed at Site 14 is well in excess of a DAF of 10, and varied from a low of 32:1 to orders of magnitude larger (based on estimates of tidal flux versus groundwater flow at the site [MARRS/Geosyntec, 2005]). The results of the updated DAF analysis (Attachment A) concluded that a 10-fold DAF is a very conservative estimate of potential attenuation of groundwater constituents from UST 229 before reaching surface water at the SBNWR and the subsequent dilution and tidal flushing (See Attachment A).

In addition the United States Geologic Society (USGS) study of attenuation in hyporheic zones (*MTBE, TBA, and TAME Attenuation in Diverse Hyporheic Zones*, 2010) further establishes the anticipated degradation rate for hydrocarbon constituents is primarily driven by dilution and dispersion through the hyporheic zone. The hyporheic zone is the organic rich zone within the tidal flat which is the interface between groundwater and surface water. The average degradation rates for these compounds within the hyporheic zone was 71% with approximately 3% driven by the microbial destruction of the oxygenate compounds (USGS, 2010).

Since UST Site 229 is located up-gradient of Site 14 (Figure 2, Attachment A) and thus farther in distance from SBNWR (which could increase diffusion and dilution and potentially increase the time it takes for Site 229 constituents to reach SBNWR), applying a generic DAF of 10 to adjust the surface water ESLs is considered rather conservative.

1.3 Identification of Chemicals of Ecological Concern

To identify chemicals of ecological concern (COECs) in this ecological screening evaluation, maximum detected concentrations in groundwater were compared to GSLs that were based on multiplying the surface water ESLs by a DAF of 10 for the protection of estuary aquatic habitats. A list of the constituents detected in groundwater and comparison to the ecological groundwater screening levels is provided in **Table A-2**.

Only two analytes (TPH as Diesel and napthalene) exceeded their ESLs. When a dilution attenuation factor of 10 was applied to the ESL to provide a groundwater screening level (GSL), only one detection of TPH as diesel exceeded the ESL. This TPH as diesel exceedance of the GSL (2.1 mg/L) was from well SB229-MW01 (2.4 mg/L in the former tank cavity) during the August 2009 sampling event, and the exceedance was only by 0.3 mg/L. Three subsequent sampling events all show values well below the GSL. In addition, downgradient well TPH Diesel values do not exceed the GSL criteria and are closer in proximity to the SBNWR. Table A2 provides a summary of all four rounds of sampling results. Table A3 highlights the exceedances to the ESL and GSL from the previous tables.

No COECs were identified for UST Site 229 since the maximum detected concentrations were all well below their respective GSLs (Table A2). As a result, the constituents detected at the Site are considered to have limited potential for ecological risk. Therefore, further evaluation of exposure is not warranted.

1.4 Summary and Conclusions

Based on the results of the ecological risk screening, it is unlikely that surface water quality at the SBNWR is being adversely affected by constituents detected at UST Site 229. The conclusion is based in the following findings:

- Of the 408 groundwater results reported in monitoring wells located upgradient of SBNWR and Site 14, only 1 napthalene and 16 TPH as diesel concentrations are above ESLs (Table A2).
- Only one TPH Diesel Concentration exceeds the GSL (2.1 mg/L) at SB229-MW01 (2.4 mg/L) as shown in Table A2. This well is located within the former tank pit area. No downgradient wells from the former tank pit area exceed the conservative GSL value (2.1 mg/L).
- There is increasing research data pointing to biodegradation of fuel hydrocarbons under both aerobic and anaerobic conditions under a variety of soil and geochemical conditions (USGS, 2010).

- UST Site 229 lies on the seaward side of the Newport-Inglewood Fault, where groundwater is predominantly brackish to saline and unsuitable for human consumption.
- A DAF of 10 to 1 for groundwater to surface water mixing is considered conservative based on the anlsysis (Attachment A) conducted for UST 229/Site 14 which showed a much higher dilution attenuation factor due to groundwater gradient and tidal mixing. The calculated DAF based on tidal flux, tidal/groundwater interface, and groundwater flow was in excess of 100,000 to 1.

Based on the results of the ecological screening evaluation, continued groundwater monitoring at the UST 229 Site is not recommended. Moreover, the results support an application for a No Further Action designation for UST Site 229 located on NAVWPNSTA Seal Beach, California.

1.5 References

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United States Geologic Society (USGS), 2010; *MTBE, TBA, and TAME Attenuation in Diverse Hyporheic Zones*, Ground Water, Vol.48, No. 1, Jan-Feb 2010 (pg. 30-41).

Table A-1
Groundwater Analytical Results
NWS Seal Beach UST Site 229

Sample Information		Analyte	TPH-DIESEL RANGE	ACENAPHTHENE	ACENAPHTHYLENE	ANTHRACENE	BENZO[A]ANTHRACENE	BENZO[A]PYRENE	BENZO[B]FLUORANTHENE	BENZO[G,H,I]PERYLENE	BENZO[K]FLUORANTHENE	CHRYSENE	DIBENZ[A,H]ANTHRACENE	FLUORANTHENE	FLUORENE	INDENO[1,2,3-CD]PYRENE	NAPHTHALENE	PHENANTHRENE	PYRENE
		Analytical Method	8015B	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM
		Units	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Well ID	**Sample Date**	**Sample ID**																	
BSW -14-4	8/7/2009	BSW-14-4-3Q09-GW01	0.59	0.13 J	0.062 J	0.028 UJ	0.011 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.15 J	0.028 U	9.1	0.04 J	0.028 U
	11/13/2009	BSW-14-4-4Q09-GW01	0.77	0.13	0.052	0.028 U	0.0094 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.12	0.028 U	7	0.067 J	0.028 UJ
	7/20/2010	BSW-14-4-3Q10-GW01	0.34 J	0.064	0.025 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.064	0.028 U	2.6	0.016 J	0.028 U
	12/9/2010	BSW-14-4-4Q10-GW01	1.1	0.16	0.060	0.028 U	0.011 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.17	0.028 U	30	0.11	0.010 J
BSW-14-6	8/7/2009	BSW-14-6-3Q09-GW01	0.47 U	0.028 UJ	0.028 UJ	0.028 UJ	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 UJ	0.028 U	0.028 UJ	0.028 UJ	0.028 U
	11/13/2009	BSW-14-6-4Q09-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.035 U	0.028 UJ	0.028 UJ
	7/20/2010	BSW-14-6-3Q10-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
	12/9/2010	BSW-14-6-4Q10-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.061 U	0.028 U	0.028 U
SB229-MW01	8/7/2009	SB229MW1-3Q09-GW01	2.4	0.93 J	0.72 J	0.028 UJ	0.015 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	3.3 J	0.028 U	31 J	3 J	0.037
	11/12/2009	SB229MW1-4Q09-GW01	1.7	0.95	0.55	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	1.9	0.028 U	17	3.3J	0.032 J
	7/19/2010	SB229MW1-3Q10-GW01	1.9	0.37	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.49	0.028 U	0.13	0.028 U	0.018 J
	12/8/2010	SB229MW1-4Q10-GW01	1.4	0.44	0.21	0.059	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	1.0	0.028 U	0.44	0.11	0.029
SB229-MW02	8/6/2009	SB229MW2-3Q09-GW01	0.85	0.028 UJ	0.028 UJ	0.028 UJ	0.015 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 UJ	0.028 U	0.028 UJ	0.028 UJ	0.028 U
	11/12/2009	SB229MW2-4Q09-GW01	1.3	0.053	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.013 J	0.028 U	0.028 U	0.028 U	0.028 U	0.042 U	0.028 UJ	0.028 UJ
	7/19/2010	SB229MW2-3Q10-GW01	1.9	0.028 U	0.023 J	0.028 U	0.013 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
	12/8/2010	SB229MW2-4Q10-GW01	1.6	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.029 U	0.028 U	0.014 J
SB229-MW03	8/7/2009	SB229MW3-3Q09-GW01	0.29 J	0.018 J	0.024 J	0.028 UJ	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.077 J	0.028 U	0.047 UJ	0.028 UJ	0.028 U
	11/12/2009	SB229MW3-4Q09-GW01	0.24 J	0.028 U	0.013 J	0.028 U	0.028U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028U	0.028 U	0.028 J	0.028U	0.036 U	0.028 UJ	0.028 UJ
	7/19/2010	SB229MW3-3Q10-GW01	0.42 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
	12/9/2010	SB229MW3-4Q10-GW01	0.29 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
SB229-MW04	8/6/2009	SB229MW4-3Q09-GW01	0.47 U	0.028 UJ	0.028 UJ	0.028 UJ	0.014 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 UJ	0.028 U	0.028 UJ	0.028 UJ	0.028 U
	11/12/2009	SB229MW4-4Q09-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.049 J	0.028 UJ
	7/19/2010	SB229MW4-3Q10-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
	12/8/2010	SB229MW4-4Q10-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.087 U	0.028 U	0.028 U

Table A-2
Chemicals of Ecological Concern (Screening Level)
NWS Seal Beach UST Site 229

Constituent	Maximum Groundwater Concentration		Units	Location of Maximum Concentration	# of Detects	# of Samples	Detection Frequency	Surface Water ESL for Estuary Habitat(1)	Maximum Concentration > ESL?	Dilution Attenuation Factor (DAF) (2)	Groundwater Screening Level (3)	Maximum Concentration > Groundwater Screening Level?
TPH as Diesel	2.4		mg/l	SB229-MW01	16	24	67	0.21	Yes	10	2.1	Yes*
Acenaphthene	0.95		µg/l	SB229-MW01	10	24	42	23	No	10	230	No
Acenaphthylene	0.72	J	µg/l	SB229-MW01	10	24	42	30	No	10	300	No
Anthracene	0.059		µg/l	SB229-MW01	1	24	4	0.73	No	10	7.3	No
Benzo[a]anthracene	0.015	J	µg/l	SB229-MW01	7	24	29	0.027	No	10	0.27	No
Benzo[a]pyrene	<0.028		µg/l	--	0	24	0	0.014	--	10	0.14	--
Benzo[b]fluoranthene	<0.028		µg/l	--	0	24	0	0.029	--	10	0.29	--
Benzo[g,h,i]perylene	<0.028		µg/l	--	0	24	0	0.10	--	10	1	--
Benzo[k]fluoranthene	<0.028		µg/l	--	0	24	0	3.7	--	10	37	--
Chrysene	0.013	J	µg/l	SB229-MW02	1	24	4	0.35	No	10	3.5	No
Dibenz[a,h]anthracene	<0.028		µg/l	--	0	24	0	7.5	--	10	75	--
Fluoranthene	<0.028		µg/l	--	0	24	0	8.0	--	10	80	--
Fluorene	3.3	J	µg/l	SB229-MW01	10	24	42	3.9	No	10	39	No
Indeno[1,2,3-cd]pyrene	<0.028		µg/l	--	0	24	0	0.048	--	10	0.48	--
Naphthalene	31	J	µg/l	SB229-MW01	8	24	33	24	Yes	10	240	No
Phenanthrene	3.3	J	µg/l	SB229-MW01	8	24	33	4.6	No	10	46	No
Pyrene	0.037		µg/l	SB229-MW01	6	24	25	2.0	No	10	20	No

Notes:

" -- " not applicable

" < " not detected, less than the method detection limit listed

Units are in " mg/l " milligrams per liter or " µg/l " micrograms per liter

" ESL " environmental screening level for marine aquatic habitat goal (discharges to surface water)

(1) SFRWQCB 2008. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, revised May 2008.

(2) Dilution Attenuation Factor of 10 used to account for groundwater discharges to surface water

(3) Derived by multiplying the ESL with the DAF

* One time exceedance on first sampling event, all other events are below Groundwater Screening Criteria

Table A-3
Exceedances of ESL Values
NWS Seal Beach UST Site 229

Sample Information		Analyte	TPH-DIESEL RANGE	ACENAPHTHENE	ACENAPHTHYLENE	ANTHRACENE	BENZO[A]ANTHRACENE	BENZO[A]PYRENE	BENZO[B]FLUORANTHENE	BENZO[G,H,I]PERYLENE	BENZO[K]FLUORANTHENE	CHRYSENE	DIBENZ[A,H]ANTHRACENE	FLUORANTHENE	FLUORENE	INDENO[1,2,3-CD]PYRENE	NAPHTHALENE	PHENANTHRENE	PYRENE
		Analytical Method	8015B	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM	8270 SIM
		Units	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Surface Water ESL for Estuary Aquatic Habitat[(1)]			0.21	23	30	0.73	0.027	0.014	0.029	0.1	3.7	0.35	7.5	8	3.9	0.048	24	4.6	2
Groundwater Screening Level[(2)]			2.1	230	300	7.3	0.27	0.14	0.29	1	37	3.5	75	80	39	0.48	240	46	20
Well ID	**Sample Date**	**Sample ID**																	
BSW -14-4	8/7/2009	BSW-14-4-3Q09-GW01	0.59	0.13 J	0.062 J	0.028 UJ	0.011 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.15 J	0.028 U	9.1	0.04 J	0.028 U
	11/13/2009	BSW-14-4-4Q09-GW01	0.77	0.13	0.052	0.028 U	0.0094 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.12	0.028 U	7	0.067 J	0.028 UJ
	7/20/2010	BSW-14-4-3Q10-GW01	0.34 J	0.064	0.025 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.064	0.028 U	2.6	0.016 J	0.028 U
	12/9/2010	BSW-14-4-4Q10-GW01	1.1	0.16	0.060	0.028 U	0.011 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.17	0.028 U	30	0.11	0.010 J
BSW-14-6	8/7/2009	BSW-14-6-3Q09-GW01	0.47 U	0.028 UJ	0.028 UJ	0.028 UJ	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 UJ	0.028 U	0.028 UJ	0.028 UJ	0.028 U
	11/13/2009	BSW-14-6-4Q09-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.035 U	0.028 UJ	0.028 UJ
	7/20/2010	BSW-14-6-3Q10-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
	12/9/2010	BSW-14-6-4Q10-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.061 U	0.028 U	0.028 U
SB229-MW01	8/7/2009	SB229MW1-3Q09-GW01	2.4	0.93 J	0.72 J	0.028 UJ	0.015 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	3.3 J	0.028 U	31 J	3 J	0.037
	11/12/2009	SB229MW1-4Q09-GW01	1.7	0.95	0.55	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	1.9	0.028 U	17	3.3J	0.032 J
	7/19/2010	SB229MW1-3Q10-GW01	1.9	0.37	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.49	0.028 U	0.13	0.028 U	0.018 J
	12/8/2010	SB229MW1-4Q10-GW01	1.4	0.44	0.21	0.059	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	1.0	0.028 U	0.44	0.11	0.029
SB229-MW02	8/6/2009	SB229MW2-3Q09-GW01	0.85	0.028 UJ	0.028 UJ	0.028 UJ	0.015 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 UJ	0.028 U	0.028 UJ	0.028 UJ	0.028 U
	11/12/2009	SB229MW2-4Q09-GW01	1.3	0.053	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.013 J	0.028 U	0.028 U	0.028 U	0.028 U	0.042 U	0.028 UJ	0.028 UJ
	7/19/2010	SB229MW2-3Q10-GW01	1.9	0.028 U	0.023 J	0.028 U	0.013 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
	12/8/2010	SB229MW2-4Q10-GW01	1.6	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.029 U	0.028 U	0.014 J
SB229-MW03	8/7/2009	SB229MW3-3Q09-GW01	0.29 J	0.018 J	0.024 J	0.028 UJ	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.077 J	0.028 U	0.047 UJ	0.028 UJ	0.028 U
	11/12/2009	SB229MW3-4Q09-GW01	0.24 J	0.028 U	0.013 J	0.028 U	0.028U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 J	0.028U	0.036 U	0.028 UJ	0.028 UJ
	7/19/2010	SB229MW3-3Q10-GW01	0.42 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
	12/9/2010	SB229MW3-4Q10-GW01	0.29 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
SB229-MW04	8/6/2009	SB229MW4-3Q09-GW01	0.47 U	0.028 UJ	0.028 UJ	0.028 UJ	0.014 J	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 UJ	0.028 U	0.028 UJ	0.028 UJ	0.028 U
	11/12/2009	SB229MW4-4Q09-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.049 J	0.028 UJ
	7/19/2010	SB229MW4-3Q10-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
	12/8/2010	SB229MW4-4Q10-GW01	0.47 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.087 U	0.028 U	0.028 U

Notes:
Units are in " mg/l " milligrams per liter
" ESL " environmental screening level for estuary aquatic habitat goal (discharges to surface water)
(1) SFRWQCB 2008. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final, revised May 2008.
(2) Derived by multiplying the ESL with the Dilution Attenuation Factor of 10
Concentrations greater than ESL
Concentrations greater than Groundwater Screening Level

Geosyntec consultants

ATTACHMENT A

DILUTION ATTENUATION FACTOR ANALYSIS

UST 229/Site 14

I. Statement of the Problem:

As part of the ecological screening analysis, a dilution attenuation factor (DAF) of 10 was used for creating the groundwater screening level for constituents of concern (COCs). The DAF allows for the slower moving groundwater gradient and associated groundwater concentrations moving into the tidal surface water. The following evaluation will determine if a 10-fold DAF is appropriate for the UST 229 water quality results.

a) Assumptions:

i Groundwater flows toward the Seal Beach National Wildlife Refuge (SBNWR) from UST 229 and Site 14, with Site 14 lying between UST 229 and SBNWR (Figure 1 and 2).

ii. The groundwater plume from UST 229 flows into the Site 14 plume (Figure 3 and 4) and water quality defined in the well samples adequately defines the constituents of concern (RBA, 2011).

iii. The groundwater gradient as shown in Figures 5-4, 5-5, 5-6, and 5-7 in the Extended Site Assessment Report (Brady, 2011) is consistently to the east toward SBNWR throughout the year.

b) The interface between the tidal marsh and the groundwater plume associated with UST 229 / Site 14 can be defined as a plane projected into the tidal area (Figure 1).

c) The area of the interface of the groundwater plume is measured by the width of the plume parallel to the tidal flat at the eastern side of Kitts Highway (measured as 100 ft wide). Control for the width of the plume is provided by monitor wells SB229-MW04 and BSW-14-6 which show no COCs above environmental screening levels (ESL) as shown in the groundwater water quality summary map (Figures 5-4, 5-5, 5-6, and 5-7 in the ESA Report; Brady,2011).

d) To provide a volume of tidal water for calculating the DAF, the plume width (100 feet (ft)) is projected across the mud flat to the channel flowing north-south within the marsh (see Figure 1). A 300-ft wide (plume width) by 125-ft long (tidal flat width) area makes up the mixing zone for the plume interaction with tidal flux (this is the area of the tidal flat adjacent to the Site 14 area seen in Figure 1).

e) The tidal flux occurs over a 12-hour period, and there are two tidal periods each 24-hour day, therefore V_T (volume of daily tidal flow) will include two transfers of water per 24 hour period.

f) Since tidal fluctuations vary approximately 3.81 ft, (based on NOAA-CO-OPs), Los Angeles Station ID #9410660 (attached), we will assume that a complete change of tidal water occurs across the tidal interface during each tide (this is a conservative estimation as the current transferring tidal water in and out actually creates a proximal stream flow during the tidal flux). The tidal interface is the downstream mixing area for the UST 229 plume as it migrates down gradient from the source area.

g) Since topographic data is not currently available for the surface of the tidal flat, we will assume that the average depth of the tidal zone that makes up the interface with the plume is 1 ft deep (based on a tidal range of 0-inches to 3.81 ft within the tidal flat area). Although the average value would be slightly less than 2 ft, the use of 1 ft is intended to be conservative. This area is identified by the low and high tide levels immediately east of UST 229/Site 14 (Figure 1).

II. Groundwater Gradient for UST 229 and Site 14

The hydraulic gradient from the gradient maps (Brady, 2011; ESA Report, Figures 5-4, 5-5, 5-6, and 5-7) indicate an average gradient of i = 0.001 ft/ft. A hydraulic gradient for Site 14 was provided from the 2002 Annual Groundwater Monitoring Report for Site 14 (FWENC, 2003), i = 0.002 ft/ft. For these calculations we will use i = 0.002 ft/ft as it approximates the values closest to SBNWR where the interface with tidal water occurs.

The USGS (1991) provided values for the co-efficient of permeability (aka hydraulic conductivity). In Section 2.3 of this document (USGS, 1991), *Groundwater Movement*, an average coefficient of permeability is provided. This K = 1.9 gpd/ft^2 based on this reference.

As discussed in the assumptions section, the plume width, as measured from FWENC, 2003, Figure 3-4, is 100 ft at the east boundary of Kitts Highway. Because the UST 229 plume flows into the Site 14 plume we will use the same tidal interface area.

Based on tide information (NOAA-CO-OPs, 2003), the tidal fluctuation at Los Angeles Station ID #9410660 (the closest station to the site), the mean tidal range is 3.8 ft and the minimum low water level is equal to -5.4 ft from mean sea level (ft msl). The

potential head between the low tide water level (-5.4 ft) and the current groundwater level in Well BSW-14-8 (3.8 ft msl) is 9.2 ft, therefore $\Delta h = 9.2$ ft

The area of the plume interface is 100 ft x 9.2 ft = 920 ft^2.

Subsequently, the groundwater flow into the tidal area across the plume interface would be equal to:

$$Q_{gw} = -KiA \qquad i = \frac{\Delta h}{L}$$

A = area = 920 ft^2

i = -0.002 ft/ft

K = 1.9 gpd/ft^2

$$Q_{gw} = 1.9 \text{ gpd/ft}^2 \times 0.002 \frac{ft}{ft} \times 920 \text{ ft}^2$$

$$Q_{gw} = 3.5 \text{ gpd}$$

III. Tidal Flux

The volume of water that will interact with the groundwater interface is, at a minimum, the volume of water within the tidal area immediately adjacent to the UST 229/Site 14 plume. To determine this volume of water, we need to know the area for mixing.

For our calculations, we have measured the tidal mixing area from Figure 5 in MARRS/Geosyntec, 2005. From the measurements, we observed an area 380 ft long by 100 ft wide (the plume width on the tidal flat).

$$A = 300 \text{ ft} \times 125 \text{ ft} \approx 38{,}000 \text{ ft}^2$$

The tidal area varies from a few inches to several ft deep. To calculate the volume of water within the tidal area, we will use an average of 1 ft depth.

Thus, the volume of water for every 12-hour tidal flux is equal to:

V_T	=	A x d	A = Area
V_T	=	38,000 ft^2 x 1 ft	d = depth
V_T	=	38,000 ft^3 x 7.48 gal/ft^3	V_T = Volume Tidal Flow
V_T	=	284,240 gallons per 12-hour tide	

IV. Comparison of Groundwater Flow and Tidal Flux

The tidal flux in a 12-hour period was calculated to be 284,240 gallons. Therefore, adjusting for two 12-hour periods in a day, the total tidal flow within the interface area (tidal mixing zone) would be V_T = 568,480 gallons per day (gpd).

The flow for the groundwater interface was equal to 3.5 gallons per day. To determine the DAF for groundwater mixing with surface water, we would use the following function, since time has been set to the same interval (1day), the volume of water can be compared as a ratio:

$$DAF = (V_T \times 1 \text{ day}) / (Q_{gw} \times 1 \text{ day})$$

$$DAF = 568{,}480 \text{ gallons} / 3.5 \text{ gallons}$$

$$DAF = 162{,}422$$

V. Conclusion:

Based on the calculations above, the DAF of 10 for groundwater to surface water is actually a very conservative value and generally accepted. Factors influencing the ratio are driven by the area of tidal mixing, the flow rate across the mixing zone, and the estimated depth of water. At this site the tidal interface provides a larger dilution factor due to the tidal flux, the area of mixing, and the tidal swing in water elevation.

VI. References:

BRADY, 2011, *Extended Site Assessment Report*, Naval Weapons Station Seal Beach, California, May

MARRS/Geosyntec, 2005; *Final Techincal Memorandum Ecological Risk Screening Results for Potential Impacts to Seal Beach National Wildlife Refuge from Site 14* Naval Weapons Station Seal Beach, California, January

USGS, 1991, Schroeder, Roy A.); *Delineation of a Hydrocarbon (Weathered Gasoline) Plume in Shallow Deposits at the U.S. Naval Weapons Station*, Seal Beach, California, Water-Resources Investigation Report 89-4203

NOAA/NOS CO-OPS

Center for Operational Oceanographic Products and Services (CO-OPS)

Station Information for Los Angeles, CA

Water Level Station Information:

Station Name: **Los Angeles, CA**
Station Identification Number: **9410660**
Latitude: **33° 43.2' N**
Longitude: **118° 16.3' W**
Date Established: **Nov 28 1923**
Maximum Water Level: **2.33 ft. above MHHW** (01/27/1983)
Minimum Water Level: **-2.73 ft. below MLLW** (12/17/1933)
Mean Range: **3.81 ft.**
Diurnal Range: **5.49 ft.**
Tidal and Geodetic Datums: **Click HERE**
Bench Mark Data Sheet: **Click HERE**

EPOCH Update Information: NEW

EPOCH Datum Comparison:	**Click HERE -**	check datum differences between the old epoch (1960-1978) and the new epoch (1983-2001)
Superceded Bench Mark Data Sheet:	**Click HERE -**	bench mark sheet on the old Tidal Datum Epoch (1960-1978)
Superceded Datums:	**Click HERE -**	datums on the old Tidal Datum Epoch (1960-1978)
Mean Sea Level Differences List:	**Click HERE -**	mean sea level differences between the two epochs for all stations.

Mean Sea Level Difference: for 9410660 Los Angeles, CA	**1983-2001**	**1960-1978**	**Difference:**
	6.65 ft.	6.53 ft.	0.12 ft.

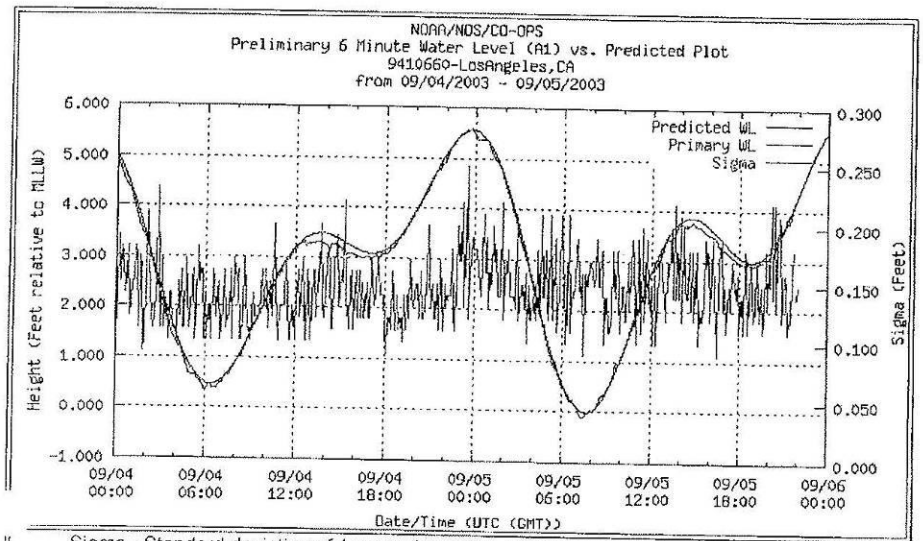
Data Types Available:

Primary Water Level

http://co-ops.nos.noaa.gov/cgi-bin/station_info.cgi?stn=9410660+LOS+ANGELES,+OUTE... 9/5/2003

Backup Water Level
Water Temperature

Current Water Level Data Plot



Sigma - Standard deviation of 1 second samples used to compute the water level height.

Retrieve Data Listing

Data Inventory
Station Data Plots
Water Level Data Listing (preliminary)
Water Level Data Listing (historical)
Meteorological/Oceanographic Data Listing

Location:

To reach the tidal bench marks, take Harbor Boulevard exit from Harbor Freeway in Los Angeles. Turn right on Harbor Boulevard, then left on 22nd Street, and right at signal to Berth 60, water Taxi. The bench marks are near Signal Street and the railroad tracks leading to and along Pier 1. Tide gauges are located in a small room at the SW end of pier.

Station Location Drawing

ck HERE for Drawing
(not for navigational use)

http://co-ops.nos.noaa.gov/cgi-bin/station_info.cgi?stn=9410660+LOS+ANGELES,+OUTE... 9/5/2003

Figure 1: Plume Interface with Tidal Zone

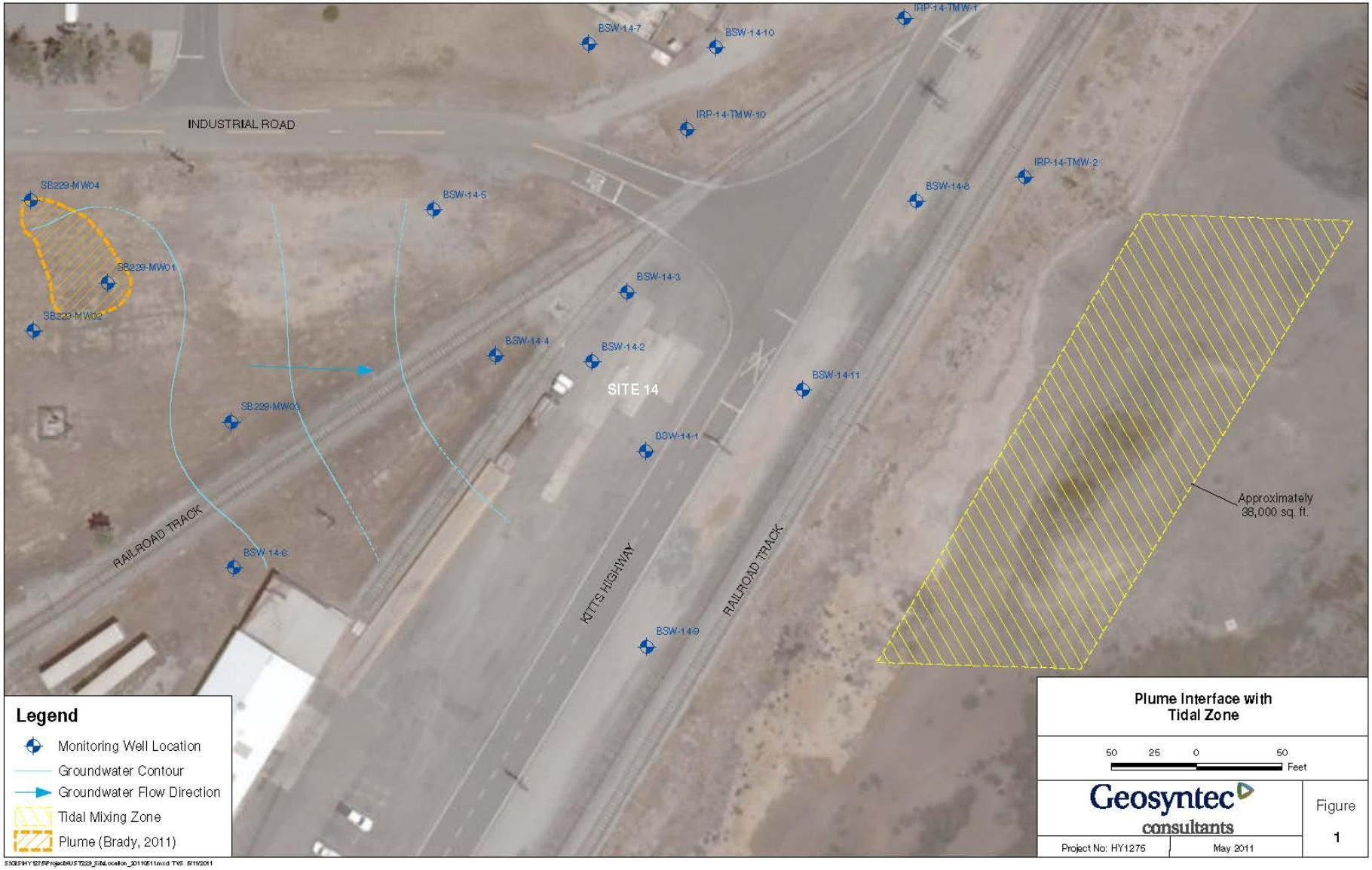


Figure 3: Groundwater Gradient Map

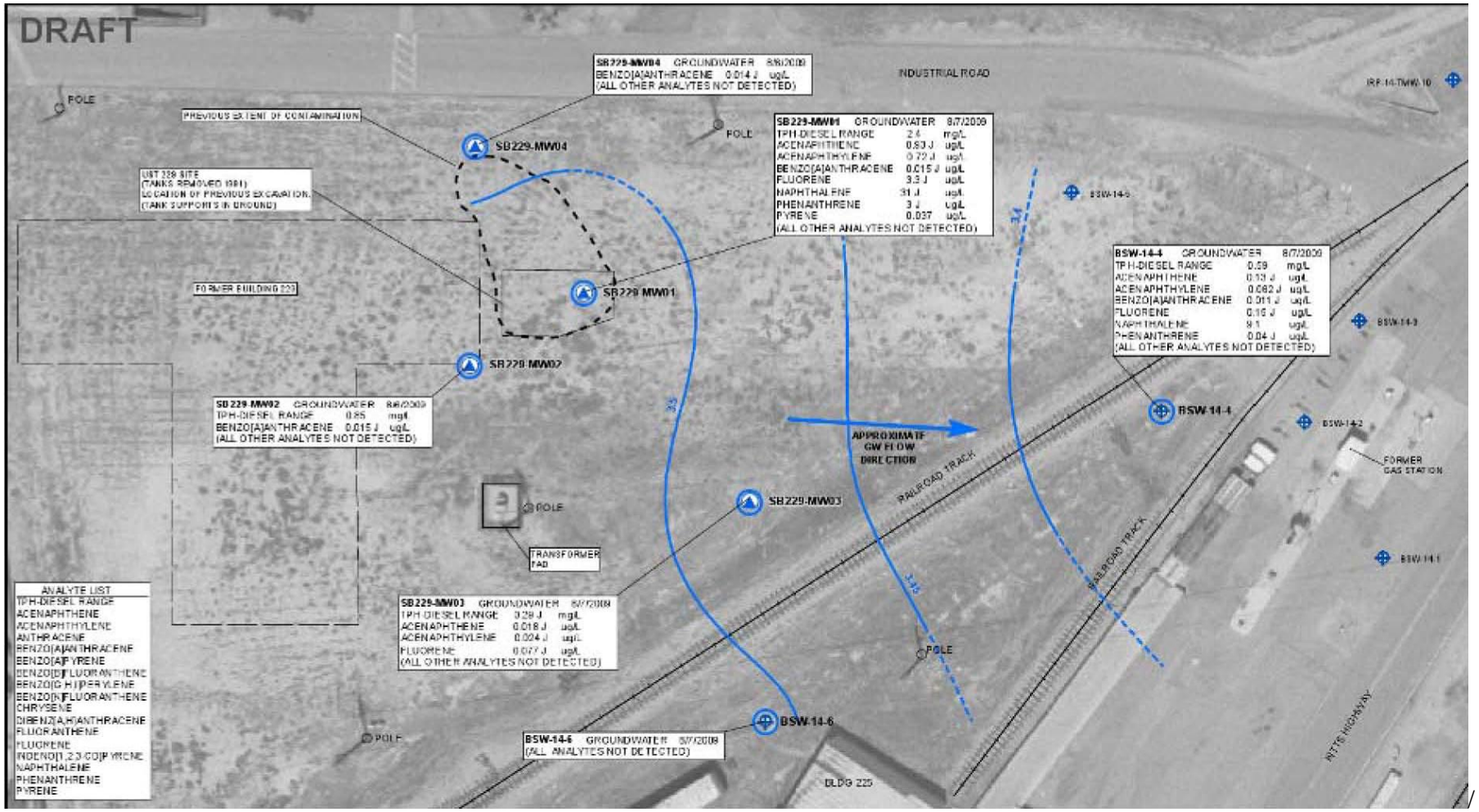
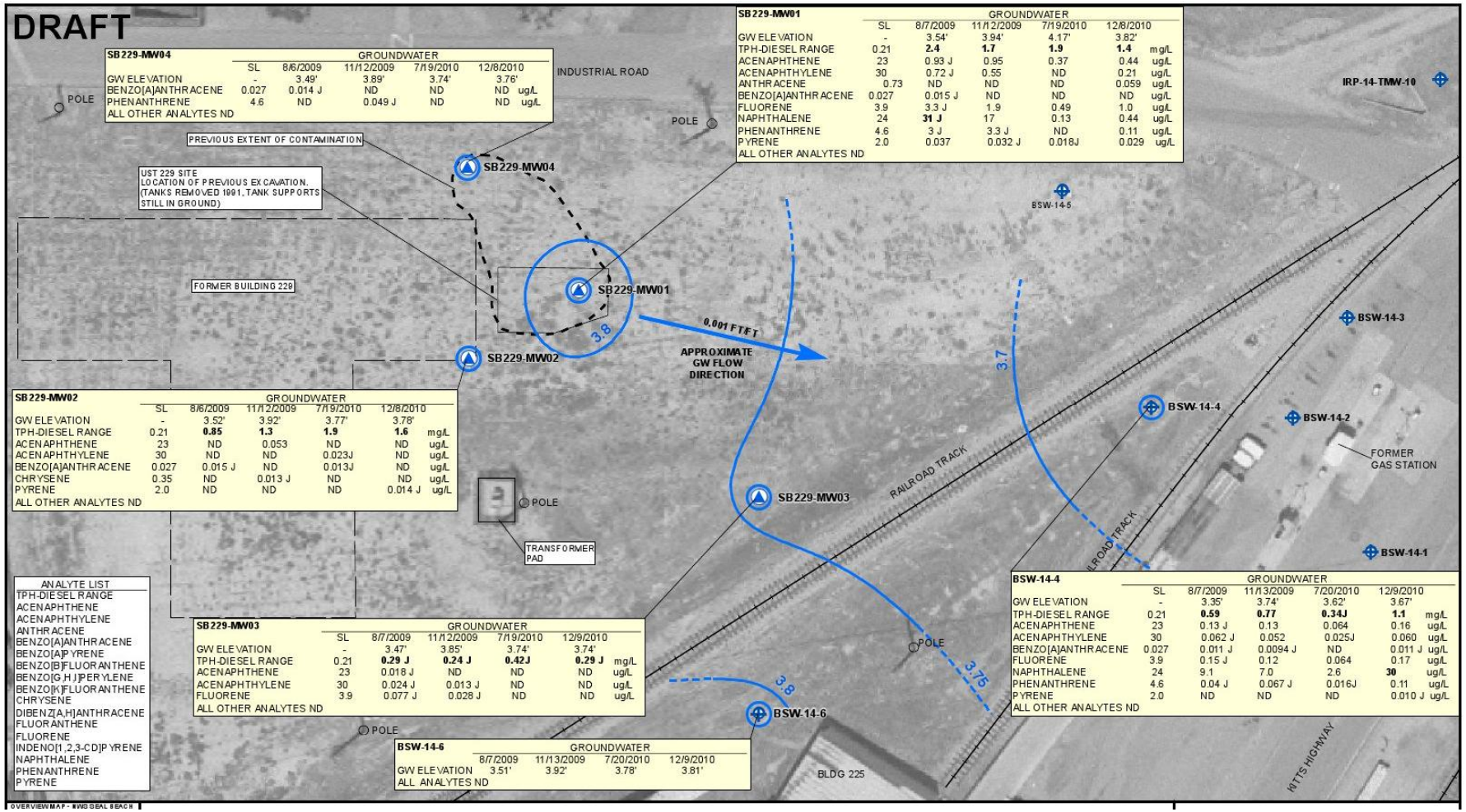



Figure 4: Groundwater Quality Results for UST 229