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DATE	JAN 15 2010
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January 15, 2010

Dockets Unit
California Energy Commission
1516 Ninth Street, MS 4
Sacramento, CA 95814

RE: Marsh Landing Generating Station
Application for Certification 08-AFC-03

On behalf of Mirant Marsh Landing, LLC, the applicant for the Marsh Landing Generating Station (MLGS), we are pleased to submit the *Focused Site Investigation Report and Human Heath Risk Assessment*. This document is submitted to the Dockets Unit and to the Proof of Service list electronically, and one print copy will be sent to the Docket Unit.

Please include this document in the AFC record.

URS Corporation

Anne Connell
Project Manager

Attachment

CC: Mike Monasmith
Alvin Greenberg

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URS

January 25, 2010

Dockets Unit
California Energy Commission
1516 Ninth Street, MS 4
Sacramento, CA 95814

RE: Marsh Landing Generating Station
Application for Certification 08-AFC-03

On behalf of Mirant Marsh Landing, LLC, the applicant for the Marsh Landing Generating Station (MLGS), we are pleased to submit one CD containing the *Focused Site Investigation Report and Human Heath Risk Assessment*. On January 15 this document was submitted to the Dockets Unit and to the Proof of Service list electronically, and one print copy was sent to the Dockets Unit. As requested, enclosed is a replacement CD containing the electronic document without security features.

Please include this document in the AFC record.

URS Corporation

Anne Connell
Project Manager

Enclosure

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URS

January 21, 2010

Dockets Unit
California Energy Commission
1516 Ninth Street, MS 4
Sacramento, CA 95814

RE: Marsh Landing Generating Station
Application for Certification 08-AFC-03

On behalf of Mirant Marsh Landing, LLC, the applicant for the Marsh Landing Generating Station (MLGS), we are pleased to submit one CD containing the *Focused Site Investigation Report and Human Heath Risk Assessment*. On January 15 this document was submitted to the Dockets Unit and to the Proof of Service list electronically, and one print copy was sent to the Dockets Unit. We have since received notice from the CEC that our electronic submission to the Dockets Unit was not successful, and therefore we are providing the electronic file on CD.

Please include this document in the AFC record.

URS Corporation

for
Anne Connell
Project Manager

Attachment

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Pacific Gas and Electric Company®

David Harnish
Manager
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January 15, 2010

Mr. Jonathan Sacks
Project Director,
Mirant Corporation
1155 Perimeter Center West
Atlanta, GA 30338

Subject: ***Focused Site Investigation and Human Health Risk Assessment***
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Dear Jon:

PG&E is pleased to submit the enclosed *Focused Site Investigation and Human Health Risk Assessment* for the Marsh Landing Generating Station (MLGS) at Mirant's Contra Costa Power Plant. This report was prepared by AMEC Geomatrix in order to respond to data requests Mirant received from the California Energy Commission (CEC) Staff as part of its review of the Application for Certification for the MLGS project. We understand that Mirant will submit the enclosed report to CEC Staff for its use in preparing a Preliminary Staff Assessment for the MLGS project.

With completion of the investigation to respond to the CEC Staff data requests, PG&E will turn its attention to completing DTSC investigation and remediation requirements for the MLGS project area.

Please contact Neil Ziemba at (707) 709-8787 if you have any questions regarding the enclosed report.

Sincerely,

David Harnish
Manager, Environmental Remediation

cc: Barbara Bensen, PG&E
Neil Ziemba, P.E., WAU & Company
Jennifer Patterson, P.E., AMEC Geomatrix, Inc.

Enclosure: Focused Site Investigation and Human Health Risk Assessment

FOCUSED SITE INVESTIGATION REPORT AND HUMAN HEALTH RISK ASSESSMENT

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Submitted by:
AMEC Geomatrix, Inc., Oakland, California

January 2010

Project 15317.000

AMEC Geomatrix

January 15, 2010

Project 15317.000/9

Mr. David Harnish
Pacific Gas & Electric Company
Environmental Services Department
3401 Crow Canyon Road
San Ramon, California 94583

Subject: Focused Site Investigation Report and Human Health Risk Assessment
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Dear Mr. Harnish:

On behalf of the Pacific Gas and Electric Company (PG&E), AMEC Geomatrix, Inc. (AMEC), has prepared this focused site investigation report and human health risk assessment (HHRA) for the Marsh Landing Generating Station (the site; MLGS) which is located within the Contra Costa Power Plant (CCPP) property at 3201 Wilbur Avenue, Contra Costa County, California.

The investigative activities and the focused HHRA described in this report were performed primarily in accordance with the AMEC's November 20, 2009 *Work Plan for Soil and Groundwater Sampling and Focused Human Health Risk Assessment* submitted to the California Energy Commission (CEC). CEC staff approved the work plan in an e-mail on November 24, 2009.

The work plan and this report were prepared in response to CEC Staff requests that additional data be collected and that a focused HHRA be performed to complete its review of the Application for Certification (AFC) submitted by Mirant Marsh Landing, LLC, an affiliate of the current property owner (Mirant Delta, LLC), for construction and operation of the proposed MLGS facility.

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AMEC Geomatrix

Please contact either of the undersigned if you have any questions.

Sincerely yours,
AMEC Geomatrix, Inc.

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JLP/RC/jh
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Enclosure

cc: Neil Ziemba, WAU & Company

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FOCUSED SITE INVESTIGATION REPORT AND HUMAN HEALTH RISK ASSESSMENT

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

1.0 INTRODUCTION

On behalf of the Pacific Gas and Electric Company (PG&E), AMEC Geomatrix, Inc. (AMEC), has prepared this focused site investigation report and human health risk assessment (HHRA) for the Marsh Landing Generating Station (the site; MLGS) which is located within the Contra Costa Power Plant (CCPP) property at 3201 Wilbur Avenue, Contra Costa County, California (Figure 1). The investigative activities and the focused HHRA described in this report were performed primarily in accordance with the *Work Plan for Soil and Groundwater Sampling and Focused Human Health Risk Assessment* (work plan) prepared by AMEC and submitted to the California Energy Commission (CEC) on November 20, 2009, except as noted in Section 3.1. CEC staff approved the work plan in an e-mail on November 24, 2009. The work plan and this report were prepared in response to CEC Staff requests that additional data be collected and that a focused HHRA be performed to complete its review of the Application for Certification (AFC) submitted by Mirant Marsh Landing, LLC (Mirant Marsh Landing), for construction and operation of the proposed MLGS facility. Mirant Marsh Landing is an affiliate of the current CCPP owner, Mirant Delta, LLC (Mirant Delta). PG&E is the former owner of the CCPP and conducted this work because it retained certain defined responsibility to remediate, as necessary, hazardous substance releases that were present at the time of its sale of the CCPP in 1999.

This report includes the objectives of the focused site investigation activities, a summary of background information for the site, a description of the focused site investigation activities and results, the focused short-format HHRA, and a discussion of the conclusions from the report and focused HHRA.

1.1 OBJECTIVES

The objective of the focused site investigation was to collect additional sampling data and to conduct a focused HHRA using the new and historical data from within the MLGS site footprint in response to the CEC staff requests. Based on the data request, the activities conducted and objectives of the focused site investigation were the following:

- Conduct groundwater sampling and analysis directly between the San Joaquin River and Tanks 1 and 2 to assess potential impacts from the tanks;

- Conduct supplemental soil and groundwater sampling and analysis for PCBs along the southern MLGS boundary immediately north of the PG&E switchyard to assess the potential impacts to soil and groundwater as a result of the reported oil-filled circuit breaker explosions in the late 1970s; and

- Conduct soil sampling and analysis near the storm water drains within the construction yard to assess potential impacts from off-site run-on.

2.0 BACKGROUND

The site history, site lithology and hydrogeology, and previous environmental investigations performed at the site are summarized below.

2.1 SITE HISTORY

The site is located within the CCPP property located at 3201 Wilbur Avenue within unincorporated Contra Costa County, near the City of Antioch and on the southern side of the San Joaquin River. The CCPP property was undeveloped prior to 1952. PG&E constructed the Contra Costa Power Plant (CCPP) in 1952 and 1953. The CCPP is situated on approximately 114 acres and existing features include power generating units, a tank farm with five 120,000-barrel bulk above ground storage tanks (ASTs) and three 500,000-barrel bulk ASTs, a water treatment system, an oily water collection system, work sheds, storage buildings, non-hazardous waste storage areas, hazardous waste storage areas, a sandblasting building, parking areas, septic system, and fire pump house (URS, 2008).

In 1999, PG&E sold the CCPP to Mirant Delta (previously named Southern Energy Delta, LLC). Mirant Delta's affiliate, Mirant Marsh Landing, has proposed constructing a new power plant facility, the MLGS, on approximately 27 acres of the CCPP. The outlines of both the MLGS boundary and the larger CCPP property it lies within are shown on Figure 2. Mirant Delta intends to create a separate parcel for the MLGS by subdividing the existing single parcel that constitutes the CCPP and transferring ownership of the MLGS parcel to Mirant Marsh Landing. The proposed MLGS is generally within the footprint of the area currently occupied by the five 120,000-barrel bulk ASTs and an adjacent construction yard immediately east of the ASTs.

The entire tank farm (ASTs 1 through 8) and associated piping and equipment were used to fuel the power plant from 1952 until approximately 1998. Since that time, the power plant has used natural gas for power generation. Only residual quantities of Number 6 fuel oil remain in the ASTs. The structural integrity of the tank bottoms is unknown. The areas surrounding the ASTs are unpaved (URS, 2008).

The adjacent construction yard was used for the storage of paints and paint supplies, accumulation of asbestos waste and removal equipment, and the temporary accumulation of hazardous waste. The area currently contains an underground septic tank, one satellite hazardous waste accumulation area, load center, storage and fabrication building, work sheds, and parking areas (URS, 2008).

Reportedly, two oil-filled circuit breakers located in the switchyard immediately south of the construction yard exploded in the late 1970s. The location of these two circuit breakers is shown in Figure 3. Dielectric fluid released in the explosions potentially contained polychlorinated biphenyls (PCBs) and may have impacted the surrounding soil (CDM, 1997). During the Phase II ESA conducted in 1998, shallow soil samples (collected at 0.5 and 4.5 feet below ground surface) were collected at five locations and groundwater samples were collected at two locations along a portion of the boundary between the switchyard and the construction yard portion of the MLGS and analyzed for PCBs. No PCBs were detected in any of the samples.

2.2 SITE LITHOLOGY AND HYDROGEOLOGY

The CCPP is located in the San Joaquin River delta within the Coast Range physiographic province. The soils beneath the site consist of fill in some areas and deltaic deposits. The deltaic deposits are comprised of fine to coarse-grained sands and thin layers of clay, silt and peat. The thin layers of clay and silt become thicker as they approach the northeastern portion of the site and the San Joaquin River. The depth to groundwater ranges from 6 to 10 feet below ground surface (bgs) and fluctuates with the tidal cycle and seasonal variations (Fluor Daniel GTI, 1998). The direction of groundwater flow is north-northwest towards the San Joaquin River (URS, 2008).

2.3 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

PG&E conducted a Phase I ESA and Phase II sampling prior to divestiture of the CCPP to Mirant Delta. To initially evaluate the site, PG&E contracted with Camp Dresser and McKee (CDM) to conduct a Phase I Environmental Site Assessment (ESA; CDM, 1997) for the entire CCPP. Based on the results of the initial Phase I, PG&E contracted with Fluor Daniel GTI to complete a Phase II environmental investigation and HHRA on the entire CCPP (Fluor Daniel GTI, 1998). The Phase II consisted of soil and groundwater sampling and analysis across the entire CCPP, which included the subject site. The sampling plan consisted of a biased sampling grid with approximately 150-foot spacing to assess general site conditions with a focus on specific areas or features of concern identified in the 1997 Phase I ESA. Historical sampling locations and tabulated historical soil and groundwater analytical data for the site are included in Appendix A.

In 2008, URS conducted a Phase I ESA on behalf of Mirant Marsh Landing in support of its AFC submitted to the CEC for the proposed MLGS.

2.4 PROPOSED SITE USE

Mirant Marsh Landing has submitted an AFC for construction of a power generation facility (the MLGS) at the site. The proposed plan is to construct four natural-gas-fired combustion turbine units on the western portion of the site now occupied by the tank farm. The eastern portion of the site occupied by the construction yard will be used for construction laydown, office and parking areas. No new facilities will be constructed within this eastern portion of the MLGS site. If needed, excess soil from the western portion of the site may be placed on the eastern portion of the site. Construction is scheduled to start in late 2010/early 2011 and power generation is expected to begin in May 2013.

3.0 FOCUSED SITE INVESTIGATION ACTIVITIES

To accomplish the objectives outlined above, AMEC and Engineering/Remediation Resources Group, Inc. (ERRG), of Martinez, California, a subcontractor to AMEC, collected soil and grab groundwater samples at 15 locations at the site on December 14 and 15, 2009. AMEC retained Woodward Drilling Company, a California-licensed drilling contractor, of Rio Vista, California to perform drilling services and Creek Environmental Laboratories, Inc., a California-certified laboratory, of San Luis Obispo, California to perform analytical services. Table 1 summarizes the sampling program and presents the objective for each sampling location; the sampling locations are shown on Figure 3. A soil boring permit was obtained from the Contra Costa Environmental Heath Division (CCEHD); a copy of this permit is included in Appendix B. A description of the field and analytical methodology used during these investigative activities is presented in Appendix C.

3.1 DEVIATIONS FROM THE WORK PLAN

The focused site investigation activities were performed in accordance with the work plan with the exception of the following:

- There was approximately 6 inches of asphaltic concrete at location SB-14. Because the objective of this sample was to assess surficial soil quality due to potential storm water run-on, a soil sample was collected directly beneath the asphaltic concrete between 0.5 and 1.0 feet bgs instead of between 0.0 and 0.5 feet bgs.

- This investigation was primarily focused on meeting the specific data requests of the CEC staff; however, some additional data was collected during the investigation in anticipation of potential data requirements to bring the site to regulatory closure

through the California Department of Toxic Substance Control (DTSC). The additional samples and analytes are highlighted in Table 1. The additional data generated from these samples is included in the risk analysis presented herein.

4.0 FOCUSED SITE INVESTIGATION RESULTS

The results for the supplemental investigation activities conducted at the site in December 2009 are summarized in the following sections.

4.1 DRILLING OBSERVATIONS

The site lithology described herein is based on observations made by ERRG during drilling of the 15 soil and grab groundwater borings at the site. Asphaltic concrete and aggregate base rock was encountered at borings SB-1 through SB-4 and SB-14 from ground surface to approximately 0.5 to 1.0 feet bgs. Below this layer at borings SB-1 through SB-4 and SB-14 and beginning at ground surface at all other borings, soil consisting of predominantly coarse-grained mixtures of sand and clay was present to a depth of 24 feet bgs, the maximum depth drilled. These observations were consistent with the lithology previously reported for the site. During the December 2009 investigative activities, groundwater was encountered in the soil borings between approximately 3.5 and 19.5 feet bgs; groundwater was observed deepest at borings SB-1 through SB-4, which are located on a higher-elevation roadway north of the tank farm. Boring logs are presented in Appendix D.

4.2 SOIL SAMPLE RESULTS

Chemical analytical results for soil samples are presented in Tables 2 through 4; analytical laboratory reports and chain-of-custody records are included in Appendix E. The following is a summary of the soil sample results from the December 2009 investigation:

- Total petroleum hydrocarbons (TPH) quantified as diesel (TPHd) was not detected in any of the 16 soil samples analyzed.

- TPH quantified as motor oil (TPHmo) was detected in 5 of the 16 soil samples analyzed at concentrations ranging from 24 to 120 milligrams per kilogram (mg/kg; sample from SB-15 at 0.5 feet bgs). Two of the samples containing TPHmo were collected from borings located along the southern site boundary (SB-10 and SB-11) and the remaining three were collected adjacent to catch basins in the northern portion of the construction yard area.

- No VOCs were detected above laboratory reporting limits in five of the six samples analyzed for VOCs. One volatile organic compound (VOC), methylene chloride, was detected at 0.051 mg/kg in one sample collected at 1.0 feet bgs from boring SB-7; however, the analytical laboratory narrative identified methylene chloride as a probable laboratory contaminant. Therefore, this result was flagged with a “U”,

which indicates that methylene chloride is considered to be not detected above 0.051 mg/kg.

- Polynuclear aromatic hydrocarbons (PAHs) were detected in 7 of the 11 soil samples analyzed; carcinogenic PAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, indeno[1,2,3-cd]pyrene, and naphthalene) were detected in 5 of the 11 soil samples analyzed. Benzo(a)pyrene toxicity equivalents (TEQs) were calculated for the locations where carcinogenic PAHs were detected and are presented in Table 2. The sample collected at 3.0 feet bgs from boring SB-10 located in the southeast corner of the site contained the highest concentrations of carcinogenic PAHs with a TEQ of 73.75 mg/kg. The TEQ in the remaining four samples that contain carcinogenic PAHs ranged from 0.066 to 0.181 mg/kg.

- PCBs were not detected in any of the 17 soil samples analyzed.

- Various metals were detected all 11 soil samples analyzed. Analytical results for metals in soil are presented in Table 4.

4.3 GROUNDWATER SAMPLE RESULTS

Chemical analytical results for grab groundwater samples are presented in Tables 5 and 6; analytical laboratory reports and chain-of-custody records are included in Appendix E. The following is a summary of the grab groundwater sample results from the December 2009 investigation:

- TPHd and TPHmo were not detected in any of the six grab groundwater samples analyzed.

- VOCs were not detected in any of the six grab groundwater samples analyzed.

- PCBs were not detected in the one grab groundwater sample analyzed (collected from boring SB-7).

- Various metals were detected in all six grab groundwater samples analyzed. Analytical results for metals in groundwater are presented in Table 6.

4.4 QUALITY ASSURANCE/QUALITY CONTROL EVALUATION SUMMARY

The laboratory data generated during this investigation were subjected to a data completeness check of each data package and a review of all laboratory reporting forms. Quality assurance/quality control (QA/QC) samples included a blind field duplicate sample, laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and matrix spike/matrix spike duplicate (MS/MSD) samples. The limited data review (completeness, precision check, hold time, and equipment and trip blank results) was conducted in accordance with U.S. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (U.S. EPA, 2008a) and U.S. EPA Contract Laboratory Program National

Functional Guidelines for Inorganic Data Review (U.S. EPA, 2004d). Based on the QA/QC review, the data are complete and usable.

5.0 HUMAN HEALTH RISK ASSESSMENT

This section presents the results of a focused HHRA for hypothetical exposure to constituents detected in environmental media at the site. The assessment was conducted to identify the potential risks posed by environmental media and whether risk reduction efforts are needed prior to or during the construction of the proposed MLGS. The intent is to provide risk managers and site decision makers with a basis for evaluating whether action to mitigate theoretical estimated health risks is necessary and appropriate.

The focused HHRA is based on regulatory guidelines recommended by U.S. Environmental Protection Agency (U.S. EPA) and California Environmental Protection Agency (Cal-EPA), and consideration of site-specific conditions. The focused HHRA is organized in a manner consistent with the referenced guidance documents and includes data evaluation and constituents of potential concern, exposure assessment, toxicity assessment, and risk characterization.

5.1 DATA EVALUATION AND CONSTITUENTS OF POTENTIAL CONCERN

Data evaluation is the process of analyzing site characteristics and analytical data to identify constituents of potential concern (COPCs) to be evaluated in the focused HHRA. The identification of potential constituent hazards is based on the site characterization data described in Sections 2 and 4 of this report. Soil and groundwater samples have been collected during several investigations at the site. Samples have been analyzed for VOCs, PAHs, total extractable hydrocarbons (TEH), TPHd and TPHmo, PCBs, and metals. A previous baseline HHRA was conducted separately for the entire CCPP in 1998. The current focused HHRA only considers analytical data collected specifically within the MLGS site boundaries; these data were reviewed for usability and adequacy in risk assessment, and were considered usable and representative of current environmental conditions at the site. Statistical summaries of constituents in soil and groundwater from samples collected from the site are presented in Tables 7 and 8; a summary of the data is presented in Appendix A.

Except for metals in soil and petroleum hydrocarbons, all constituents detected in at least one

soil or groundwater sample were considered as COPCs. It is likely that methylene chloride is a laboratory contaminant, however, it will be conservatively retained as a COPC[1].

The previous investigations conducted at the site generated a significant amount of petroleum hydrocarbon data for soil and groundwater. During those investigations, petroleum hydrocarbons were reported as TEH, TPHd, and TPHmo, which included the carbon ranges C_9 to C_{40}, C_{10} to C_{25}, and C_{25} to C_{40}, respectively; these results represent mixtures of constituents, the toxicity of which can be represented by key indicator constituents (DTSC, 1993 and 1999). In this case, benzene, toluene, ethylbenzene, and xylenes (BTEX) and PAHs are the indicator constituents used to represent the toxicity of the TEH, TPHd, and TPHmo mixtures.

Because metals occur naturally in soil, metal concentrations in soil were statistically compared to site-specific background (Table 9; Fluor Daniel GTI, 1998) for the purposes of COPC selection. This site-specific background dataset is considered adequate and representative for comparison with site data for the selection of COPCs. As described below, a tiered, statistical testing approach was employed to identify metals as COPCs. In the first tier of testing, the Wilcoxon-Mann-Whitney (WMW) test or the Gehan test was used to determine whether metals concentrations from the site (Table 7) tended to be higher (or lower) than those from the corresponding background data set (Table 9). Both tests are nonparametric (i.e., not sensitive to the underlying distribution of data) and can be used with censored data (i.e., non-detect values). Test selection depended on the frequency of detection of each of the populations being compared and the number of samples with results below detection limits within each data set. In the second tier of testing, the quantile test was typically employed because it is more powerful than the WMW test or Gehan test for detecting cases of high-value measurements present in the upper quantile (right-hand tail) of a distribution (U.S. EPA, 2007). When applied together, these tests are more robust in identifying true differences between two population distributions. All cases used one-sided statistical tests, employing a Type I error rate of 0.05 (5 percent).

[1] Methylene chloride was detected at low concentrations in a number of soil samples during the 1997 Phase II investigation, most of which were detected below the laboratory reporting limit. Fluor Daniel GTI reported that methylene chloride was detected in method blanks in several laboratory reports and reported the results as non-detect accordingly (methylene chloride is a solvent commonly used by analytical laboratories, which can lead to cross-contamination of samples). The majority of the detections that were reported were in samples from two laboratory reports. Although Fluor Daniel GTI did not identify method blank detections for these specific laboratory reports, it is possible that the methylene chloride results may be due to laboratory contamination as reported for other data sets from the Phase II investigation. The source data was not available for review at the time this report was prepared. Therefore, to be conservative, the reported results from the Phase II investigation were used to calculate an EPC for methylene chloride.

The tiered, statistical testing of metals against background was conducted as recommended by U.S. EPA (2007) and consistent with DTSC guidance (1997):

- 1st Tier – The WMW test was performed for metals with a frequency of detection of 100 percent in both the site and background data sets. The Gehan test was performed for metals with non-detections in either data set. Both tests were applied with the null hypothesis assuming the median concentration for site data is less than or equal to the median concentration in the background population.

- 2nd Tier – When either the WMW test or Gehan test did not reject the null hypothesis (when it was concluded that the median concentrations were not significantly different), the quantile test was typically performed to confirm the results. The quantile test was not performed for any censored data sets with non-detect results exceeding maximum detected concentrations (U.S. EPA, 2007). For these cases, an examination of the range of detected measurements (test of comparisons) and professional judgment were used in place of the quantile test to confirm the results of the WMW test or Gehan test.

All statistical tests were conducted using ProUCL software developed by the U.S. EPA (2007). The results of the two-population statistical testing are presented as ProUCL output in Appendix F and are summarized in Table 10, including the rationale for identifying metals as COPCs.

The results of the two-tiered approach are summarized as follows:

- Molybdenum, selenium, and thallium were detected in at least one on-site sample and were not detected in any background samples. Therefore, these metals were identified as COPCs.

- Cobalt and mercury also were identified as COPCs. Concentrations of these metals at the site were statistically elevated from background concentrations based on the results of the WMW or Gehan tests.

- Eight metals detected in soil at the site (arsenic, barium, chromium, copper, lead, nickel, vanadium, and zinc) <u>were not</u> considered COPCs because the concentrations were consistent with background soils data.

Due to the lack of a site-specific background dataset for metals in groundwater, all metals detected in groundwater were conservatively retained as COPCs.

Tables 11 and 12 provide statistical summaries of the COPCs detected in soil and groundwater. These tables include chemical name, total number of samples analyzed, total number of detections, frequency of detection, range of detection limits, and range of concentrations detected. Physical chemical properties for the COPCs are presented in Table 13.

5.2 EXPOSURE ASSESSMENT

Exposure assessment is the process of describing, measuring, or estimating the intensity, frequency, and duration of potential hypothetical human exposure to COPCs at the site (U.S. EPA, 1989, 1992a). The exposure assessment is conducted within the context of a risk-based site conceptual model (SCM; Figure 4), where chemical sources, potentially impacted media, hypothetically exposed populations, migration pathways, exposure media, exposure routes and pathways, and possible exposure scenarios are identified. As defined by U.S. EPA (1989), an exposure pathway consists of four of the following elements: 1) a source and mechanism of COPC release to the environment; 2) an environmental receiving or transport medium (e.g., air, soil) for the released COPC; 3) a hypothetical point of potential contact with the medium of concern (e.g., exposure point); and 4) a hypothetical exposure route (e.g., ingestion) at the contact point. For the pathway to be complete, a receptor must be present. Designation of a complete exposure pathway suggests that human exposure is possible but does not necessarily indicate that exposure will occur nor that exposure will occur at the levels estimated in this report. When any one of the factors is missing, the exposure pathway is considered incomplete. An incomplete exposure pathway does not pose a health hazard and was not evaluated in this focused HHRA.

Potentially impacted media considered in this assessment are soil and groundwater. Given the future use of the property as a power plant, the primary potential hypothetically exposed populations include the following:

- the trenching and excavation worker during construction (e.g., construction worker);
- the off-site public[2] (e.g., off-site residents) during construction;
- the on-site worker during long-term plant operations;
- the off-site public (off-site residents[3]) during long-term plant operations;
- the off-site commercial/industrial worker during long-term plant operations.

As described in the investigation results, constituents detected in soil and groundwater at the site are volatile (e.g., 1,3,5-trimethylbenzene), semi-volatile (e.g., PAHs), and non-volatile

[2] Potential exposures to off-site workers are expected to be less than off-site residents due to longer exposure frequencies and durations. Therefore, only nearby off-site residents were considered for this HHRA. The nearest residence is located more than 2,000 feet from the site boundary. This focused HHRA conservatively assumes that an off-site resident is located at the site boundary.

[3] This focused HHRA conservatively assumes that the off-site resident is located at the site boundary. There are no residences located at the site boundary. The nearest resident is located more than 2,000 feet from the site boundary.

(e.g., metals). Volatile constituents can potentially migrate from soil and groundwater to indoor or ambient air. Semi-volatile and non-volatile compounds potentially can be resuspended with soil particulates and be present in ambient air. Volatile, semi-volatile, and non-volatile compounds can potentially move in groundwater, depending on conditions and their physical chemical properties. These release mechanisms may result in constituents potentially being present in the following exposure media: surface and subsurface soil, indoor air, ambient air, and groundwater.

For hypothetical construction workers, several potentially complete exposure pathways have been identified, including inhalation of ambient air (particulates and volatiles) and dermal contact with and ingestion of surface and subsurface soil during construction. In addition, construction workers may be required to enter or work in utility trenches that do not have mechanical ventilation making the exposure potentially different than outdoor air (and more similar to an indoor scenario). Potential exposures to groundwater are unlikely to be significant because future intrusive activities to the water table likely would require dewatering of trenches or excavations, thereby limiting dermal contact with groundwater by a future construction worker. However, for the purpose of this focused HHRA, potential hypothetical exposures from dermal contact with shallow groundwater and inhalation of volatiles when a trench is filled with shallow groundwater are evaluated.

Nearby off-site residents could potentially be exposed to volatile constituents or dust particulates during construction of the power plant. The exposure pathway considered potentially complete for off-site residents includes inhalation of VOCs and particulates potentially released during construction activities.

Following the completion of construction activities (i.e., during plant operations), off-site residents also could potentially be exposed to volatile COPCs or dust particulates in ambient air. However, potential exposures to volatile COPCs by off-site residents are not expected to be significant because intrusive construction-related activities would have been completed and the lack of residual sources given that detected concentrations of volatile constituents are extremely low. Once the power plant is constructed, a majority of the site will be covered by power blocks and associated infrastructure, buildings, tanks, pavement, gravel, and compacted soil. Therefore, potential exposures from inhalation of particulates at an off-site location also are expected to be insignificant. However, to account for the possibility that some of the areas within the site may be exposed, inhalation of airborne particulates as dust is quantitatively evaluated.

Off-site commercial/industrial workers could potentially be exposed to COPCs during both construction and subsequent plant operations similar to off-site residents. The potential exposure of off-site commercial/industrial workers, however, would be expected to be less

than off-site residents due to shorter exposure frequencies and duration. Therefore, only the potential exposure of off-site residents will be evaluated quantitatively in this focused HHRA.

For on-site workers during plant operations, potential exposures to COPCs in soil via dermal contact, soil ingestion, and the inhalation of particulates in ambient air are not expected to be significant because the majority of the site will be covered by power blocks and associated infrastructure, buildings, tanks, pavement, gravel, and compacted soil. However, for the purposes of this focused HHRA, these hypothetical pathways are evaluated (i.e., site soil is assumed to be exposed and accessible). In addition, although there is no evidence of residual sources given that detected concentrations are extremely low, volatile constituents detected in soil and groundwater could hypothetically migrate through the unsaturated zone into ambient air[4] or through the concrete slab of the building foundation, and into indoor air of the enclosed structure; these hypothetical exposure routes also are evaluated.

Finally, use of groundwater as a drinking water source is considered an incomplete exposure pathway because shallow groundwater beneath the site is not considered a viable drinking water source and municipal drinking water is readily available.

The overall approach of the focused HHRA is consistent with the Reasonable Maximum Exposure (RME) approach as defined by U.S. EPA (1989). The RME approach is defined as the “highest exposure that is reasonably expected to occur at the site.” Hypothetical exposure point concentrations for each COPC in each media were estimated based on the 95 percent upper confidence limit (95% UCL) or maximum concentration detected, whichever was lower (U.S. EPA, 1992b and 2002a). Given that groundwater is present between 6 and 11 feet bgs and subsurface soils could be redistributed at the land surface during excavation and grading, only soil data collected from the top 10 feet were considered for the focused HHRA. A summary of the hypothetical exposure point concentrations for the COPCs is presented in Table 14. Backup documentation for the ProUCL calculations is presented in Appendix G.

Hypothetical indoor air concentrations for VOCs and semi-volatile PAHs from soil and groundwater were estimated using the Johnson & Ettinger model (U.S. EPA, 2004a) for vapor intrusion based on soil and groundwater data. Default assumptions regarding future building conditions and subsurface soils were used as inputs to the model. The Johnson and Ettinger model spreadsheets are presented in Appendix H.

Hypothetical exposure point concentrations for ambient air were estimated separately for particulates and volatile constituents. For particulates, default particulate emission factors

[4] Although not considered in the work plan, this pathway was conservatively evaluated quantitatively in this focused HHRA.

(PEF) for hypothetical construction workers, off-site residents during construction, and on-site workers during plant operations were used. For volatile compounds, hypothetical soil exposure point concentrations were used to estimate hypothetical ambient air concentrations using the volatilization factor model outlined in U.S. EPA's soil screening guidance (2002b).

The U.S. EPA's Air Emission Model for Quiescent Surface Impoundments was used to calculate the hypothetical air concentrations resulting from volatilization from groundwater exposed during excavation activities (U.S. EPA, 1995). The vapor emission rate of organics from the exposed groundwater is assumed to be proportional to the water concentration of the solute and the mass transfer coefficient. The emission rates were then used in a box model to calculate ambient air concentrations resulting from emissions from exposed groundwater. The box model is a mass balance equation that is based on the concept of a theoretically enclosed space over the area of interest and it assumes that vapors enter the box and are removed by wind. These models were conservatively used to estimate ambient air concentrations for both the hypothetical future construction worker and on-site worker.

The Annual Average Daily Dose (AADD) and Lifetime Average Daily Dose (LADD) are the general parameters used to quantify hypothetical exposure in site risk assessments. The AADD is used as a standard measure for characterizing long-term non-carcinogenic effects. The LADD addresses hypothetical exposures that may occur over varying durations from a single event to an average 70-year human lifetime and are used to estimate potential carcinogenic risks. The equations for calculating AADD and LADD for ingestion and inhalation exposures are those presented by the U.S. EPA in its 1989 RAGS guidance (U.S. EPA, 1989). The AADD and LADD equations for hypothetical dermal exposures are taken from the 2004 RAGS dermal guidance (U.S. EPA, 2004b). The components of the equations for each exposure pathway evaluated in this focused HHRA are presented in Appendix I.

Exposure parameters are quantitative estimates of the frequency, duration, and magnitude of exposure to various media. The exposure parameters were selected from U.S. EPA guidance or DTSC guidance as appropriate, or, when applicable, are based on site-specific factors. The hypothetical exposure parameters are based primarily on conservative default values to estimate hypothetical potential exposure and are presented in Tables 15 through 17.

5.3 TOXICITY ASSESSMENT

The toxicity assessment consists of two parts (U.S. EPA, 1989):

1. **Hazard Identification** evaluates available information regarding the potential for a constituent to cause adverse health effects in exposed individuals; and

2. **Dose-Response Assessment** estimates the relationship between the extent of exposure and the increased likelihood and/or severity of adverse effects.

The associated toxicity criteria for the COPCs evaluated in the focused HHRA were selected according to the following hierarchy:

a. Office of Environmental Health and Hazard Assessment (OEHHA), 2009, Cal-EPA, Toxicity Criteria Database, OEHHA, on-line database;

b. U.S. EPA, 2009, Integrated Risk Information System (IRIS) on-line database;

c. U.S. EPA, 1997, Health Effects Assessment Summary Tables, FY-1997 Annual, Office of Solid Waste and Emergency Response, Washington, D.C.;

d. U.S. EPA, 2008b, Regional Screening Levels for Chemical Contaminants at Superfund Sites; and

e. U.S. EPA, 2004c, Region 9 Preliminary Remediation Goals PRGs.

In the event that a Reference Dose (RfD) or Slope Factor (SF) was not available for the oral or inhalation route of exposure, the RfD or SF for the other route (oral if inhalation was absent, inhalation if oral was absent) was used in the calculations. In addition, dermal toxicity values were calculated for evaluating dermal exposure by adjusting the oral RfDs or SFs according to U.S. EPA guidance (U.S. EPA, 2004b). For COPCs where no dermal adjustment is recommended, the oral RfDs or SFs were used. The toxicity criteria are summarized in Tables 18 and 19.

Hypothetical acute effects were evaluated by comparing the maximum predicted concentrations in air to available acute standards, such as the OEHHA acute Reference Exposure Limits (RELs; OEHHA, 2008) for hazardous airborne substances. The acute REL is a concentration level at or below which no adverse health effects to hypothetical human populations, including sensitive subgroups, are anticipated for a one-hour exposure duration on an intermittent basis. The acute RELs are applicable to risk characterization of air releases of chemicals and are based on the most sensitive, relevant, adverse health effect reported in the medical and toxicological literature. Because margins of safety have been included in the RELs, exceeding the REL does not automatically indicate an adverse health impact.

5.4 RISK CHARACTERIZATION

Risk characterization represents the final step in the risk assessment process. In this step, the results of the hypothetical exposure and toxicity assessments are integrated into quantitative or qualitative estimates of potential health risks. Potential noncarcinogenic health effects and carcinogenic health risks are characterized separately.

5.4.1 Noncarcinogenic Health Effects

Potential adverse noncarcinogenic health effects are evaluated using the hazard index (HI) approach as recommended by U.S. EPA (1989). The first step in this approach is to compare the AADD for each constituent to the appropriate RfD. This comparison is expressed in terms of a "hazard quotient," which is calculated as follows:

$$\text{Hazard Quotient}_i = \frac{\text{AADD}_i}{\text{RfD}_i}$$

Where: i = individual constituents
AADD = annual average daily dose (mg/kg-day)
RfD = reference dose (mg/kg-day)

A hazard quotient less than or equal to 1 indicates that the predicted exposure to that constituent should not result in an adverse noncarcinogenic health effect (U.S. EPA, 1989). In cases where individual constituents potentially act on the same organs or result in the same health endpoint (e.g., respiratory irritants), potential additive effects may be addressed by calculating a HI as follows:

$$\text{Hazard Index} = \sum_{i=1}^{n} \text{Hazard Quotient}_i$$

A HI of less than or equal to 1 indicates acceptable levels of exposure for constituents having an additive effect. In this focused HHRA, a screening-level HI was calculated by summing the hazard quotients for all constituents, regardless of toxic endpoint, as recommended by agency guidance (U.S. EPA, 1989). This approach is generally believed to overestimate the potential for noncarcinogenic health effects due to simultaneous exposure to multiple constituents because it does not account for different toxic endpoints (U.S. EPA, 1989; National Research Council, 1988; Risk Commission, 1997; Seed, et al., 1995). However, it can be used as a screening tool to rapidly identify those exposure scenarios for which exposure to multiple constituents does not pose a noncarcinogenic health risk.

Table 20 presents available acute RELs to predicted concentrations in air as a result of construction activities. Acute RELs are only available for methylene chloride and xylenes. The results of the comparison indicate that the levels of volatile constituents predicted in air do not pose a significant on-site or off-site risk to human health.

Summary hazard indexes are presented in Tables 21 through 24; the calculations supporting these values are presented in Appendix I. The results of the noncarcinogenic risk characterization for the potential hypothetically exposed populations are summarized below:

- For the future construction worker, the hazard index is 0.3.
- For the future off-site resident during plant construction, the hazard index is 0.5.
- For the future on-site worker during plant operations, the hazard index is 0.03.
- For future off-site resident during plant operations, the hazard index is 0.002.

5.4.2 Carcinogenic Effects

Carcinogenic health risks are defined in terms of the increased probability of an individual developing cancer as the result of exposure to a given constituent at a given concentration. As required by Cal-EPA and U.S. EPA (1989), lifetime excess cancer risks are estimated as follows:

$$\text{Lifetime Excess Cancer Risk}_i = \text{LADD}_i \times \text{SF}_i$$

Where: i = individual constituents
LADD = Lifetime average daily dose (mg/kg-day)
SF = Slope factor $(\text{mg/kg-day})^{-1}$

As with hazard indices, the estimated excess cancer risks for each constituent and exposure route are summed regardless of toxic endpoint to estimate the total excess cancer risk for the exposed individual.

Regulatory agencies such as Cal-EPA and U.S. EPA have defined what is considered an acceptable level of risk in similar though slightly different ways. The U.S. EPA considers 1×10^{-6} to 1×10^{-4} to be the target range for acceptable risks at sites where remediation is considered (U.S. EPA, 1990a and 1990b). Estimates of lifetime excess cancer risk associated with exposure to constituents of less than one-in-one-million (1×10^{-6}) are considered to be so low as to not warrant any further investigation or analysis (U.S. EPA, 1990a).

Within the State of California, Cal-EPA also tends to work within the same target range for acceptable risks. Cal-EPA follows the California Health and Safety Code where response actions are to be based upon and be no less stringent than the requirements established by the National Contingency Plan (NCP). According to the NCP, as adopted by the U.S. EPA, “acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} using information on the relationship between dose and response. The 10^{-6} risk level shall be used as a point of departure. From this point of departure other site-specific risk management decisions are taken into account to justify a higher acceptable risk threshold within the 10^{-6} to 10^{-4} range. The final determination of the acceptable risk threshold is generally made on a site-specific

basis by the lead regulatory agency." Because the future site use will be industrial (i.e., a power plant) a cumulative cancer risk level of 1×10^{-5} is deemed appropriate.

It should be noted that cancer risks in the 1×10^{-6} to 1×10^{-4} range or higher do not necessarily mean that adverse health effects will be observed. Current methodology for estimating the carcinogenic potential of constituents is believed to not underestimate the true risk, but could overestimate the true risk due to compounded conservative assumptions and calculations.

The summary of total estimated theoretical lifetime excess cancer risks are presented in Tables 25 through 28; the calculations supporting these values are presented in Appendix I. A summary of the results of the theoretical carcinogenic risk characterizations for the potential hypothetically exposed populations evaluated is presented below.

- For the future construction worker, the theoretical excess lifetime cancer risk estimate is 7×10^{-7}, and is below the *de minimis* risk level.
- For the future off-site resident during plant construction, the theoretical excess lifetime cancer risk estimate is 9×10^{-7}, and is below the *de minimis* risk level.
- For the future on-site worker during plant operations, the theoretical excess lifetime cancer risk estimate is 4×10^{-6}, which is between the acceptable risk range of 1×10^{-6} to 1×10^{-4}, and below the 1×10^{-5} target risk level deemed acceptable for an industrial site. Carcinogenic PAHs from incidental soil ingestion and dermal contact are the primary COPCs and pathways contributing to the theoretical cancer risk estimate.
- For the future off-site resident during plant operations, the theoretical excess lifetime cancer risk estimate is 7×10^{-10}, and is below the *de minimis* risk level.

5.4.3 Uncertainties

As in any risk assessment, the estimates of risk have many associated uncertainties. The procedures used in the focused HHRA result in conditional estimates of hypothetical risk that incorporate assumptions concerning chemical toxicity and human exposure and unavoidable uncertainties. These elements may result in the underestimation or overestimation of risks and hazards. To be health protective, the types of assumptions used in the focused HHRA were conservative. To the extent possible, site-specific factors were incorporated into the focused HHRA. As a result of these inherent uncertainties, the risk assessment should not be construed as presenting absolute risks or hazards. Rather, it is a conservative analysis intended to indicate the potential for adverse health impacts to occur based on a hypothetical reasonable maximum exposure.

5.5 HUMAN HEALTH RISK ASSESSMENT CONCLUSIONS

Potential noncarcinogenic hazard indices and theoretical excess lifetime cancer risks were estimated quantitatively for the following potential hypothetically exposed populations:

construction/utility workers and off-site residents during construction, and future on-site workers and future off-site residents during plant operations. It was determined that the risks to off-site workers would be lower than those to hypothetical off-site residents. Because the risks to hypothetical off-site residents during construction and during plant operations are below the *de minimis* risk levels, potential risks and hazards to off-site workers were not quantitatively evaluated in this focused HHRA. The results of the focused HHRA (Table 29) are summarized below.

Future Construction Worker

For the hypothetical construction worker, both the HI (0.3) and the theoretical excess lifetime cancer risk estimate (7×10^{-7}) are below the target hazard index of 1 and at the 1×10^{-6} *de minimis* risk level, respectively.

Off-Site Resident during plant construction

For the hypothetical off-site residential receptor, both the HI (0.5) and the theoretical lifetime excess carcinogenic risk estimate (9×10^{-7}) are below the target hazard index of 1 and at the 1×10^{-6} *de minimis* risk level, respectively.

Future On-site Worker during plant operations

For the hypothetical future on-site worker, the HI (0.03) is below the target hazard index of 1 and the theoretical lifetime excess cancer risk estimate (4×10^{-6}) is above the 1×10^{-6} *de minimis* risk level but within the acceptable risk range (1×10^{-4} to 1×10^{-6}) and below the 1×10^{-5} target risk level deemed acceptable for an industrial site. The primary constituents contributing to the overall risk estimates are the carcinogenic PAHs.

Off-Site Resident during plant operations

For the hypothetical off-site residential receptor, the HI (0.002) and the theoretical lifetime excess carcinogenic risk estimate (7×10^{-10}) are below the target hazard index of 1 and at the 1×10^{-6} *de minimis* risk level, respectively.

6.0 DISCUSSION

The primary findings of the focused investigation and risk assessment with respect to the objectives are presented below:

- ***Assess impacts from the tanks along the northern site boundary***: Analytical results demonstrate no significant impacts from the ASTs.

- ***Assess potential PCB impacts to soil and groundwater as a result of the reported historical oil-filled circuit breaker explosions at the PG&E switchyard***: No PCBs were detected in soil and groundwater samples collected along the southern boundary of the site, adjacent to the PG&E switchyard.
- ***Assess potential impacts from off-site run-on in the construction yard area***: Analytical results demonstrate no significant impacts in surface soil adjacent to storm drains that may receive off-site run on in the construction yard area.
- ***Assess potential health risks associated with chemicals present in site soil and groundwater:*** The results of the focused HHRA indicate that the estimated noncarcinogenic hazards are below the target hazard index of 1. The estimated hypothetical lifetime excess cancer risk are below the 1×10^{-6} de minimis risk level for all receptors evaluated except the future hypothetical on-site worker. Under a conservative assumption that soil is left exposed following the completion of construction activities for the Power Plant and assuming that incidental ingestion and dermal contact with soil occur, the estimated theoretical lifetime excess cancer risk for a hypothetical future on-site worker is 4×10^{-6}. This estimate is above the de minimis risk but within the acceptable regulatory risk range and below the cumulative cancer risk of 1×10^{-5}; a level deemed appropriate for the site, which is planned for redevelopment as an industrial power generation facility. The primary chemicals contributing to the theoretical cumulative health risk estimate are carcinogenic PAHs in soil, particularly from sample locations SB-10, CB5-005, and CB5-006 (from the previous investigation) both located along the southeast site boundary. Although the highest concentrations were detected at 3 feet bgs, the risk calculations are based on the conservative assumptions that deeper soil can be brought to the surface where potential hypothetical receptors can be exposed.

7.0 LIMITATIONS

The results of the focused HHRA are based on current conditions and existing analytical data collected from the site. A re-evaluation of potential human health risks at the site may be required if site use or conditions change significantly. However, the focused HHRA has been prepared in a manner consistent with that generally used in agency guidance at the time it was prepared. It is likely that risk assessment methods and data identifying and quantifying the toxicity of chemicals will improve with time. Should site use, conditions, or toxicity criteria change, the information and conclusions in this report may no longer apply.

8.0 REFERENCES

Camp Dresser and McKee, (CDM) 1997, Phase I Environmental Site Assessment, Contra Costa Power Plant, Antioch, California, October.

Fluor Daniel GTI, 1998, Phase II Environmental Site Assessment, Pacific Gas and Electric Company, Contra Costa Power Plant, Antioch, California.

Department of Toxic Substances Control (DTSC), 1993, *Memorandum Regarding Policy for the Evaluation of Risk from Total Petroleum Hydrocarbons (TPH) at an Hazardous Waste Site*, From TPH Task Group, Office of Scientific Affairs (OSA), To Toxicologists (DTSC), Human & Ecological Risk Section, OSA, April 26.

DTSC, 1997, Selecting Inorganic Constituents as Chemicals of Potential Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities, Human and Ecological Risk Division (HERD), February.

DTSC, 1999, Preliminary Endangerment Assessment Guidance Manual, California Environmental Protection Agency, Sacramento, California.

Fluor Daniel GTI, 1998, Phase II Environmental Site Assessment, Pacific Gas and Electric Company, Contra Costa Power Plant, Antioch, California.

National Research Council (NRC), 1988, Chemical Mixtures: National Academy Press, Washington, D.C.

Office of Environmental Health Hazard Assessment (OEHHA), 2008, All OEHHA Acute, 8-hour and Chronic Reference Exposure Levels (chRELs) as on December 18. http://www.oehha.org/air/allrels.html

OEHHA, 2009, Toxicity Criteria Database: California Environmental Protection Agency, online database, http://www.oehha.ca.gov/risk/chemicaldata/index.asp.

Presidential/Congressional Commission of Risk Assessment and Risk Management (Risk Commission), 1997, Final Report, Volume 2, Risk Management in Regulatory Decision-Making.

Seed, J., R.P. Brown, S.S. Olin, and J.A. Foran, 1995, Chemical Mixtures: Current Risk Assessment Methodologies and Future Directions, Regulatory Toxicology.

URS, 2008, Phase I Environmental Site Assessment, Contra Costa Power Plant and Marsh Landing Generating Station, 3201 Wilbur Avenue, Antioch, California, May.

U.S. EPA, 1989, Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual, Part A, Interim Final, Office of Emergency and Remedial Response, Washington, D.C.

U.S. EPA, 1990a, Corrective Action for Solid Waste Management Units at Hazardous Waste Management Facilities, Proposed Rule, Federal Register, v. 55, p. 3078.

U.S. EPA, 1990b, National Oil and Hazardous Substances Pollution Contingency Plan, Federal Register, v. 55, p. 8666.

U.S. EPA, 1992a, Guidelines for Exposure Assessment, May 29. Federal Register 57[104]:22888-22937.

U.S. EPA, 1992b, Supplemental Guidance to RAGS: Calculating the Concentration Term, Office of Solid Waste and Emergency Response, Washington, D.C.

U.S. EPA, 1995, Air/Superfund National Technical Guidance Study Series, Guideline for Predictive Baseline Emissions Estimation for Superfund Sites, Interim Final, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, November.

U.S. EPA, 1997, Health Effects Summary Tables, FY-1997, Annual, Office of Solid Waste and Emergency Response, Washington, D.C.

U.S. EPA, 2002a, Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites, OSWER 9285.6-10, Office of Emergency and Remedial Response, Washington, DC, December.

U.S. EPA, 2002b, Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, Office of Solid Waste and Emergency Response, December.

U.S. EPA, 2004a, User's Guide for Evaluating Subsurface Vapor Intrusion Into Buildings, Office of Emergency and Remedial Response, February 22.

U.S. EPA, 2004b, Risk Assessment Guidance for Superfund: Volume 1 – Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. Office of Superfund Remediation and Technology Innovation, July.

U.S. EPA, 2004c, Region IX Preliminary Remediation Goals (PRGs), October.

U.S. EPA, 2004d, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (OSWER 9240.1-45, EPA-540-R-04-004), October.

U.S. EPA, 2007, ProUCL Version 4.00.02 User Guide: Office of Research and Development, National Exposure Research Laboratory, April. EPA/600/R-07/038.

U.S. EPA, 2008a, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (OSWER 9240.1-48, EPA-540-R-08-01), June.

U.S. EPA, 2008b, Regional Screening Levels for Chemical Contaminants at Superfund Sites, on-line address: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.

U.S. EPA, 2009, Integrated Risk Information System (IRIS), online database.

TABLES

TABLE 1

SAMPLING PROGRAM
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Sampling Location[1]	Objective	Media	Sample Depths (feet bgs)	TPHd with Silica Gel Cleanup	TPHmo with Silica Gel Cleanup	PAHs	PCBs	VOCs	Metals
SB-1	Assess groundwater quality between Tanks 1 & 2 and river	GW	19-24	X	X			X	X
SB-2 [2]	Assess groundwater quality between Tanks 1 & 2 and river	GW	16.5-20	X	X			X	X
SB-3	Assess groundwater quality between Tanks 1 & 2 and river	GW	12-16	X	X			X	X
SB-4	Assess groundwater quality between Tanks 1 & 2 and river	GW	9-14	X	X			X	X
SB-5	Assess potential impacts to soil due to historical circuit breaker explosions	Soil	0.5-1.0	X	X		X	X	X
			1.5-2.0	X	X		X	X	X
SB-6	Assess potential impacts to soil due to historical circuit breaker explosions	Soil	0.5-1.0	X	X		X	X	X
			1.5-2.0	X	X		X	X	X
SB-7	Assess potential impacts to soil and groundwater due to historical circuit breaker explosions	Soil	0.5-1.0	X	X		X	X	X
			1.5-2.0	X	X		X	X	X
			3.0-3.5	X	X				
		GW	3.5-8.5	X	X		X	X	X
SB-8	Assess potential soil impacts near storm drains as a result of run-on and assess potential impacts to soil due to historical circuit breaker explosions	Soil	0-0.5	X	X	X	X		X
			0.5-1.0	X	X		X		
SB-9	Assess potential impacts to soil due to historical circuit breaker explosions	Soil	0.5-1.0	X	X	X	X		
			2.5-3.0			X	X		
SB-10	Assess potential impacts to soil due to historical circuit breaker explosions	Soil	0.5-1.0	X	X	X	X		
			2.5-3.0			X	X		
SB-11	Assess potential impacts to soil due to historical circuit breaker explosions	Soil	0.5-1.0	X	X	X	X		
			2.5-3.0			X			
SB-12	Assess potential soil impacts near storm drains as a result of run-on	Soil	0-0.5	X	X	X	X		X
SB-13	Assess potential soil impacts near storm drains as a result of run-on	Soil	0-0.5	X	X	X	X		X
SB-14	Assess potential soil impacts near storm drains as a result of run-on	Soil	0.5-1.0	X	X	X	X		X
SB-15	Assess potential soil impacts near storm drains as a result of run-on	Soil	0-0.5	X	X	X	X		X

highlighing denotes an analyses or a sample that is not included in the work plan.

Analysis:
Samples were analyzed for: TPHd and TPHmo using EPA Method 8015M with silica gel cleanup; PCBs using EPA Method 8082 on a dry-weight basis, VOCs using EPA Method 8260B, PAHs using EPA Method 8270C-SIM; Title 22 metals using EPA Methods 6020/7471A (groundwater and soil); and select metals using EPA Methods 200.8/7470 (groundwater).

Notes:
[1] Sample locations are shown on Figure 3.
[2] A blind duplicate groundwater sample was collected at the SB-2 location and labeled SB-20-GW.

Abbreviations:
EPA = U. S. Environmental Protection Agency
bgs = feet below ground surface
PAHs = polynuclear aromatic hydrocarbons
PCBs = polychlorinated biphenyls
SIM = seletive ion mode
TPHd = total petroleum hydrocarbons quantified as diesel
TPHmo = total petroleum hydrocarbons quantified as motor oil
VOCs = volatile organic compounds

TABLE 2

SOIL SAMPLE ANALYTICAL RESULTS -
PETROLEUM HYDROCARBONS, VOCs, AND PCBs [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Petroleum Hydrocarbons		VOCs [2]	PCBs [2]
			TPHd	TPHmo		
SB-5	12/14/2009	1.0	<10	<10	All ND	All ND
		2.0	<10	<10	All ND	All ND
SB-6	12/14/2009	1.0	<10	<10	All ND	All ND
		2.0	<10	<10	All ND	All ND
SB-7	12/15/2009	1.0	<10	**12**	All ND [3]	All ND
		2.0	<10	<10	All ND	All ND
		3.5	<10	<10	---	---
SB-8	12/15/2009	0.5	<10	<10	---	All ND
		1.0	<10	<10	---	All ND
SB-9	12/14/2009	1.0	<10	<10	---	All ND
		3.0	---	---	---	All ND
SB-10	12/14/2009	1.0	<10	**24**	---	All ND
		3.0	---	---	---	All ND
SB-11	12/15/2009	1.0	<10	**25**	---	All ND
SB-12	12/14/2009	0.5	<10	**36**	---	All ND
SB-13	12/14/2009	0.5	<10	<10	---	All ND
SB-14	12/14/2009	1.0	<10	**48**	---	All ND
SB-15	12/14/2009	0.5	<10	**120**	---	All ND

Notes
1. Samples collected by AMEC Geomatrix, Inc., and analyzed by Creek Environmental Laboratories, Inc., of San Luis Obispo, California for TPHd (carbon range C_{10} through C_{25}) and TPHmo (carbon range C_{25} through C_{40}) using EPA Method 8015 with silica gel cleanup; VOCs using EPA Method 8260B; and PCBs using EPA Method 8082 on a dry-weight basis. Detected concentrations are shown in **bold.**
2. Full list of VOC and PCB analytes are included in Appendix E.
3. Methylene chloride was detected at 0.051mg/kg in the sample; however, the laboratory indicated this is likely due to laboratory contamination. Therefore, methylene chloride is considered to be not detected above 0.051 mg/kg.

Abbreviations
--- = not analyzed
< = constituent not detected above indicated reporting limit
bgs = below ground surface
EPA = U.S. Environmental Protection Agency
PCBs = polychlorinated biphenyls
TPHd = total petroleum hydrocarbons quantified as diesel
TPHmo = total petroleum hydrocarbons quantified as motor oil
VOCs = volatile organic compounds

TABLE 3

SOIL SAMPLE ANALYTICAL RESULTS - POLYNUCLEAR AROMATIC HYDROCARBONS[1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Acenaph-thene	Acenaph-thylene	Anthra-cene	Benzo-(ghi)-perylene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoran-thene	Benzo(k)-fluoran-thene	Chrysene	Dibenz-(a,h)an-thracene	Fluoran-thene	Fluorene	Indeno-(1,2,3-cd)-pyrene	Naphtha-lene	Phenan-threne	Pyrene	B(a)P TEQ[2]
SB-8	12/15/2009	0.5	<0.010	<0.010	<0.010	<0.010	<0.010	**0.012**	**0.023**	**0.016**	**0.024**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.099**
SB-9	12/14/2009	1.0	<0.010	<0.010	<0.010	**0.018**	**0.023**	**0.022**	**0.015**	**0.019**	**0.026**	<0.010	**0.033**	<0.010	**0.014**	<0.010	**0.014**	**0.062**	**0.124**
		3.0	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NC
SB-10	12/14/2009	1.0	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NC
		3.0	<0.500	**4.9**	**2.5**	**2.5**	**27**	**8.6**	**2.5**	**2.3**	**32**	**1.1**	**29**	**0.50**	<0.500	**0.65**	**5.3**	**62**	**73.75**
SB-11	12/15/2009	1.0	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NC
		3.0	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.010**	NC
SB-12	12/14/2009	0.5	<0.010	<0.010	<0.010	**0.051**	**0.017**	**0.035**	**0.026**	**0.031**	**0.029**	<0.010	**0.021**	<0.010	**0.038**	<0.010	<0.010	**0.036**	**0.181**
SB-13	12/14/2009	0.5	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NC
SB-14	12/14/2009	1.0	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	**0.031**	NC
SB-15	12/14/2009	0.5	<0.010	<0.010	<0.010	<0.010	<0.010	**0.018**	**0.011**	<0.010	**0.017**	<0.010	**0.012**	<0.010	<0.010	<0.010	<0.010	**0.014**	**0.066**

Notes
1. Samples collected by AMEC Geomatrix, Inc., and analyzed by Creek Environmental Laboratories, Inc., of San Luis Obispo, California, for PAHs using EPA Method 8270C-SIM. Detected concentrations are shown in **bold.**
2. Benzo(a)pyrene TEQs were calculated for each sample that had at least one carcinogenic PAH detection above laboratory reporting limit. All results for non-detected carcinogenic PAHs were set at half of the detection limit. The equivalent is calculated using TEFs, adjusting the toxicity of the carcinogenic PAHs to the TEQ of benzo(a)pyrene.

Abbreviations
< = constituent not detected above indicated reporting limit
B(a)p = benzo(a)pyrene
bgs = below ground surface
EPA = U.S. Environmental Protection Agency
NC = not calculated
PAHs = polynuclear aromatic hydrocarbons
SIM = selective ion monitoring
TEF = toxic equivalency factor
TEQ = toxic equivalency

TABLE 4

SOIL SAMPLE ANALYTICAL RESULTS - METALS[1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
SB-5	12/14/2009	1.0	<0.4	**2.4**	**81**	<0.4	<0.4	**17**	**5.2**	**10**	**6.6**	<0.04	<0.4	**20**	<0.5	<0.4	<0.4	**26**	**36**
		2.0	<0.4	**1.7**	**59**	<0.4	<0.4	**17**	**4.9**	**8.2**	**3.0**	<0.04	<0.4	**17**	<0.5	<0.4	<0.4	**24**	**22**
SB-6	12/14/2009	1.0	<0.4	**2.6**	**76**	<0.4	<0.4	**22**	**6.0**	**13**	**15**	<0.04	**0.4**	**23**	<0.5	<0.4	<0.4	**32**	**54**
		2.0	<0.4	**1.2**	**54**	<0.4	<0.4	**16**	**4.6**	**6.9**	**2.4**	<0.04	<0.4	**16**	<0.5	<0.4	<0.4	**20**	**19**
SB-7	12/15/2009	1.0	<0.4	**3.2**	**59**	<0.4	<0.4	**18**	**4.9**	**10**	**14**	<0.04	**0.4**	**22**	<0.5	<0.4	<0.4	**26**	**56**
		2.0	<0.4	**1.3**	**45**	<0.4	<0.4	**13**	**4.2**	**6.5**	**2.3**	<0.04	<0.4	**15**	<0.5	<0.4	<0.4	**19**	**17**
SB-8	12/15/2009	0.5	<0.4	**1.8**	**35**	<0.4	<0.4	**13**	**3.8**	**6.2**	**2.9**	<0.04	**0.5**	**16**	<0.5	<0.4	<0.4	**19**	**17**
SB-12	12/14/2009	0.5	<0.4	**2.5**	**160**	<0.4	<0.4	**42**	**11**	**22**	**3.3**	**0.05**	**0.7**	**43**	<0.5	<0.4	<0.4	**40**	**30**
SB-13	12/14/2009	0.5	<0.4	**2.4**	**180**	<0.4	<0.4	**41**	**9.4**	**20**	**4.3**	<0.04	<0.4	**36**	<0.5	<0.4	<0.4	**39**	**28**
SB-14	12/14/2009	1.0	<0.4	**1.7**	**75**	<0.4	<0.4	**27**	**12**	**37**	**5.3**	**0.24**	<0.4	**28**	<0.5	<0.4	<0.4	**46**	**38**
SB-15	12/14/2009	0.5	<0.4	**0.5**	**15**	<0.4	<0.4	**59**	**16**	**80**	**4.0**	**0.29**	**0.4**	**18**	<0.5	<0.4	<0.4	**95**	**17**

Notes
1. Samples collected by AMEC Geomatrix, Inc., and analyzed by Creek Environmental Laboratories, Inc., of San Luis Obispo, California, for Title 22 metals using EPA Method 6020/7471A. Detected concentrations are shown in **bold.**

Abbreviations
< = constituent not detected above indicated reporting limit
bgs = below ground surface
EPA = U.S. Environmental Protection Agency

TABLE 5

GROUNDWATER SAMPLE ANALYTICAL RESULTS - PETROLEUM HYDROCARBONS, VOCs, and PCBs [1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Sample Location	Date	TPHd	TPHmo	VOCs [2]	PCBs [2]
SB-1	12/15/2009	<50	<100	All ND	---
SB-2	12/15/2009	<50	<100	All ND	---
SB-2 (dup) [3]	12/15/2009	<50	<100	All ND	---
SB-3	12/15/2009	<50	<100	All ND	---
SB-4	12/14/2009	<50	<100	All ND	---
SB-7	12/15/2009	<50 UJ	<100 UJ	All ND	All ND

Notes

1. Samples collected by AMEC Geomatrix, Inc., and analyzed by Creek Environmental Laboratories, Inc., of San Luis Obispo, California for TPHd (carbon range C_{10} through C_{25}) and TPHmo (carbon range C_{25} through C_{40}) using EPA Method 8015 with silica gel cleanup; VOCs using EPA Method 8260B; and PCBs using EPA Method 8082.
2. Full list of VOC and PCB analytes are included in Appendix E.
3. A blind duplicate of sample SB-2 was collected and labeled SB-20-GW.

Abbreviations

< = constituent not detected above indicated reporting limit
--- = not analyzed
dup = duplicate sample
EPA = U.S. Environmental Protection Agency
PCBs = polychlorinated biphenyls
TPHd = total petroleum hydrocarbons quantified as diesel
TPHmo = total petroleum hydrocarbons quantified as motor oil
VOCs = volatile organic compounds
UJ = The analyte was not detected above the reported sample quantitation limit. However, the reported quantitaion limit is approximate.

TABLE 6

GROUNDWATER SAMPLE ANALYTICAL RESULTS - METALS[1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Sample Location	Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel
SB-1	12/15/2009	<8	<8	**74**	<8 / <1	<8 / <1	**13**	<8 / <2	<8 / **5**	<8 / **3**	<0.5 / <0.2	<8	<8
SB-2	12/15/2009	<8	<8	**86**	<8 / <1	<8 / <1	<8	<8 / **1**	<8 / <1	<8 / <1	<0.5 / <0.2	<8	<8
SB-2 (dup) [2]	12/15/2009	<8	<8	**74**	<8 / <1	<8 / <1	**8**	<8 / **1**	<8 / <1	<8 / <1	<0.5 / <0.2	**16**	**9**
SB-3	12/15/2009	<8	**65**	**55**	<8 / <1	<8 / <1	**46**	<8 / **3**	<8 / **6**	<8 / **2**	<0.5 / <0.2	**14**	**16**
SB-4	12/14/2009	<8	**21**	**15**	<8 / <1	<8 / <1	**26**	<8 / <2	<8 / **2**	<8 / <1	<0.5 / <0.2	**17**	<8
SB-7	12/15/2009	<8	<8	**51**	<8 / <1	<8 / <1	**21**	<8 / <2	<8 / **2**	<8 / **1**	<0.5 / <0.2	<8	**8**

Sample Location	Date	Selenium	Silver	Thallium	Vanadium	Zinc
SB-1	12/15/2009	<8 / <1	<8 / <1	<8 / <1	<10	<80
SB-2	12/15/2009	<8 / <1	<8 / <1	<8 / <1	<8	<80
SB-2 (dup) [2]	12/15/2009	<8 / <1	<8 / <1	<8 / <1	<8	<80
SB-3	12/15/2009	<8 / <1	<8 / <1	<8 / <1	**180**	<80
SB-4	12/14/2009	<8 / <1	<8 / <1 U[3]	<8 / <1	**68**	<80
SB-7	12/15/2009	<8 / **3**	<8 / <1	<8 / <1	**19**	<80

Notes
1. Samples collected by AMEC Geomatrix, Inc., and analyzed by Creek Environmental Laboratories, Inc., of San Luis Obispo, California, for Title 22 metals using EPA Method 6020/7471A. Select metals (beryllium, cadmium, cobalt, copper, lead, selenium, silver, and thallium) were also analyzed using EPA Method 200.8 and mercury was analyzed using EPA Method 7470 to achieve lower reporting limits; results for these metals analyses are shown after the "/". Detected concentrations are shown in **bold.** Samples were filtered in the field using a 0.45-micron filter prior to collection and analysis.
2. A blind duplicate of sample SB-2 was collected and labeled SB-20-GW.
3. Silver was detected in sample SB-4-GW and the laboratory blank at the method detection limit of 0.1 µg/L. This result was flagged with a "U" to indicate that silver is considered not detected above the laboratory reporting limit.

Abbreviations
< = constituent not detected above indicated reporting limit
dup = duplicate sample
EPA = U.S. Environmental Protection Agency
U = The analyte was analyzed for, but was not detected above the reported sample quantitaion limit.

TABLE 7

STATISTICAL SUMMARIES OF CONSTITUENTS IN SOIL

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

All concentrations in milligrams per kilogram (mg/kg)

Chemical	Count	Number of Detects	Number of Non-Detects	Minimum Detection	Maximum Detection	Minimum Reporting Limit	Maximum Reporting Limit	Detection Frequency
Metals								
Antimony	67	0	0	ND	ND	0.4	6	0%
Arsenic	67	67	67	0.5	6.9	0	0	100%
Barium	67	67	67	15	394	0	0	100%
Beryllium	67	0	0	ND	ND	0.4	0.5	0%
Cadmium	67	0	0	ND	ND	0.4	2	0%
Chromium	67	67	67	7.7	630	0	0	100%
Cobalt	67	67	67	2.5	17	0	0	100%
Copper	67	67	67	3.8	80	0	0	100%
Iron	3	3	3	6700	9600	0	0	100%
Lead	67	67	67	1	30	0	0	100%
Mercury	67	20	20	0.011	0.41	0.04	0.05	30%
Molybdenum	67	5	5	0.4	0.7	0.4	10	7%
Nickel	67	67	67	5.6	400	0	0	100%
Selenium	67	1	1	1.6	1.6	0.5	1	1%
Silver	67	0	0	ND	ND	0.4	2	0%
Thallium	67	1	1	1.5	1.5	0.4	1	1%
Vanadium	67	67	67	12	95	0	0	100%
Zinc	67	59	59	14	79	13	21	88%
Total Petroleum Hydrocarbons (TPH)								
Total Extractable Hydrocarbons	152	93	59	0.59	1900	1	30	61%
TPHd	10	0	10	ND	ND	10	10	0%
TPHmo	10	4	6	24	120	10	10	40%
Volatile Organic Compounds (VOCs)								
Benzene	59	0	59	ND	ND	0.001	0.005	0%
Bromobenzene	59	0	59	ND	ND	0.001	0.005	0%
Bromoform	59	0	59	ND	ND	0.001	0.005	0%
Bromomethane	59	0	59	ND	ND	0.001	0.01	0%
Bromodichloromethane	59	0	59	ND	ND	0.001	0.005	0%
n-Butylbenzene	59	0	59	ND	ND	0.001	0.005	0%
sec-Butylbenzene	59	0	59	ND	ND	0.001	0.005	0%
tert-Butylbenzene	59	0	59	ND	ND	0.001	0.005	0%
Carbon Tetrachloride	59	0	59	ND	ND	0.001	0.005	0%
Bromochloromethane	59	0	59	ND	ND	0.001	0.005	0%
Chloroethane	59	0	59	ND	ND	0.001	0.01	0%
Chloromethane	59	0	59	ND	ND	0.001	0.01	0%
2-Chlorotoluene	59	0	59	ND	ND	0.001	0.005	0%
4-Chlorotoluene	59	0	59	ND	ND	0.001	0.005	0%
Chloroform	59	0	59	ND	ND	0.001	0.005	0%
1,2-dibromo-3-chloromethane	59	0	59	ND	ND	0.001	0.005	0%
Dibromochloropropane	59	0	59	ND	ND	0.001	0.005	0%
1,2-Dichlorobenzene	59	0	59	ND	ND	0.001	0.01	0%
1,3-Dichlorobenzene	59	0	59	ND	ND	0.001	0.01	0%
1,4-Dichlorobenzene	59	0	59	ND	ND	0.001	0.01	0%
Dichlorodifluoromethane	59	0	59	ND	ND	0.001	0.01	0%
1,1-Dichloroethane	59	0	59	ND	ND	0.001	0.005	0%
1,2-Dichloroethane	59	0	59	ND	ND	0.001	0.005	0%
1,1-Dichloroethene	59	0	59	ND	ND	0.001	0.005	0%

TABLE 7

STATISTICAL SUMMARIES OF CONSTITUENTS IN SOIL

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

All concentrations in milligrams per kilogram (mg/kg)

Chemical	Count	Number of Detects	Number of Non-Detects	Minimum Detection	Maximum Detection	Minimum Reporting Limit	Maximum Reporting Limit	Detection Frequency
cis-1,2-Dichloroethene	59	0	59	ND	ND	0.001	0.005	0%
trans-1,2-Dichloroethene	59	0	59	ND	ND	0.001	0.005	0%
1,2-Dichloropropane	59	0	59	ND	ND	0.001	0.005	0%
1,3-Dichloropropane	59	0	59	ND	ND	0.001	0.005	0%
2,2-Dichloropropane	59	0	59	ND	ND	0.001	0.005	0%
1,1-Dichloropropene	59	0	59	ND	ND	0.001	0.005	0%
Ethylbenzene	59	0	59	ND	ND	0.001	0.005	0%
Ethylene Dibromide	53	0	53	ND	ND	0.005	0.005	0%
Hexachlorobutadiene	59	0	59	ND	ND	0.001	0.005	0%
Iso-propylbenzene	59	0	59	ND	ND	0.001	0.005	0%
p-Iso-propyltoluene	59	1	58	0.0028	0.0028	0.001	0.005	2%
Methylene Chloride	59	21	38	0.0033	0.019	0.006	0.051	36%
Methylene Bromide	53	0	53	ND	ND	0.005	0.005	0%
Chlorobenzene	59	0	59	ND	ND	0.001	0.005	0%
Naphthalene	59	0	59	ND	ND	0.005	0.02	0%
n-Propylbenzene	59	0	59	ND	ND	0.001	0.005	0%
Styrene	59	0	59	ND	ND	0.001	0.005	0%
1,1,1,2-Tetrachloroethane	59	0	59	ND	ND	0.001	0.005	0%
1,1,2,2-Tetrachloroethane	59	0	59	ND	ND	0.001	0.005	0%
Tetrachloroethene	59	0	59	ND	ND	0.001	0.005	0%
Toluene	59	0	59	ND	ND	0.001	0.005	0%
1,2,3-Trichlorobenzene	59	0	59	ND	ND	0.001	0.005	0%
1,2,4-Trimethylbenzene	59	1	58	0.0064	0.0064	0.001	0.005	2%
1,1,1-Trichloroethane	59	0	59	ND	ND	0.001	0.005	0%
1,1,2-Trichloroethane	59	0	59	ND	ND	0.001	0.005	0%
Trichloroethene	59	0	59	ND	ND	0.001	0.005	0%
Trichlorofluoromethane	59	0	59	ND	ND	0.001	0.005	0%
1,2,3-Trichloropropane	59	0	59	ND	ND	0.001	0.005	0%
1,2,4-Trichlorobenzene	59	0	59	ND	ND	0.001	0.005	0%
1,3,5-Trimethylbenzene	59	1	58	0.0053	0.0053	0.001	0.005	2%
Vinyl Chloride	59	0	59	ND	ND	0.001	0.005	0%
Xylene (Mixed Isomers)	59	1	58	0.0021	0.0021	0.001	0.005	2%
2-Chloroethylvinyl Ether	6	0	6	ND	ND	0.03	0.1	0%
Dibromomethane	6	0	6	ND	ND	0.001	0.005	0%
cis-1,3-Dichloropropene	6	0	6	ND	ND	0.001	0.005	0%
trans-1,3-Dichloropropene	6	0	6	ND	ND	0.001	0.005	0%
Methyl tert-butyl ether	6	0	6	ND	ND	0.001	0.005	0%
Polycyclic Aromatic Hydrocarbons (PAHs)								
Acenaphthene	150	2	148	1.6	9	0.01	10	1%
Acenaphthylene	150	1	149	4.9	4.9	0.01	200	1%
Anthracene	150	1	149	2.5	2.5	0.01	10	1%
Benzo(ghi)perylene	150	7	143	0.018	2.5	0.01	10	5%
Benzo(a)anthracene	150	7	143	0.017	27	0.01	10	5%
Benzo(a)pyrene	150	10	140	0.012	8.6	0.01	2.5	7%
Benzo(b)fluoranthene	150	10	140	0.011	2.5	0.01	10	7%
Benzo(k)fluoranthene	150	6	144	0.016	2.3	0.01	10	4%
Chrysene	150	9	141	0.017	32	0.01	10	6%
Dibenz(a,h)anthracene	150	7	143	0.051	2.9	0.01	5	5%
Fluoranthene	150	9	141	0.012	29	0.01	5	6%
Fluorene	150	1	149	0.5	0.5	0.01	10	1%

TABLE 7

STATISTICAL SUMMARIES OF CONSTITUENTS IN SOIL

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

All concentrations in milligrams per kilogram (mg/kg)

Chemical	Count	Number of Detects	Number of Non-Detects	Minimum Detection	Maximum Detection	Minimum Reporting Limit	Maximum Reporting Limit	Detection Frequency
Indeno(1,2,3-cd)pyrene	150	5	145	0.014	2.1	0.01	6	3%
Naphthalene	150	2	148	0.65	7	0.01	5	1%
Phenanthrene	150	4	146	0.014	13	0.01	5	3%
Pyrene	150	10	140	0.01	62	0.01	5	7%
Polychlorinated Biphenyls (PCBs)								
Aroclor 1016	33	0	33	ND	ND	0.033	0.05	0%
Aroclor 1221	33	0	33	ND	ND	0.067	0.08	0%
Aroclor 1232	33	0	33	ND	ND	0.033	0.05	0%
Aroclor 1242	33	0	33	ND	ND	0.033	0.05	0%
Aroclor 1248	33	0	33	ND	ND	0.033	0.05	0%
Aroclor 1254	33	0	33	ND	ND	0.033	0.05	0%
Aroclor 1260	33	0	33	ND	ND	0.033	0.05	0%

Abbreviations
ND = not detected

TABLE 8

STATISTICAL SUMMARIES OF CONSTITUENTS IN GROUNDWATER

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

All concentrations in micrograms per liter (µg/L)

Chemical	Count	Number of Detects	Number of Non-Detects	Minimum Detection	Maximum Detection	Minimum Reporting Limit	Maximum Reporting Limit	Detection Frequency
Metals								
Antimony	12	0	0	ND	ND	8	60	0%
Arsenic	13	7	7	21	65	8	10	54%
Barium	12	5	5	15	86	8	200	42%
Beryllium	12	0	0	ND	ND	1	5	0%
Cadmium	12	0	0	ND	ND	1	20	0%
Calcium	0	0	0	ND	ND	0	0	0%
Chromium	12	5	5	8	46	8	30	42%
Cobalt	12	3	3	1	3	2	50	25%
Copper	12	6	6	2	34	1	25	50%
Iron	1	1	1	71	71	0	0	100%
Lead	12	3	3	2	3	1	5	25%
Magnesium	0	0	0	ND	ND	0	0	0%
Manganese	0	0	0	ND	ND	0	0	0%
Mercury	12	0	0	ND	ND	0.2	0.5	0%
Molybdenum	12	4	4	14	66	8	100	33%
Nickel	12	4	4	8	41	8	40	33%
Potassium	0	0	0	ND	ND	0	0	0%
Selenium	12	2	2	3	14	1	50	17%
Silver	12	0	0	ND	ND	1	20	0%
Sodium	0	0	0	ND	ND	0	0	0%
Thallium	12	0	0	ND	ND	1	10	0%
Vanadium	12	7	7	19	210	8	50	58%
Zinc	12	1	1	150	150	32	110	8%
Total Petroleum Hydrocarbons (TPH)								
Total Extractable Hydrocarbons	15	11	4	26	220	50	82	73%
TPHd	6	1	5	460	460	50	100	17%
TPHmo	6	1	5	1200	1200	50	100	17%
Volatile Organic Compounds (VOCs)								
Carbon Tetrachloride	11	0	11	ND	ND	0.5	5	0%
Chloroform	11	0	11	ND	ND	0.5	5	0%
Benzene	11	0	11	ND	ND	0.5	5	0%
1,1,1-Trichloroethane	11	0	11	ND	ND	0.5	5	0%
Bromomethane	11	0	11	ND	ND	0.5	10	0%
Chloromethane	11	0	11	ND	ND	0.5	5	0%
Methylene Bromide	5	0	5	ND	ND	5	5	0%
Bromochloromethane	11	0	11	ND	ND	0.5	5	0%
Chloroethane	11	0	11	ND	ND	0.5	5	0%
Vinyl Chloride	11	0	11	ND	ND	0.5	3	0%
Methylene Chloride	11	1	10	2.6	2.6	5	5	9%
Bromoform	11	0	11	ND	ND	0.5	5	0%
Bromodichloromethane	11	0	11	ND	ND	0.5	5	0%
1,1-Dichloroethane	11	0	11	ND	ND	0.5	5	0%
1,1-Dichloroethene	11	0	11	ND	ND	0.5	5	0%
Trichlorofluoromethane	11	0	11	ND	ND	0.5	5	0%
Dichlorodifluoromethane	11	0	11	ND	ND	0.5	10	0%
1,2-Dichloropropane	11	0	11	ND	ND	0.5	5	0%
1,1,2-Trichloroethane	11	0	11	ND	ND	0.5	5	0%
Trichloroethene	11	0	11	ND	ND	0.5	5	0%

TABLE 8

STATISTICAL SUMMARIES OF CONSTITUENTS IN GROUNDWATER

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

All concentrations in micrograms per liter (µg/L)

Chemical	Count	Number of Detects	Number of Non-Detects	Minimum Detection	Maximum Detection	Minimum Reporting Limit	Maximum Reporting Limit	Detection Frequency
1,1,2,2-Tetrachloroethane	11	0	11	ND	ND	0.5	5	0%
1,2,3-Trichlorobenzene	11	0	11	ND	ND	0.5	5	0%
Hexachlorobutadiene	11	0	11	ND	ND	0.5	5	0%
Naphthalene	11	0	11	ND	ND	5	5	0%
2-Chlorotoluene	11	0	11	ND	ND	0.5	5	0%
1,2-Dichlorobenzene	11	0	11	ND	ND	0.5	10	0%
1,2,4-Trimethylbenzene	11	0	11	ND	ND	0.5	5	0%
1,2-Dibromo-3-chloropropane	11	0	11	ND	ND	1	5	0%
1,2,3-Trichloropropane	11	0	11	ND	ND	0.5	5	0%
tert-Butylbenzene	11	0	11	ND	ND	0.5	5	0%
Isopropylbenzene	11	0	11	ND	ND	0.5	5	0%
p-Isopropyltoluene	11	0	11	ND	ND	0.5	5	0%
Ethylbenzene	11	0	11	ND	ND	0.5	5	0%
Styrene	11	0	11	ND	ND	0.5	5	0%
n-Propylbenzene	11	0	11	ND	ND	0.5	5	0%
n-Butylbenzene	11	0	11	ND	ND	0.5	5	0%
4-Chlorotoluene	11	0	11	ND	ND	0.5	5	0%
1,4-Dichlorobenzene	11	0	11	ND	ND	0.5	5	0%
Chlorobenzene	11	0	11	ND	ND	0.5	5	0%
1,2-Dibromoethane	11	0	11	ND	ND	0.5	5	0%
1,2-Dichloroethane	11	0	11	ND	ND	0.5	5	0%
1,3,5-Trimethylbenzene	11	0	11	ND	ND	0.5	5	0%
Bromobenzene	11	0	11	ND	ND	0.5	5	0%
Toluene	11	0	11	ND	ND	0.5	5	0%
1,2,4-Trichlorobenzene	11	0	11	ND	ND	0.5	5	0%
Dibromochloromethane	11	0	11	ND	ND	0.5	5	0%
Tetrachloroethene	11	0	11	ND	ND	0.5	5	0%
sec-Butylbenzene	11	0	11	ND	ND	0.5	5	0%
1,3-Dichloropropane	11	0	11	ND	ND	0.5	5	0%
cis-1,2-Dichloroethene	11	0	11	ND	ND	0.5	5	0%
trans-1,2-Dichloroethene	11	0	11	ND	ND	0.5	5	0%
1,3-Dichlorobenzene	11	0	11	ND	ND	0.5	10	0%
1,1-Dichloropropene	11	0	11	ND	ND	0.5	5	0%
2,2-Dichloropropane	11	0	11	ND	ND	0.5	5	0%
1,1,1,2-Tetrachloroethane	11	0	11	ND	ND	0.5	5	0%
Xylenes	11	0	11	ND	ND	0.5	5	0%
Methyl t-Butyl Ether	6	0	6	ND	ND	0.5	0.5	0%
2-Chlorovinyl ether	6	0	6	ND	ND	20	20	0%
Dibromomethane	6	0	6	ND	ND	0.5	0.5	0%
cis-1,3-Dichloropropene	6	0	6	ND	ND	0.5	0.5	0%
trans-1,3-Dichloropropene	6	0	6	ND	ND	0.5	0.5	0%
1,1,1,2-Tetrachloroethane	6	0	6	ND	ND	0.5	0.5	0%
Polycyclic Aromatic Hydrocarbons (PAHs)								
Acenaphthene	15	0	15	ND	ND	2	2.7	0%
Acenaphthylene	15	0	15	ND	ND	10	14	0%
Anthracene	15	0	15	ND	ND	2	2.7	0%
Benzo(ghi)perylene	15	0	15	ND	ND	2	2.7	0%
Benzo(a)anthracene	15	0	15	ND	ND	0.5	0.68	0%
Benzo(a)pyrene	15	0	15	ND	ND	0.2	0.27	0%

TABLE 8

STATISTICAL SUMMARIES OF CONSTITUENTS IN GROUNDWATER

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

All concentrations in micrograms per liter (µg/L)

Chemical	Count	Number of Detects	Number of Non-Detects	Minimum Detection	Maximum Detection	Minimum Reporting Limit	Maximum Reporting Limit	Detection Frequency
Benzo(b)fluoranthene	15	0	15	ND	ND	0.5	0.68	0%
Benzo(k)fluoranthene	15	0	15	ND	ND	0.5	0.68	0%
Chrysene	15	0	15	ND	ND	2	2.7	0%
Dibenz(a,h)anthracene	15	0	15	ND	ND	0.5	0.68	0%
Fluoranthene	15	0	15	ND	ND	2	2.7	0%
Fluorene	15	0	15	ND	ND	2	2.7	0%
Indeno(1,2,3-cd)pyrene	15	0	15	ND	ND	0.5	1	0%
Naphthalene	15	0	15	ND	ND	2	2.7	0%
Phenanthrene	15	0	15	ND	ND	2	2.7	0%
Pyrene	15	0	15	ND	ND	2	2.7	0%
Polychlorinated Biphenyls (PCBs)								
Aroclor 1016	4	0	4	ND	ND	0.033	0.05	0%
Aroclor 1221	4	0	4	ND	ND	0.50	0.65	0%
Aroclor 1232	4	0	4	ND	ND	1.0	2.0	0%
Aroclor 1242	4	0	4	ND	ND	0.50	0.65	0%
Aroclor 1248	4	0	4	ND	ND	0.50	0.65	0%
Aroclor 1254	4	0	4	ND	ND	0.50	0.65	0%
Aroclor 1260	4	0	4	ND	ND	0.50	0.65	0%

Abbreviations
ND = not detected

TABLE 9

SOIL ANALYTICAL RESULTS - BACKGROUND METALS [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Concentrations reported in milligrams per kilogram (mg/kg)

SITE	DATE	DEPTH (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
CB6-025	9/30/1997	0.5	< 6	2.2	45	< 0.5	< 2	16	2.5	6.5	5.3	< 0.025	< 10	19	< 1	< 2	< 1	19	23
		4.5	< 6	1.8	67	< 0.5	< 2	19	6	8.6	2.5	< 0.025	< 10	23	< 1	< 2	< 1	23	25
		9.5	< 6	2	46	< 0.5	< 2	23	6.1	9.4	2.7	< 0.025	< 10	30	< 1	< 2	< 1	22	26
CB6-026	9/30/1997	0.5	< 6	2.1	70	< 0.5	< 2	20	8	10	3.9	< 0.025	< 10	24	< 1	< 2	< 1	25	30
		4.5	< 6	1.5	54	< 0.5	< 2	17	6	7.9	2.2	< 0.025	< 10	22	< 1	< 2	< 1	22	25
		9.5	< 6	4	39	< 0.5	< 2	12	5.6	7	3.1	< 0.025	< 10	20	< 1	< 2	< 1	23	25
CB6-027	9/29/1997	0.5	< 6	1.7	48	< 0.5	< 2	12	2.5	6.8	5.2	< 0.025	< 10	15	< 1	< 2	< 1	16	24
		4.5	< 6	3.9	100	< 0.5	< 2	54	16	38	5.3	< 0.025	< 10	94	< 1	< 2	< 1	57	70
		9.5	< 6	4.6	55	< 0.5	< 2	14	6	9.7	3.7	0.025	< 10	19	< 1	< 2	< 1	25	28
CB6-028	10/6/1997	0.5	< 6	3.4	57	< 0.5	< 2	32	9.9	7.4	2.2	< 0.025	< 10	43	< 1	< 2	< 1	33	35
		4.5	< 6	1.4	38	< 0.5	< 2	16	2.5	7.1	2.3	< 0.025	< 10	18	< 1	< 2	< 1	26	25
		9.5	< 6	4.2	41	< 0.5	< 2	34	8.6	5.6	2.1	< 0.025	< 10	40	< 1	< 2	< 1	32	30
		16.5	< 6	1.6	90	< 0.5	< 2	20	5.6	8.3	2.1	0.025	< 10	24	< 1	< 2	< 1	30	28
CB6-029	9/30/1997	0.5	< 6	2.1	58	< 0.5	< 2	19	6.8	10	5.1	< 0.025	< 10	22	< 1	< 2	< 1	24	30
		4.5	< 6	1.8	67	< 0.5	< 2	25	7.2	12	3	0.37	< 10	30	< 1	< 2	< 1	30	31
		9.5	< 6	3.6	72	< 0.5	< 2	62	17	38	3.7	0.15	< 10	110	< 1	< 2	< 1	71	62
CB6-030	9/29/1997	0.5	< 6	1.6	50	< 0.5	< 2	12	2.5	6.5	4.8	< 0.025	< 10	15	< 1	< 2	< 1	16	24
		4.5	< 6	1.9	65	< 0.5	< 2	18	5.2	8.1	2.9	< 0.025	< 10	22	< 1	< 2	< 1	20	21
		7.5	< 6	2	130	< 0.5	< 2	47	12	19	5.5	< 0.025	< 10	64	< 1	< 2	< 1	32	47
		14.5	< 6	4.2	100	< 0.5	< 2	53	16	34	6	0.025	< 10	88	< 1	< 2	< 1	53	63
CB6-031	10/6/1997	0.5	< 6	1.2	43	< 0.5	< 2	20	7.1	9.8	2	< 0.025	< 10	22	< 1	< 2	< 1	36	27
		4.5	< 6	1.9	40	< 0.5	< 2	19	5.4	6.1	1.9	< 0.025	< 10	23	< 1	< 2	< 1	29	21
		9.5	< 6	3.2	43	< 0.5	< 2	38	9.8	6.7	1.9	< 0.025	< 10	46	< 1	< 2	< 1	32	34
		16.5	< 6	1.4	58	< 0.5	< 2	16	5.3	7.2	1.6	< 0.025	< 10	22	< 1	< 2	< 1	22	20
CB6-032	10/6/1997	0.5	< 6	1.2	56	< 0.5	< 2	18	5.3	8.2	2.4	< 0.025	< 10	21	< 1	< 2	< 1	27	28
		4.5	< 6	1.6	41	< 0.5	< 2	18	2.5	6.9	2.2	< 0.025	< 10	20	< 1	< 2	< 1	25	23
		9.5	< 6	3	50	< 0.5	< 2	37	10	8.5	2.3	< 0.025	< 10	44	< 1	< 2	< 1	36	35
		16.5	< 6	2.7	100	< 0.5	< 2	29	9.6	13	2.7	< 0.025	< 10	41	< 1	< 2	< 1	40	35
CB6-033	9/29/1997	0.5	< 6	1.5	47	< 0.5	< 2	13	2.5	6.4	2.7	< 0.025	< 10	16	< 1	< 2	< 1	16	21
		4.5	< 6	1.7	64	< 0.5	< 2	14	5.3	7	2.4	< 0.025	< 10	18	< 1	< 2	< 1	18	19
		7.5	< 6	3	30	< 0.5	< 2	13	2.5	5	2.6	< 0.025	< 10	17	< 1	< 2	< 1	19	16
CB6-034	10/6/1997	0.5	< 6	1.9	33	< 0.5	< 2	11	2.5	5.2	2	< 0.025	< 10	16	< 1	< 2	< 1	16	16
		4.5	< 6	1.5	53	< 0.5	< 2	15	5.8	7.6	2.3	< 0.025	< 10	22	< 1	< 2	< 1	18	20
		9.5	< 6	5.1	31	< 0.5	< 2	28	7.8	5.2	2.7	< 0.025	< 10	35	< 1	< 2	< 1	26	29
		16.5	< 6	1	28	< 0.5	< 2	10	2.5	4.7	1.5	0.025	< 10	9.8	< 1	< 2	< 1	13	15
CB6-035	10/6/1997	0.5	< 6	1.3	61	< 0.5	< 2	24	8.4	12	2.2	< 0.025	< 10	23	< 1	< 2	< 1	40	34
		4.5	< 6	1.7	41	< 0.5	< 2	18	5.5	6.5	1.9	< 0.025	< 10	21	< 1	< 2	< 1	29	22
		9.5	< 6	1.3	45	< 0.5	< 2	19	2.5	6.7	3.1	< 0.025	< 10	19	< 1	< 2	< 1	25	25
		16.5	< 6	3.2	66	< 0.5	< 2	37	12	8.1	2.7	< 0.025	< 10	48	< 1	< 2	< 1	37	40
CB6-036	9/29/1997	0.5	< 6	1.6	44	< 0.5	< 2	13	2.5	6.2	3.4	< 0.025	< 10	17	< 1	< 2	< 1	17	21
		4.5	< 6	1.5	42	< 0.5	< 2	12	2.5	5.7	2.5	< 0.025	< 10	14	< 1	< 2	< 1	19	< 10
		7.5	< 6	0.59	37	< 0.5	< 2	13	2.5	6.1	0.84	< 0.025	< 10	17	< 1	< 2	< 1	21	17
CB6-037	10/6/1997	0.5	< 6	1.4	48	< 0.5	< 2	13	2.5	6	2	< 0.025	< 10	20	< 1	< 2	< 1	17	19
		4.5	< 6	1.3	29	< 0.5	< 2	13	2.5	4.7	1.5	< 0.025	< 10	17	< 1	< 2	< 1	18	16
		9.5	< 6	3.6	44	< 0.5	< 2	26	8.3	5.8	2.4	< 0.025	< 10	38	< 1	< 2	< 1	25	33
		16.5	< 6	3.6	23	< 0.5	< 2	21	5.8	3.8	2.4	< 0.025	< 10	25	< 1	< 2	< 1	19	20

TABLE 9

SOIL ANALYTICAL RESULTS - BACKGROUND METALS [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Concentrations reported in milligrams per kilogram (mg/kg)

SITE	DATE	DEPTH (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
CB6-038	10/6/1997	0.5	< 6	2.1	51	< 0.5	< 2	16	2.5	7.3	4	< 0.025	< 10	20	< 1	< 2	< 1	28	24
		4.5	< 6	1.6	37	< 0.5	< 2	17	5.2	6	1.9	< 0.025	< 10	21	< 1	< 2	< 1	26	21
		9.5	< 6	4.6	78	< 1	< 4	36	14	9.5	2.9	< 0.025	< 20	52	< 1	< 4	< 1	42	46
		16.5	< 6	5.6	67	< 0.5	< 2	40	13	8.5	2.4	< 0.025	< 10	55	< 1	< 2	< 1	36	38
CB6-039	9/29/1997	0.5	< 6	1.2	37	< 0.5	< 2	11	2.5	5.6	3.2	< 0.025	< 10	14	< 1	< 2	< 1	18	< 9
		4.5	< 6	1.2	42	< 0.5	< 2	12	2.5	5.6	3.2	< 0.025	< 10	13	< 1	< 2	< 1	18	22
		7.5	< 6	1	47	< 0.5	< 2	16	5.9	23	86	< 0.025	< 10	73	< 1	< 2	< 1	110	53
CB6-040	9/29/1997	0.5	< 6	1.2	30	< 0.5	< 2	8.2	2.5	4.4	2.2	< 0.025	< 10	12	< 1	< 2	< 1	12	23
		4.5	< 6	1.5	50	< 0.5	< 2	12	2.5	21	20	0.025	< 10	38	< 1	< 2	< 1	94	40
		7.5	< 6	1.4	43	< 0.5	< 2	16	5	6.2	1.8	< 0.025	< 10	18	< 1	< 2	< 1	17	< 10
CB6-041	10/6/1997	0.5	< 6	1.7	36	< 0.5	< 2	13	2.5	5.2	2.1	< 0.025	< 10	19	< 1	< 2	< 1	17	18
		4.5	< 6	2.2	34	< 0.5	< 2	17	5.6	5.4	3.8	< 0.025	< 10	24	< 1	< 2	< 1	18	22
		9.5	< 6	4.1	34	< 0.5	< 2	23	7.5	5.1	2.3	< 0.025	< 10	35	< 1	< 2	< 1	21	25
		16.5	< 6	5.3	32	< 0.5	< 2	21	6.8	4.2	2.4	< 0.025	< 10	29	< 1	< 2	< 1	20	21
CB6-042	10/2/1997	0.5	< 6	2	170	< 0.5	< 2	22	6.2	10	2.3	0.24	< 10	25	< 1	< 2	< 1	28	25
		5.5	< 6	3.9	70	< 0.5	< 2	32	9.4	8	2.6	< 0.025	< 10	42	< 1	< 2	< 1	34	38
		10.25	< 6	2.7	68	< 0.5	< 2	30	7.1	12	4.5	< 0.025	< 10	32	< 1	< 2	< 1	39	36
		16.75	< 6	5.3	82	< 0.5	< 2	32	15	10	2.6	< 0.025	< 10	48	< 1	< 2	< 1	42	44
CB6-043	9/29/1997	0.5	< 6	1.1	49	< 0.5	< 2	11	2.5	6.1	4.5	< 0.025	< 10	13	< 1	< 2	< 1	14	21
		4.5	< 6	1.3	45	< 0.5	< 2	12	2.5	6.1	2.8	< 0.025	< 10	15	< 1	< 2	< 1	16	20
		7.5	< 6	1.5	41	< 0.5	< 2	16	2.5	6.3	1.6	< 0.025	< 10	17	< 1	< 2	< 1	22	22
CB6-044	10/6/1997	0.5	< 6	4.3	98	< 0.5	< 2	19	7.4	5.5	3.1	0.025	< 10	33	< 1	< 2	< 1	21	22
		4.5	< 6	3.2	32	< 0.5	< 2	13	5.3	4.3	2.7	< 0.025	< 10	21	< 1	< 2	< 1	15	20
		9.5	< 6	1.6	48	< 0.5	< 2	8.9	2.5	5.3	6.2	< 0.025	< 10	13	< 1	< 2	< 1	13	20
		16.5	< 6	0.91	21	< 0.5	< 2	8.1	2.5	3.1	1.4	< 0.025	< 10	13	< 1	< 2	< 1	13	11
CB6-045	9/29/1997	0.5	< 6	4.1	120	< 0.5	< 2	22	7.8	8.5	4	0.025	< 10	32	< 1	< 2	< 1	25	30
		4.5	< 6	1.4	40	< 0.5	< 2	11	2.5	5.3	2.5	< 0.025	< 10	15	< 1	< 2	< 1	18	< 8.5
		9.5	< 6	1.9	37	< 0.5	< 2	17	2.5	5.7	2.6	< 0.025	< 10	18	< 1	< 2	< 1	18	< 9.5
		14.5	< 6	1.9	26	< 0.5	< 2	15	2.5	4.3	1.9	< 0.025	< 10	14	< 1	< 2	< 1	18	< 7.5
		19.5	< 6	2.2	34	< 0.5	< 2	9.7	2.5	4.7	2.3	< 0.025	< 10	14	< 1	< 2	< 1	15	18
		24.5	< 6	1.3	33	< 0.5	< 2	12	2.5	5.2	1.2	< 0.025	< 10	16	< 1	< 2	< 1	15	16
CB6-046	9/29/1997	0.5	< 6	1.6	33	< 0.5	< 2	15	2.5	5.2	1.7	< 0.025	< 10	17	< 1	< 2	< 1	23	17
		4.5	< 6	1.1	29	< 0.5	< 2	8.6	2.5	4.5	1.3	< 0.025	< 10	15	< 1	< 2	< 1	15	15
		9.5	< 6	1.6	38	< 0.5	< 2	14	2.5	6.4	1.7	< 0.025	< 10	17	< 1	< 2	< 1	21	21
CB6-047	10/9/1997	0.5	< 6	1.3	34	< 0.5	< 2	11	2.5	5.7	1.8	< 0.025	< 10	13	< 1	< 2	< 1	15	17
		5.5	< 6	1.3	29	< 0.5	< 2	11	2.5	4.2	1.7	< 0.025	< 10	13	< 1	< 2	< 1	17	16
CB6-048	10/9/1997	0.5	< 6	3	46	< 0.5	< 2	20	5.8	7.2	3.3	< 0.025	< 10	24	< 1	< 2	< 1	23	23
		5.5	< 6	1.2	25	< 0.5	< 2	9	2.5	4.6	1.4	< 0.025	< 10	14	< 1	< 2	< 1	14	14
CB6-049	9/29/1997	0.5	< 6	1.6	33	< 0.5	< 2	15	5.5	7.4	2	0.025	< 10	18	< 1	< 2	< 1	24	22
		4.5	< 6	1.9	24	< 0.5	< 2	10	2.5	5.1	1.6	< 0.025	< 10	16	< 1	< 2	< 1	14	17
		9.5	< 6	1.8	26	< 0.5	< 2	12	2.5	4.5	1.8	< 0.025	< 10	16	< 1	< 2	< 1	13	< 8.5

Notes:

1. Samples collected by Fluor Daniel GTI, Inc., as part of the Phase II Environmental Site Assessment for soil and groundwater at the Contra Costa Power Plant (CCPP) and analyzed in accordance with EPA Methods 6000 and 7000 series.

Abbreviations:
< = analytical result less than the detection limit indicated.

TABLE 10

SUMMARY OF COMPARISON OF SITE AND BACKGROUND METALS IN SOIL [1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Metal	Tier One Evaluation[2]	Result of Tier One Evaluation	Result of Tier Two Evalutation[3]	Retained as COPC
Antimony	Not detected on-site			No
Arsenic	WMW Test	Site ≤ Background	Site ≤ Background	No
Barium	WMW Test	Site ≤ Background	Site ≤ Background	No
Beryllium	Not detected on-site			No
Cadmium	Not detected on-site			No
Chromium (Total)	WMW Test	Site ≤ Background	Site ≤ Background	No
Cobalt	WMW Test	Site > Background	--	Yes
Copper	WMW Test	Site ≤ Background	Site ≤ Background	No
Lead	WMW Test	Site ≤ Background	Site ≤ Background	No
Mercury	Gehan Test	Site > Background	--	Yes
Molybdenum	Not detected in background dataset			Yes
Nickel	WMW Test	Site ≤ Background	Site ≤ Background	No
Selenium	Not detected in background dataset			Yes
Silver	Not detected on-site			No
Thallium	Not detected in background dataset			Yes
Vanadium	WMW Test	Site ≤ Background	Site ≤ Background	No
Zinc	Gehan Test	Site ≤ Background	Site ≤ Background	No

Notes:
1. Statistical evaluations performed using ProUCL 4.00.04 (U.S. EPA, 2009).
2. The Wilcoxon-Mann-Whitney (WMW) test was performed for metals with consistent detection limits and a frequency of detection of at least 60 percent in both site and background data sets. The Gehan test was performed for metals with multiple detection limits.
3. The Quantile test was performed as the tier two evaluation.

Abbreviations:
-- = not applicable
COPC = Chemical of Potential Concern
WMW = Wilcoxon-Mann-Whitney

TABLE 11

STATISTICAL SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN (COPCs) IN SOIL

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

All concentrations in milligrams per kilogram (mg/kg)

Chemical	Count	Number of Detects	Number of Non-Detects	Minimum Detection	Maximum Detection	Minimum Reporting Limit	Maximum Reporting Limit	Detection Frequency	Representative Concentration [1]	Basis
Metals [2]										
Cobalt	67	67	67	2.5	17	0	0	100%	6.47	Upper Confidence Limit
Mercury	67	20	20	0.011	0.41	0.04	0.05	30%	0.064	Upper Confidence Limit
Molybdenum	67	5	5	0.4	0.7	0.4	10	7%	0.51	Upper Confidence Limit
Selenium	67	1	1	1.6	1.6	0.5	1	1%	1.6	Detected Concentration
Thallium	67	1	1	1.5	1.5	0.4	1	1%	1.5	Detected Concentration
Volatile Organic Compounds (VOCs)										
Methylene Chloride	59	21	38	0.0033	0.019	0.006	0.051	36%	0.00971	Upper Confidence Limit
1,2,4-Trimethylbenzene	59	1	58	0.0064	0.0064	0.001	0.005	2%	0.0064	Detected Concentration
p-Isopropyltoluene	59	1	58	0.0028	0.0028	0.001	0.005	2%	0.0028	Detected Concentration
1,3,5-Trimethylbenzene	59	1	58	0.0053	0.0053	0.001	0.005	2%	0.0053	Detected Concentration
Xylene (Mixed Isomers)	59	1	58	0.0021	0.0021	0.001	0.005	2%	0.0021	Detected Concentration
Polycyclic Aromatic Hydrocarbons (PAHs) -- Shallow Samples (0 to 10 feet below ground surface)										
Acenaphthene	130	2	2	1.6	9	0.01	10	2%	9	Detected Concentration
Acenaphthylene	130	1	1	4.9	4.9	0.01	200	1%	4.9	Detected Concentration
Anthracene	130	1	1	2.5	2.5	0.01	10	1%	2.5	Detected Concentration
Benzo(ghi)perylene	130	7	7	0.018	2.5	0.01	10	5%	0.11	Upper Confidence Limit
Benzo(a)anthracene	130	7	7	0.017	27	0.01	10	5%	0.62	Upper Confidence Limit
Benzo(a)pyrene	130	10	10	0.012	8.6	0.01	2.5	8%	0.27	Upper Confidence Limit
Benzo(b)fluoranthene	130	10	10	0.011	2.5	0.01	10	8%	0.13	Upper Confidence Limit
Benzo(k)fluoranthene	130	6	6	0.016	2.3	0.01	10	5%	0.079	Upper Confidence Limit
Chrysene	130	9	9	0.017	32	0.01	10	7%	1.91	Upper Confidence Limit
Dibenz(a,h)anthracene	130	7	7	0.051	2.9	0.01	5	5%	0.13	Upper Confidence Limit
Fluoranthene	130	9	9	0.012	29	0.01	5	7%	2.04	Upper Confidence Limit
Fluorene	130	1	1	0.5	0.5	0.01	10	1%	0.5	Detected Concentration
Indeno(1,2,3-cd)pyrene	130	5	5	0.014	2.1	0.01	6	4%	0.072	Upper Confidence Limit
Naphthalene	130	2	2	0.65	7	0.01	5	2%	0.99	Upper Confidence Limit
Phenanthrene	130	4	4	0.014	13	0.01	5	3%	9.1	Upper Confidence Limit
Pyrene	130	10	10	0.01	62	0.01	5	8%	3.73	Upper Confidence Limit

Notes
1. For chemicals with more than one detection, the upper confidence limit (UCL; Appendix G) was used as the representative concentration. For chemicals only detected once, the detected concentration was used for the representative concentration.
2. Metals were eliminated as chemicals of potential concern (COPCs) if the detected concentrations were less than naturally occuring, or background, concentrations (Appendix G).

TABLE 12

STATISTICAL SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN (COPCs) IN GROUNDWATER

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

All concentrations in micrograms per liter (µg/L)

Chemical	Count	Number of Detects	Number of Non-Detects	Minimum Detection	Maximum Detection	Minimum Reporting Limit	Maximum Reporting Limit	Detection Frequency	Representative Concentration [1]	Basis
Metals										
Arsenic	13	7	7	21	65	8	10	54%	47.5	Upper Confidence Limit
Barium	12	5	5	15	86	8	200	42%	78.25	Upper Confidence Limit
Chromium	12	5	5	8	46	8	30	42%	27.83	Upper Confidence Limit
Cobalt	12	3	3	1	3	2	50	25%	3	Upper Confidence Limit
Copper	12	6	6	2	34	1	25	50%	13.64	Upper Confidence Limit
Lead	12	3	3	2	3	1	5	25%	2.8	Upper Confidence Limit
Molybdenum	12	4	4	14	66	8	100	33%	41	Upper Confidence Limit
Nickel	12	4	4	8	41	8	40	33%	20.55	Upper Confidence Limit
Selenium	12	2	2	3	14	1	50	17%	14	Upper Confidence Limit
Vanadium	12	7	7	19	210	8	50	58%	110.9	Upper Confidence Limit
Zinc	12	1	1	150	150	32	110	8%	150	Maximum Detected
Volatile Organic Compounds (VOCs)										
Methylene Chloride	10	1	9	2.6	2.6	5.0	5.0	10%	2.6	Maximum Detected

Notes
1. For chemicals with more than two detections, the upper confidence limit (UCL) was used as the representative concentration. For chemicals with one detection, the maximum detected concentration was used for the representative concentration.

TABLE 13

PHYSICOCHEMICAL CONSTANTS FOR CONSTITUENTS OF POTENTIAL CONCERN (COPCs)

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

CAS No.	Chemical	organic/ inorganic	Log Octanol-Water Coefficient (Log Kow)		Henry's Law Constant (H)		Dimensionless Henry's Law Constant (H)		Water Solubility (S)		Diffusivity in Air (D_i)		Diffusivity in Water (Dw)		Organic Carbon Partition Coefficient (Koc)		Molecular Weight (MW)		Dermal Soil Absorption (ABSds)		Permeability Constant (Kp)	
			(unitless)	Ref	(atm-m^3/mole)	Ref	(unitless)	Ref	(mg/L)	Ref	(cm^2/sec)	Ref	(cm^2/sec)	Ref	(L/kg)	Ref	(g/mole)	Ref	(unitless)	Ref	(cm/hr)	Ref
83329	Acenaphthene	o	3.92	3	1.55E-04	11	6.34E-03	calc	3.57E+00	11	4.21E-02	11	7.69E-06	11	7.08E+03	11	154.21	11	0.13	9	NA	--
208968	Acenaphthylene	o	4.01	1	1.13E-04	1	4.64E-03	calc	1.00E+01	1	4.40E-02	11	6.60E-06	1	4.79E+03	1	152.2	1	0.13	14	NA	--
120127	Anthracene	o	4.55	3	6.50E-05	10	2.67E-03	calc	4.34E-02	10	3.24E-02	10	7.74E-06	10	2.95E+04	10	178.24	8	0.13	14	NA	--
7440382	Arsenic	i	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	75	6	0.03	9	0.001	9
7440393	Barium	i	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	137	6	0.01	4	0.001	9
56553	Benzo(a)anthracene	o	5.70	3	3.35E-06	3	1.37E-04	calc	9.40E-03	2	5.10E-02	2	9.00E-06	2	3.98E+05	2	228.3	1	0.13	4	0.47	9
50328	Benzo(a)pyrene	o	6.11	3	1.13E-06	8	4.63E-05	calc	1.62E-03	8	4.30E-02	8	9.00E-06	8	1.02E+06	8	252.32	1	0.13	9	0.7	9
205992	Benzo(b)fluoranthene	o	6.20	3	1.11E-04	11	4.54E-03	calc	1.50E-03	11	2.26E-02	11	5.56E-06	11	1.23E+06	11	252.32	11	0.13	9	0.7	9
191242	Benzo(g,h,i)perylene	o	7.10	1	2.66E-07	1	1.09E-05	calc	2.60E-04	1	4.50E-02	1	4.90E-06	1	7.76E+06	1	276.34	1	0.13	9	NA	--
207089	Benzo(k)fluoranthene	o	6.20	3	8.29E-07	8	3.40E-05	calc	8.00E-04	8	2.26E-02	8	5.56E-06	8	1.23E+06	8	252.32	1	0.13	9	NA	--
16065831	Chromium III	i	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	52	6	0.01	4	0.001	9
218019	Chrysene	o	5.70	3	9.44E-05	11	3.87E-03	calc	6.30E-03	11	2.48E-02	11	6.21E-06	11	3.98E+05	11	228.3	11	0.13	9	0.47	9
7440484	Cobalt	i	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	59	6	0.01	4	0.0004	9
7440508	Copper	i	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	64	6	0.01	4	0.001	9
99876	Cymene (p-Isopropyltoluene)	o	4.10	10	1.10E-02	7	4.51E-01	calc	2.34E+01	7	5.60E-02	5	7.30E-06	5	4.05E+03	7	134.22	6	0.1	4	NA	--
53703	Dibenz(a,h)anthracene	o	6.69	3	1.47E-08	8	6.03E-07	calc	2.49E-03	8	2.02E-02	8	5.18E-06	8	3.80E+06	8	278.36	1	0.13	9	1.5	9
206440	Fluoranthene	o	5.12	3	1.61E-05	8	6.60E-04	calc	2.06E-01	8	3.02E-02	8	6.35E-06	8	1.07E+05	8	202.26	1	0.13	9	0.22	9
86737	Fluorene	o	4.21	3	6.34E-05	11	2.60E-03	calc	1.98E+00	11	3.63E-02	11	7.88E-06	11	1.38E+04	11	166.22	11	0.13	9	NA	--
193395	Indeno(1,2,3-cd)pyrene	o	6.65	3	1.60E-06	8	6.56E-05	calc	2.20E-05	8	1.90E-02	8	5.66E-06	8	3.47E+06	8	276.34	1	0.13	9	1	9
7439921	Lead	i	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	207.2	12	0.01	4	0.0001	9
7439976	Mercury (elemental)	i	NA	--	1.07E-02	11	4.40E-01	calc	2.00E+01	11	3.07E-02	11	6.30E-06	11	5.20E+01	11	200.59	11	0.01	4	0.001	9
75092	Methylene chloride	o	1.25	3	2.18E-03	11	8.96E-02	calc	1.30E+04	11	1.01E-01	11	1.17E-05	11	1.17E+01	11	84.93	11	0.1	4	0.0035	9
7439987	Molybdenum	i	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	95.94	6	0.01	4	0.001	9
91203	Naphthalene	o	3.36	3	4.82E-04	11	1.98E-02	calc	3.10E+01	11	5.90E-02	11	7.50E-06	11	2.00E+03	11	128.18	11	0.1	4	0.047	9
7440020	Nickel	i	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	59	6	0.01	4	0.0002	9
85018	Phenanthrene	o	4.48	1	3.90E-05	8	1.60E-03	calc	1.21E+00	8	5.80E-02	8	5.90E-06	8	2.72E+04	8	178.24	1	0.13	9	0.14	9
129000	Pyrene	o	5.11	3	1.10E-05	11	4.50E-04	calc	1.35E+00	11	2.72E-02	11	7.24E-06	11	1.05E+05	11	202.26	11	0.13	9	NA	--
7782492	Selenium	i	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	79	6	0.01	4	0.001	9
7446186	Thallium	i	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	204	6	0.01	4	0.001	9
95636	1,2,4-Trimethylbenzene	o	3.72	1	6.14E-03	11	2.52E-01	calc	5.70E+01	11	6.06E-02	11	7.92E-06	11	1.35E+03	11	120.2	11	0.1	4	NA	--
108678	1,3,5-Trimethylbenzene	o	3.54	1	5.87E-03	11	2.41E-01	calc	2.00E+00	11	6.02E-02	11	8.67E-06	11	1.35E+03	11	120.2	11	0.1	4	NA	--
7440622	Vanadium	i	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	51	6	0.01	4	0.001	9
1330207	Xylenes	o	3.17	3	6.63E-03	12	2.72E-01	calc	1.06E+02	12	8.50E-02	12	9.90E-06	12	4.43E+02	12	106.17	12	0.1	4	0.053	9
7440666	Zinc	i	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	65	6	0.01	4	0.0006	9

TABLE 13

PHYSICOCHEMICAL CONSTANTS FOR CONSTITUENTS OF POTENTIAL CONCERN (COPCs)

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

References:

(1) Montgomery, 2000, Groundwater Chemicals Desk Reference (Third Edition), Lewis Publishers, New York.
(2) U.S. EPA, 1996, Soil Screening Guidance: User's Guide. Office of Solid Waste and Emergency Response, 9355.4-23, July.
(3) U.S. EPA, 1996, Soil Screening Guidance: Technical Background Document. Office of Solid Waste and Emergency Response. EPA/540/R-95/128, May.
(4) Cal-EPA, 1999, Preliminary Endangerment Assessment Manual, Department of Toxic Substances Control.
(5) U.S. EPA, 1994, AIR EMISSIONS MODELS FOR WASTE AND WASTEWATER, EPA-453/R-94-080A. <http://www.epa.gov/ttn/chief/software/water/air_emission_models_waste_wastewater.pdf>
(6) Merk Index, 1996.
(7) Hazardous Substances Database (HSDB). <http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>
(8) U.S. EPA, 2000, User's Guide for the Johnson and Ettinger Model for Subsurface Vapor Intrusion Into Buildings (1991 Revision), December.
(9) U.S. EPA, 2004, Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part E, Supplemental guidance for Dermal Risk Assessment), Final.
(10) Illustrated Handbook of Physical-Chemical Properties and Environmental Fate for Organic Chemicals, MacKay, Boca Raton : Lewis Publishers, ©1992-©1997.
(11) U.S. EPA, 2004, User's Guide for Evaluating Subsurface Vapor Intrusion Into Buildings, Office of Emergency and Remedial Response, February 22.
(12) U.S. EPA, 2009, Regional Screening Levels for Chemical Contaminants at Superfund Sites, on-line address: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.

Abbreviations:

atm-m^3/mole = atmospheres -cubic meters per mole
calc = calculated
CAS No. = chemical abstract service number
cm/hr = centimeters per hour
cm^2/sec = squared cenitmeters per second
g/mole = grams per mole
L/kg = liters per kilogram
mg/L = milligrams per liter
NA = Not available
Ref = reference
-- = not applicable

TABLE 14

SUMMARY OF EXPOSURE POINT CONCENTRATIONS OF CONSTITUENTS OF POTENTIAL CONCERN (COPCs)[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Chemical	Soil (mg/kg)	Basis	Groundwater (µg/L)	Basis
Acenaphthene	9.0	Upper Confidence Limit	ND	--
Acenaphthylene	4.9	Detected Concentration	ND	--
Anthracene	2.5	Detected Concentration	ND	--
Arsenic	--	Less than Background [2]	47.5	Upper Confidence Limit
Barium	--	Less than Background [2]	78.25	Upper Confidence Limit
Benzo(a)anthracene	0.62	Upper Confidence Limit	ND	--
Benzo(a)pyrene	0.27	Upper Confidence Limit	ND	--
Benzo(b)fluoranthene	0.13	Upper Confidence Limit	ND	--
Benzo(ghi)perylene	0.11	Upper Confidence Limit	ND	--
Benzo(k)fluoranthene	0.079	Upper Confidence Limit	ND	--
Chromium	--	Less than Background [2]	27.83	Upper Confidence Limit
Chrysene	1.91	Upper Confidence Limit	ND	--
Cobalt	6.47	Upper Confidence Limit	3.0	Upper Confidence Limit
Copper	--	Less than Background [2]	13.64	Upper Confidence Limit
Cymene (p-Isopropyltoluene)	0.0028	Detected Concentration	ND	--
Dibenz(a,h)anthracene	0.13	Upper Confidence Limit	ND	--
Fluoranthene	2.04	Upper Confidence Limit	ND	--
Fluorene	0.5	Detected Concentration	ND	--
Indeno(1,2,3-cd)pyrene	0.072	Upper Confidence Limit	ND	--
Lead	--	Less than Background [2]	2.8	Upper Confidence Limit
Mercury	0.064	Upper Confidence Limit	ND	--
Methylene Chloride	0.00971	Upper Confidence Limit	2.6	Detected Concentration
Molybdenum	0.51	Upper Confidence Limit	41	Upper Confidence Limit
Naphthalene	0.99	Upper Confidence Limit	ND	--
Nickel	--	Less than Background [2]	20.55	Upper Confidence Limit
Phenanthrene	9.1	Upper Confidence Limit	ND	--
Pyrene	3.73	Upper Confidence Limit	ND	--
Selenium	1.6	Detected Concentration	14	Upper Confidence Limit
Thallium	1.5	Detected Concentration	ND	--
Trimethylbenzene, 1,2,4-	0.0064	Detected Concentration	ND	--
Trimethylbenzene, 1,3,5-	0.0053	Detected Concentration	ND	--
Vanadium	--	Less than Background [2]	110.9	Upper Confidence Limit
Xylene (Mixed Isomers)	0.0021	Detected Concentration	ND	--
Zinc	--	Less than Background [2]	150	Maximum Detected

Notes

1. All chemicals detected in at least one soil or groundwater samples were included as chemical of potential concern.

2. Metals were eliminated as chemicals of potential concern (COPCs) if the detected concentrations were less than naturally occuring, or background, concentrations (Appendix G).

Abbreviations

-- = not applicable; not a COPC
COPC = chemical of potential concern
mg/kg = milligrams per kilogram
µg/L = micrograms per liter
NA = not analyzed
ND = not detected

TABLE 15

HYPOTHETICAL EXPOSURE PARAMETERS FOR CONSTRUCTION WORKER

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Exposure Parameter	Units	Reasonable Maximum Exposure	
GENERAL EXPOSURE PARAMETERS			
Exposure Frequency (EF)	days/year	Value:	250
		Rationale:	U.S. EPA, 2002
Exposure Duration (ED)	years	Value:	1
		Rationale:	U.S. EPA, 2002
Body Weight (BW)	kg	Value:	70
		Rationale:	DTSC, 1996; U.S. EPA, 1991; U.S. EPA, 2002
Averaging Time (AT)	days	Value:	25,550 (carcinogens) 365 (noncarcinogens)
		Rationale:	DTSC, 1996; U.S. EPA, 1991; U.S. EPA, 2002
PATHWAY-SPECIFIC PARAMETERS			
Incidental Soil Ingestion			
Soil Ingestion Rate (IR_s)	mg/day	Value:	480
		Rationale:	U.S. EPA 2002
Dermal Contact with Soil			
Exposed Skin Surface Area (SA_s)	cm^2/day	Value:	5,800
		Rationale:	U.S. EPA 2002
Soil-to-Skin Adherence Factor (SAF)	mg/cm^2	Value:	0.51
		Rationale:	U.S. EPA 2002
Absorption Fraction (ABS)	unitless	Value:	Chemical-specific
		Rationale:	U.S. EPA, 2004
Inhalation of Vapors in Ambient Air			
Inhalation Rate (IHR_a)	m^3/hr	Value:	2.5
		Rationale:	U.S. EPA, 2002b; U.S. EPA 1997a
Exposure Time (ET)	hours/day	Value:	8
		Rationale:	DTSC, 1996; U.S. EPA, 1991; Standard work day

TABLE 15

HYPOTHETICAL EXPOSURE PARAMETERS FOR CONSTRUCTION WORKER

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Exposure Parameter	Units	Reasonable Maximum Exposure	
Inhalation of Suspended Soil Particulates			
Particulate Emission Factor (PEF)	m^3/kg	Value:	2.0×10^7
		Rationale:	DTSC, 1999; corresponds to the PM10 Ambient Air Quality Standard of 50 µg/m^3; also consistent with U.S. EPA, 2002, recommended PEF for construction activities other than unpaved road traffic (3.6×10^7 m^3/kg)
Inhalation Rate (IHR_a)	m^3/hr	Value:	2.5
		Rationale:	U.S. EPA, 2002, U.S. EPA, 1997
Exposure Time (ET)	hours	Value:	8
		Rationale:	DTSC, 1996; U.S. EPA, 1991; Standard work day
Inhalation of Volatiles in Trench Ambient Air			
Exposure Time (ET)	hours/day	Value:	2
		Rationale:	Professional judgment
Event Frequency (EV)	event/day	Value:	1
		Rationale:	Professional judgment
Exposure Frequency (EF)	days/year	Value:	20
		Rationale:	Professional judgment
Inhalation Rate (IHRa)	m^3/hr	Value:	2.5
		Rationale:	DTSC, 1996; U.S. EPA, 1991; Standard work day
Dermal Contact with Groundwater			
Event Time (ET)	hours/day	Value:	0.5
		Rationale:	Professional judgment; based on incidental contact
Event Frequency (EV)	event/day	Value:	1
		Rationale:	Professional judgment
Exposure Frequency (EF)	days/year	Value:	20
		Rationale:	Professional judgment

TABLE 15

HYPOTHETICAL EXPOSURE PARAMETERS FOR CONSTRUCTION WORKER

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Exposure Parameter	Units	Reasonable Maximum Exposure
Exposed Skin Surface Area (SA_s)	cm^2	Value: 7,000 Rationale: U.S. EPA, 1997. Assuming that workers stand in ~2 feet of water; thus, forearms, hands, lower legs, and feet (30.6% of total body area, 23,000 cm^3) are exposed.

Abbreviations
cm^2 = squared centimeters
kg = kilogram
mg/cm^2 = milligrams per squared centimeters
mg/day = milligrams per day
m^3/hr = cubic meters per hour
m^3/kg = cubic meters per kilogram

References

Department of Toxic Substances Control (DTSC), 1996, Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities (corrected and reprinted): Office of the Scientific Advisor, California Environmental Protection Agency (Cal/EPA), Sacramento, California.

DTSC, 1999, Preliminary Endangerment Assessment Guidance Manual, California Environmental Protection Agency, Department of Toxic Substances Control, Sacramento, California.

U.S. Environmental Protection Agency (EPA), 1991, Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors: Office of Emergency and Remedial Response, Washington, D.C.

U.S. EPA, 1997, Exposure Factors Handbook, Office of Health and Environmental Assessment, Washington, D.C.

U.S. EPA, 2002, Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites: Office of Solid Waste and Emergency Response, December.

U.S. EPA, 2004, Risk Assessment Guidance for Superfund (RAGS): Volume 1 – Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final, Office of Superfund Remediation and Technology Innovation, July.

TABLE 16

HYPOTHETICAL EXPOSURE PARAMETERS FOR OFF-SITE RESIDENTS[1] DURING CONSTRUCTION AND OPERATIONS

Marsh Landing Generating Station
Mirant Contra Cost Power Plant
Contra Costa County, California

Exposure Parameter	Units	Reasonable Maximum Exposure
GENERAL EXPOSURE PARAMETERS		
Exposure Frequency (EF)	days/year	Value: 350 Rationale: DTSC, 1996; U.S. EPA, 1991
Exposure Duration (ED)	years	Value: 6 (child) 24 (adult) Rationale: DTSC, 1996; U.S. EPA, 1991
Body Weight (BW)	kg	Value: 15 (child) 70 (adult) Rationale: DTSC, 1996; U.S. EPA, 1991
Averaging Time (AT)	days	Value: 25,550 (carcinogens) 2,190 (child—noncarcinogens) 8,760 (adult—noncarcinogens) Rationale: DTSC, 1996; U.S. EPA, 1991
PATHWAY-SPECIFIC PARAMETERS		
Inhalation of Vapors in Ambient Air		
Inhalation Rate (IHR_a)	m^3/hr	Value: 0.42 (child) 0.83 (adult) Rationale: U.S. EPA, 1997 (child); DTSC, 1996 (adult)
Exposure Time (ET)	hours	Value: 24 Rationale: DTSC, 1996; U.S. EPA, 1991
Inhalation of Suspended Soil Particulates		
Inhalation Rate (IHR_a)	m^3/hr	Value: 0.42 (child) 0.83 (adult) Rationale: U.S. EPA, 1997 (child); DTSC, 1996 (adult)
Particulate Emission Factor (PEF)	m^3/kg	Value: 4.4×10^8 Rationale: U.S. EPA, 2002
Exposure Time (ET)	hours	Value: 24 Rationale: DTSC, 1996; U.S. EPA, 1991

TABLE 16

HYPOTHETICAL EXPOSURE PARAMETERS FOR OFF-SITE RESIDENTS[1] DURING CONSTRUCTION AND OPERATIONS

Marsh Landing Generating Station
Mirant Contra Cost Power Plant
Contra Costa County, California

Abbreviations

kg = kilograms
m^3/hr = cubic meters per hour
m^3/kg = cubic meters per kilogram

References

Department of Toxic Substances Control (DTSC), 1996, Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities (corrected and reprinted): Office of the Scientific Advisor, California Environmental Protection Agency (Cal/EPA), Sacramento, California.

U.S. Environmental Protection Agency (U.S. EP), 1991, Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors: Office of Emergency and Remedial Response, Washington, D.C.

U.S. EPA, 1997, Exposure Factors Handbook, Volume 1: Office of Research and Development, Washington, D.C.

U.S. EPA, 2002, Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites: Office of Solid Waste and Emergency Response, December.

Notes:

1. The focused HHRA conservatively assumes that an off-site resident is located at the site boundary. There are no residences located at the site boundary. The nearest residence is more than 2,000 feet from the site boundary.

TABLE 17

HYPOTHETICAL EXPOSURE PARAMETERS FOR ON-SITE OUTDOOR WORKER

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Exposure Parameter	Units	Reasonable Maximum Exposure	
GENERAL EXPOSURE PARAMETERS			
Exposure Frequency (EF)	days/year	Value:	250
		Rationale:	DTSC, 1996; U.S. EPA, 1991
Exposure Duration (ED)	years	Value:	25
		Rationale:	DTSC, 1996; U.S. EPA, 1991
Body Weight (BW)	kg	Value:	70
		Rationale:	DTSC, 1996; U.S. EPA, 1991
Averaging Time (AT)	days	Value:	25,550 (carcinogens) 9125 (noncarcinogens)
		Rationale:	DTSC, 1996; U.S. EPA, 1991
Pathway-Specific Parameters			
Incidental Soil Ingestion			
Soil Ingestion Rate (IR_s)	mg/day	Value:	100
		Rationale:	DTSC, 1996; U.S. EPA, 1991; U.S. EPA, 2002
Dermal Contact with Soil			
Exposed Skin Surface Area (SA_s)	cm^2/day	Value:	3,300
		Rationale:	U.S. EPA, 2002; U.S. EPA, 2004
Soil-to-Skin Adherence Factor (SAF)	mg/cm^2	Value:	0.2
		Rationale:	U.S. EPA, 2002; U.S. EPA, 2004
Absorption Fraction (ABS)	unitless	Value:	Chemical-specific
		Rationale:	U.S. EPA, 2004
Inhalation of Vapors in Ambient Air			
Inhalation Rate (IHR_a)	m^3/hr	Value:	1.6
		Rationale:	U.S. EPA, 1997
Exposure Time (ET)	hrs/day	Value:	8
		Rationale:	DTSC, 1996; U.S. EPA, 1991; Standard work day

TABLE 17

HYPOTHETICAL EXPOSURE PARAMETERS FOR ON-SITE OUTDOOR WORKER

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Exposure Parameter	Units	Reasonable Maximum Exposure
Inhalation of Suspended Soil Particulates		
Particulate Emission Factor (PEF)	m^3/kg	Value: 1.32×10^9 Rationale: Estimated
Inhalation Rate (IHR_a)	m^3/hr	Value: 1.6 Rationale: U.S. EPA, 1997
Exposure Time (ET)	hrs/day	Value: 8 Rationale: DTSC, 1996; U.S. EPA, 1991; Standard work day

Abbreviations
cm^2/day = square centimeters per day
hrs/day = hours per day
kg = kilograms
m^3/hr = cubic meters per hour
m^3/kg = cubic meters per kilogram
mg/cm^2 = milligrams per square centimeters
mg/day = milligrams per day

References

Department of Toxic Substances Control (DTSC), 1996, Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities (corrected and reprinted), Office of the Scientific Advisor, Department of Toxic Substances Control, Sacramento, California.

U.S. Environmental Protection Agency (U.S. EPA), 1991, Interoffice Memorandum Regarding the Human Health Evaluation Manual, Supplemental Guidance: “Standard Default Exposure Factors,” Office of Emergency and Remedial Response, Washington, D.C.

U.S. EPA, 1997, Exposure Factors Handbook, National Center for Environmental Assessment, Office of Research and Development, August

U.S. EPA, 2002, Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, Office of Solid Waste and Emergency Response, December.

U.S. EPA, 2004, Risk Assessment Guidance for Superfund (RAGS): Volume 1 – Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final, Office of Superfund Remediation and Technology Innovation, July.

TABLE 18

CHRONIC NONCARCINOGENIC TOXICITY CRITERIA FOR CONSTITUENTS OF POTENTIAL CONCERN (COPCs)
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Chemical	Oral						Child		Dermal		Inhalation						
	Reference Dose (RfDo) (mg/kg-day)	UF x MF	Target Species	Target Organ	Critical Effect	Reference	Child Reference Dose (RfDch) (mg/kg-day)	Reference	Dermal Adjustment Factor (ABS_{GI})	Reference Dose (RfDd) (mg/kg-day)	chREL/RfC ($\mu g/m^3$)	RfDi (mg/kg-day)	UF x MF	Target Species	Target Organ	Critical Effect	Reference
Acenaphthene	0.06	3000 x 1	Mouse	Liver	Hepatotoxicity	IRIS	0.06	IRIS	1	0.06	210	0.06	--	--	--	--	Route
Acenaphthylene	0.06	--	--	--	--	Acenaphthene	0.06	Acenaphthene	1	0.06	210	0.06	--	--	--	--	Acenaphthene
Anthracene	0.3	3000 x 1	Mouse	--	None Observed	IRIS	0.3	IRIS	1	0.3	1050	0.3	--	--	--	--	Route
Arsenic	0.0003	3 x 1	Human	Skin	Hyperpigmentation, Keratosis	IRIS	0.0003	IRIS	1	0.0003	0.015	4.3E-06	30	Mice	Development; Cardiovascular system; Nervous system	Decrease in intellectual function, adverse effects on neurobehavioral development	OEHHA
Barium	0.2	300x1	Mice	Kidney	Nephropathy	IRIS	0.2	IRIS	0.07	0.014	0.5	0.00014	1000 x 1	Rat	Fetus	Fetotoxicity	USEPA, 2009b
Benzo(a)anthracene	NA	--	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	--
Benzo(a)pyrene	NA	--	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	--
Benzo(b)fluoranthene	NA	--	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	--
Benzo(g,h,i)perylene	0.06	--	--	--	--	Acenaphthene	0.06	Acenaphthene	1	0.06	210	0.06	--	--	--	--	Acenaphthene
Benzo(k)fluoranthene	NA	--	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	--
Chromium III	1.5	100 x 10	Rat	--	None Observed	IRIS	1.5	IRIS	0.013	0.0195	5250	1.5E+00	--	--	--	--	Route
Chrysene	NA	--	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	--
Cobalt	0.02	NA	NA	NA	NA	USEPA, 2004c	0.02	USEPA, 2004c	1	0.02	0.01995	0.0000057	--	--	--	--	USEPA, 2004c
Copper	0.037	Human	--	Gastrointestinal System	Irritation	HEAST	0.037	HEAST	1	0.037	129.5	0.037	--	--	--	--	Route
Cymene	0.08	3000 x 1	Rat	Kidney	Increased Weight	Toluene	0.08	Toluene	1	0.08	4900	1.4	10 x 1	Human	Nervous system	Neurological effects	Toluene
Dibenz(a,h)anthracene	NA	--	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	--
Fluoranthene	0.04	3000 x 1	Mouse	Kidney, Liver, Blood	Nephropathy, Weight Changes, Histopathological Changes	IRIS	0.04	IRIS	1	0.04	140	0.04	--	--	--	--	Route
Fluorene	0.04	3000 x 1	Mouse	Blood	Decreased RBC	IRIS	0.04	IRIS	1	0.04	140	0.04	--	--	--	--	Route
Indeno(1,2,3-cd)pyrene	NA	--	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	--
Lead	NA	--	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	--
Mercury (elemental)	0.000009	--	--	--	--	Route	0.000009	Route	1	0.000009	0.03	0.000009	300	Humans	Nervous system	Neurotoxicity as measured by: intention tremor; memory and sleep disturbances; decreased performance on neurobehavioral tests (finger tapping, visual scan, visuomotor coordination, visual memory); decreased EEG activity	OEHHA
Methylene chloride	0.06	100 x 1	Rat	Liver	Toxicity	IRIS	0.06	IRIS	1	0.06	400	0.11	100	Humans	Cardiovascular system; nervous system	Significantly elevated carboxyhemoglobin levels	OEHHA
Molybdenum	0.005	30 x 1	Human	Kidney	Increase in Uric Acid	IRIS	0.005	IRIS	1	0.005	17.5	0.005	--	--	--	--	Route
Naphthalene	0.02	3000 x 1	Rat	--	Decreased Body Weight	IRIS	0.02	IRIS	1	0.02	9	0.0026	1000	Mice	Respiratory system	Nasal inflammation, olfactory epithelial metaplasia, and respiratory epithelial hyperplasia	OEHHA
Nickel	0.02	300 x 1	Rat	Various	Decreased Weight	IRIS	0.011	OEHHA	0.04	0.0008	0.05	1.4E-05	30	Rats	Respiratory system; Hematopoietic system	Pathological changes in lung, lymph nodes, and nasal epithelium: (1) active pulmonary inflammation, (2) macrophage hyperplasia, (3) alveolar proteinosis, (4) fibrosis, (5) lymph node hyperplasia, (6) olfactory epithelial atrophy	OEHHA
Phenanthrene	0.04	--	--	--	--	fluoranthene	0.04	fluoranthene	1	0.04	140	0.04	--	--	--	--	fluoranthene
Pyrene	0.03	3000 x 1	Mouse	Kidney	Nephropathy, Decreased Weight	IRIS	0.03	IRIS	1	0.03	105	0.03	--	--	--	--	Route
Selenium	0.005	3 x 1	Human	Various	Clinical Selenosis	IRIS	0.005	IRIS	1	0.005	20	5.7E-03	3	Humans	Alimentary system; Cardiovascular system; Nervous system	Clinical selenosis (liver, blood, skin, CNS)	OEHHA
Thallium	0.00008	3000 x 1	Rat	--	NOAEL	IRIS	0.00008	IRIS	1	0.00008	0.28	0.00008	--	--	--	--	Route

TABLE 18

CHRONIC NONCARCINOGENIC TOXICITY CRITERIA FOR CONSTITUENTS OF POTENTIAL CONCERN (COPCs)
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Chemical	Oral						Child		Dermal		Inhalation						
	Reference Dose (RfDo) (mg/kg-day)	UF x MF	Target Species	Target Organ	Critical Effect	Reference	Child Reference Dose (RfDch) (mg/kg-day)	Reference	Dermal Adjustment Factor (ABS_{GI})	Reference Dose (RfDd) (mg/kg-day)	chREL/RfC ($\mu g/m^3$)	RfDi (mg/kg-day)	UF x MF	Target Species	Target Organ	Critical Effect	Reference
1,2,4-Trimethylbenzene	0.05	3000 x 1	Rat	various	various	USEPA, 2004c	0.05	USEPA, 2004c	1	0.05	5.95	0.0017	3000 x 1	Human	CNS	CNS symptoms	USEPA, 2004c
1,3,5-Trimethylbenzene	0.05	3000 x 1	Rat	various	various	USEPA, 2009b	0.05	USEPA, 2009b	1	0.05	5.95	0.0017	3000 x 1	Human	CNS	CNS symptoms	USEPA, 2009b
Vanadium	0.007	100 x 1	Rat	NA	NA	USEPA, 2008b	0.007	USEPA, 2008b	0.026	0.000182	25	0.007	--	--	--	--	Route
Xylenes	0.2	1000 x 1	Rat	--	Hyperactivity, Mortality, Decreased Body Weight	IRIS	0.2	IRIS	1	0.2	700	0.2	30	Human	Nervous system; Respiratory system	CNS effects; irritation of eyes, nose and throat	OEHHA
Zinc	0.3	3 x 1	Human	Blood	Enzyme Changes	IRIS	0.3	IRIS	1	0.3	1050	0.3	--	--	--	--	Route

Notes:
1. U.S. EPA, 2004b; Dermal Reference Dose (RfDd) = RfDo x ABS_{GI}

References:
IRIS = U.S. EPA, 2007, Integrated Risk Information System (IRIS) Data Base
HEAST = U.S. EPA, 1997, Health Effects Assessment Summary Tables (HEAST)
OEHHA = Cal-EPA, Office of Environmental Health Hazard Assessment, 2007, Toxicity Criteria Database.
USEPA, 2004b = U.S. EPA, 2004, Risk Assessment Guidance for Superfund (RAGS): Volume 1 – Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final.
USEPA, 2004c = U.S. EPA Region 9, 2004, Preliminary Remediation Goals, October.
USEPA, 2009b, Regional Screening Levels for Chemical Contaminants at Superfund Sites, Regions 3, 6, & 9, Oak Ridge National Laboratory, <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>, April.

Abbreviations:
chREL = chronic reference exposure level
mg/kg-day = milligrams per kilograms-day
$\mu g/m^3$ = micrograms per cubic meter
RfC = reference concentration
UF = Uncertainty Factor
MF = Modifying Factor
NA = Not available
-- = Not applicable

TABLE 19

CARCINOGENIC TOXICITY CRITERIA FOR CONSTITUENTS OF POTENTIAL CONCERN (COPCs)

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Chemical	Oral							Dermal		Inhalation							
	Slope Factor (SFo) $(mg/kg\text{-}d)^{-1}$	Target Species	Target Organ	Critical Effect	Reference	Weight-of-evidence	Reference	Dermal Adjustment Factor (ABS_{GI})	Slope Factor[1] (SFd) $(mg/kg\text{-}d)^{-1}$	Unit Risk Factor (URF) $(\mu g/m^3)^{-1}$	Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Target Species	Target Organ	Critical Effect	Reference	Weight-of-evidence	Reference
Acenaphthene	NA	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	NA	--
Acenaphthylene	NC	--	--	--	--	D	IRIS	1	NA	NC	NC	--	--	--	--	D	IRIS
Anthracene	NC	--	--	--	--	D	IRIS	1	NA	NC	NC	--	--	--	--	D	IRIS
Antimony	NA	--	--	--	--	NA	--	0.15	NA	NC	NC	--	--	--	--	NA	--
Arsenic	9.45	Human	Skin	Cancer	OEHHA	A	IRIS	1	9.45	3.3E-03	12	Human	Lung	Tumors	OEHHA	A	IRIS
Barium	NC	--	--	--	--	D	IRIS	0.07	NA	NC	NC	--	--	--	--	D	IRIS
Benzo(a)anthracene	1.2	NA[2]			OEHHA	B2	IRIS	1	1.2	1.1E-04	0.39	NA[2]			OEHHA	B2	IRIS
Benzo(a)pyrene	12	Hamster	GI Tract	Tumors	OEHHA	B2	IRIS	1	12	1.1E-03	3.9	Hamster	Respiratory system	Tumors	OEHHA	B2	IRIS
Benzo(b)fluoranthene	1.2	NA[2]			OEHHA	B2	IRIS	1	1.2	1.1E-04	0.39	NA[2]			OEHHA	B2	IRIS
Benzo(g,h,i)perylene	NC	--	--	--	--	D	IRIS	1	NA	NC	NC	--	--	--	--	D	IRIS
Benzo(k)fluoranthene	1.2	NA[2]			OEHHA	B2	IRIS	1	1.2	1.1E-04	0.39	NA[2]			OEHHA	B2	IRIS
Chromium III	NC	--	--	--	--	D	IRIS	0.013	NC	NC	NC	--	--	--	--	D	IRIS
Chrysene	0.12	NA[2]			OEHHA	B2	IRIS	1	0.12	1.1E-05	0.039	NA[2]			OEHHA	B2	IRIS
Cobalt	NA	--	--	--	--	NA	--	1	NA	NA	NA	NA	NA	NA	--	NA	--
Copper	NC	--	--	--	--	D	IRIS	1	NA	NC	NC	--	--	--	--	D	IRIS
Cymene	NC	--	--	--	--	D	IRIS	1	NA	NC	NC	--	--	--	--	D	IRIS
Dibenz(a,h)anthracene	4.1	Mouse	Lung	Carcinoma	OEHHA	B2	IRIS	1	4.1	1.2E-03	4.1	Route Extrapolation			OEHHA	B2	IRIS
Fluoranthene	NC	--	--	--	--	D	IRIS	1	NA	NC	NC	--	--	--	--	D	IRIS
Fluorene	NC	--	--	--	--	D	IRIS	1	NA	NC	NC	--	--	--	--	D	IRIS
Indeno(1,2,3-cd)pyrene	1.2	NA[2]			OEHHA	B2	IRIS	1	1.2	1.1E-04	0.39	NA[2]			OEHHA	B2	IRIS
Iron	NA	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	NA	--
Lead	0.0085	Rat	Kidney	Tumors	OEHHA	B2	IRIS	1	0.0085	1.2E-05	0.042	Rat	Kidney	Tumors	OEHHA	B2	IRIS
Mercury (elemental)	NA	--	--	--	--	D	IRIS	1	NA	NA	NA	--	--	--	--	D	IRIS
Methylene chloride	0.014	NA	NA	NA	OEHHA	B2	IRIS	1	0.014	1.0E-06	0.0035	Mouse, Rat	Mammary Gland, Lung, Liver	Adenomas, Carcinomas	OEHHA	B2	IRIS
Molybdenum	NA	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	NA	--
Naphthalene	0.12	Route Extrapolation			OEHHA	C	IRIS	1	0.12	3.4E-05	0.12	Rat	Respiratory system	Nasal tumors	OEHHA	C	IRIS
Nickel	NA	--	--	--	--	NA	--	0.04	NA	2.6E-04	0.91	Human	Lung	Cancer	OEHHA	A	IRIS
Phenanthrene	NC	--	--	--	--	D	IRIS	1	NA	NC	NC	--	--	--	--	D	IRIS
Pyrene	NC	--	--	--	--	D	IRIS	1	NA	NC	NC	--	--	--	--	D	IRIS
Selenium	NC	--	--	--	--	D	IRIS	1	NA	NC	NC	--	--	--	--	D	IRIS
Thallium	NA	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	NA	--
1,2,4-Trimethylbenzene	NA	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	NA	--
1,3,5-Trimethylbenzene	NA	--	--	--	--	NA	--	1	NA	NA	NA	--	--	--	--	NA	--
Vanadium	NA	--	--	--	--	NA	--	0.026	NA	NA	NA	--	--	--	--	NA	--
Xylenes	NA	--	--	--	--	NA	--	1	NA	NC	NC	--	--	--	--	NA	--
Zinc	NC	--	--	--	--	D	IRIS	1	NA	NC	NC	--	--	--	--	D	IRIS

TABLE 19

CARCINOGENIC TOXICITY CRITERIA FOR CONSTITUENTS OF POTENTIAL CONCERN (COPCs)
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Notes:
1. U.S. EPA, 2004b; Dermal Slope Factor (SFd) = SFo/ABS_{GI}
2. The carcinogenic effects and potency of this polycyclic aromatic hydrocarbon (PAH) are based on benzo(a)pyrene.

References:
IRIS = U.S. EPA, 2009a, Integrated Risk Information System (IRIS) Data Base
USEPA, 2009b, Regional Screening Levels for Chemical Contaminants at Superfund Sites, Regions 3, 6, & 9, Oak Ridge National Laboratory, <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>, April.
OEHHA = Cal-EPA, Office of Environmental Health Hazard Assessment, 2009, Toxicity Criteria Database.

Weight of Evidence:
A = Known human carcinogen
B1 = Probable human carcinogen - based on limited evidence of carcinogenicity in humans (or Group 2A per IARC classification)
B2 = Likely to be carcinogenic to humans based on strong evidence of carcinogenicity in animals and inconclusive evidence of carcinogenicity in an exposed human population.
C = Possible human carcinogen
D = Inadequate evidence to assess carcinogenic potential

Abbreviations:
mg/kg-day = milligrams per kilograms-day
NA = Not available
NC = Not believed to be carcinogenic
$\mu g/m^3$ = micrograms per cubic meter
-- = Not applicable

TABLE 20

COMPARISON OF PREDICATED AMBIENT AIR CONCENTRATIONS TO ACUTE REFERENCE EXPOSURE LEVELS FOR CONSTRUCTION WORKER AND OFF-SITE RESIDENT DURING CONSTRUCTION

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

All concentrations presented in micrograms per cubic meter (µg/m ^{3})

Chemical	Predicted Ambient Air Concentrations		Acture Reference Exposure Level [1]
	Construction Worker	Residential (Cancer)	
Methylene chloride	3.15E-05	1.29E-05	14,000
Xylenes	2.81E-06	1.15E-06	22,000

Notes

1. Office of Environmental Health Hazard Assessment (OEHHA), 2008, Acute Reference Exposure Levels, December 18, http://www.oehha.ca.gov/air/allrels.html.

TABLE 21

SUMMARY OF NONCARCINOGENIC HAZARD INDEXES:
HYPOTHETICAL FUTURE CONSTRUCTION WORKER

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Chemical	Soil				Groundwater		Hazard Index	Percent Contribution
	Incidental Ingestion of Soil	Dermal Contact with Soil	Inhalation of Particulates	Inhalation of Volatiles in Ambient Air from Soil	Inhalation of Volatiles in Ambient Air from Groundwater	Dermal Contact with Groundwater		
Acenaphthene	7.0E-04	5.6E-04	NA	1.1E-03	NA	NA	2.E-03	0.7%
Acenaphthylene	3.8E-04	3.1E-04	NA	6.3E-04	NA	NA	1.E-03	0.4%
Anthracene	3.9E-05	3.1E-05	NA	1.7E-05	NA	NA	9.E-05	0.0%
Arsenic	NA	NA	NA	NA	NA	4.3E-04	4.E-04	0.1%
Barium	NA	NA	NA	NA	NA	1.5E-05	2.E-05	0.0%
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	8.6E-06	6.9E-06	2.5E-07	NA	NA	NA	2.E-05	0.0%
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Chromium III	NA	NA	NA	NA	NA	3.9E-06	4.E-06	0.0%
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	1.5E-03	9.4E-05	1.5E-01	NA	NA	4.1E-07	2.E-01	49.5%
Copper	NA	NA	NA	NA	NA	1.0E-06	1.E-06	0.0%
Cymene	1.6E-07	1.0E-07	NA	1.9E-07	NA	NA	5.E-07	0.0%
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2.4E-04	1.9E-04	6.9E-06	NA	NA	NA	4.E-04	0.1%
Fluorene	5.9E-05	4.7E-05	NA	3.9E-05	NA	NA	1.E-04	0.0%
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (elemental)	3.5E-02	2.2E-03	1.0E-03	NA	NA	NA	4.E-02	12.2%
Methylene chloride	7.6E-07	4.7E-07	NA	5.4E-05	2.7E-06	2.9E-08	6.E-05	0.0%
Molybdenum	4.8E-04	3.0E-05	1.4E-05	NA	NA	2.2E-05	5.E-04	0.2%
Naphthalene	2.3E-04	1.4E-04	NA	1.1E-02	NA	NA	1.E-02	3.6%
Nickel	NA	NA	NA	NA	NA	1.4E-05	1.E-05	0.0%
Phenanthrene	1.1E-03	8.6E-04	NA	5.0E-04	NA	NA	2.E-03	0.8%
Pyrene	5.8E-04	4.7E-04	1.7E-05	NA	NA	NA	1.E-03	0.3%
Selenium	1.5E-03	9.3E-05	3.8E-05	NA	NA	7.7E-06	2.E-03	0.5%
Thallium	8.8E-02	5.4E-03	2.5E-03	NA	NA	NA	1.E-01	30.5%
1,2,4-Trimethylbenzene	6.0E-07	3.7E-07	NA	4.7E-04	NA	NA	5.E-04	0.1%
1,3,5-Trimethylbenzene	5.0E-07	3.1E-07	NA	3.8E-04	NA	NA	4.E-04	0.1%
Vanadium	NA	NA	NA	NA	NA	1.7E-03	2.E-03	0.5%
Xylenes	4.9E-08	3.0E-08	NA	2.7E-06	NA	NA	3.E-06	0.0%
Zinc	NA	NA	NA	NA	NA	8.2E-07	8.E-07	0.0%
Total	1E-01	1E-02	2E-01	1E-02	3E-06	2E-03	3E-01	100%
Percent Contribution	41.3%	3.3%	50.2%	4.5%	0.0%	0.7%	100%	

Abbreviations:
NA = not applicable

TABLE 22

SUMMARY OF NONCARCINOGENIC HAZARD INDEXES: HYPOTHETICAL FUTURE OFF-SITE RESIDENT DURING CONSTRUCTION[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

	Soil		Groundwater		
Chemical	**Inhalation of Particulates**	**Inhalation of Volatiles in Ambient Air from Soil**	**Inhalation of Volatiles in Ambient Air from Groundwater**	**Hazard Index**	**Percent Contribution**
Acenaphthene	NA	1.5E-03	NA	1.5E-03	0.3%
Acenaphthylene	NA	8.5E-04	NA	8.5E-04	0.2%
Anthracene	NA	2.3E-05	NA	2.3E-05	0.0%
Arsenic	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	8.2E-07	NA	NA	8.2E-07	0.0%
Benzo(k)fluoranthene	NA	NA	NA	NA	NA
Chromium III	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA
Cobalt	5.1E-01	NA	NA	5.1E-01	94.3%
Copper	NA	NA	NA	NA	NA
Cymene	NA	2.5E-07	NA	2.5E-07	0.0%
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA
Fluoranthene	2.3E-05	NA	NA	2.3E-05	0.0%
Fluorene	NA	5.2E-05	NA	5.2E-05	0.0%
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA
Mercury (elemental)	3.3E-03	NA	NA	3.3E-03	0.6%
Methylene chloride	NA	7.3E-05	3.6E-06	7.6E-05	0.0%
Molybdenum	4.6E-05	NA	NA	4.6E-05	0.0%
Naphthalene	NA	1.5E-02	NA	1.5E-02	2.7%
Nickel	NA	NA	NA	NA	NA
Phenanthrene	NA	6.7E-04	NA	6.7E-04	0.1%
Pyrene	5.6E-05	NA	NA	5.6E-05	0.0%
Selenium	1.3E-04	NA	NA	1.3E-04	0.0%
Thallium	8.4E-03	NA	NA	8.4E-03	1.6%
1,2,4-Trimethylbenzene	NA	6.3E-04	NA	6.3E-04	0.1%
1,3,5-Trimethylbenzene	NA	5.1E-04	NA	5.1E-04	0.1%
Vanadium	NA	NA	NA	NA	NA
Xylenes	NA	3.7E-06	NA	3.7E-06	0.0%
Zinc	NA	NA	NA	NA	NA
Total	5.2E-01	1.9E-02	4E-06	5E-01	100%
Percent Contribution	96%	4%	0%	100%	

Notes:

1. Noncarcinogenic health effects for off-site residents are based on exposures to children, and it assumes that the off-site resident is located at the site boundary. There are no residences located at the site boundary. The nearest residence is more than 2,000 feet from the MLGS boundary.

Abbreviations:

NA = not applicable

TABLE 23

SUMMARY OF NONCARCINOGENIC HAZARD INDEXES:
FUTURE ON-SITE WORKER DURING OPERATIONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

	Soil					Groundwater			
Chemical	**Incidental Ingestion of Soil**	**Dermal Contact with Soil**	**Inhalation of Particulates**	**Inhalation of Volatiles in Ambient Air from Soil**	**Inhalation of Volatiles in Indoor Air from Soil**	**Inhalation of Volatiles in Ambient Air from Groundwater**	**Inhalation of Volatiles in Indoor Air from Groundwater**	**Hazard Index**	**Percent Contribution**
Acenaphthene	1.5E-04	1.3E-04	NA	1.4E-04	2.3E-05	NA	NA	4.3E-04	1.3%
Acenaphthylene	8.0E-05	6.9E-05	NA	8.0E-05	3.8E-04	NA	NA	6.0E-04	1.8%
Anthracene	8.2E-06	7.0E-06	NA	2.2E-06	8.0E-08	NA	NA	1.7E-05	0.1%
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	1.8E-06	1.5E-06	1.7E-10	NA	NA	NA	NA	3.3E-06	0.0%
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium III	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	3.2E-04	2.1E-05	1.1E-04	NA	NA	NA	NA	4.4E-04	1.3%
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cymene	3.4E-08	2.3E-08	NA	2.4E-08	1.2E-06	NA	NA	1.3E-06	0.0%
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	5.0E-05	4.3E-05	4.8E-09	NA	NA	NA	NA	9.3E-05	0.3%
Fluorene	1.2E-05	1.0E-05	NA	5.0E-06	1.7E-07	NA	NA	2.8E-05	0.1%
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (elemental)	7.3E-03	4.8E-04	7.1E-07	NA	NA	NA	NA	7.8E-03	23.4%
Methylene chloride	1.6E-07	1.0E-07	NA	6.9E-06	1.9E-04	3.5E-07	2.5E-05	2.2E-04	0.7%
Molybdenum	1.0E-04	6.6E-06	9.7E-09	NA	NA	NA	NA	1.1E-04	0.3%
Naphthalene	4.8E-05	3.2E-05	NA	1.4E-03	9.5E-04	NA	NA	2.4E-03	7.3%
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	2.2E-04	1.9E-04	NA	6.4E-05	6.1E-05	NA	NA	5.4E-04	1.6%
Pyrene	1.2E-04	1.0E-04	1.2E-08	NA	NA	NA	NA	2.3E-04	0.7%
Selenium	3.1E-04	2.1E-05	2.7E-08	NA	NA	NA	NA	3.3E-04	1.0%
Thallium	1.8E-02	1.2E-03	1.8E-06	NA	NA	NA	NA	2.0E-02	58.8%
1,2,4-Trimethylbenzene	1.3E-07	8.3E-08	NA	6.0E-05	1.9E-04	NA	NA	2.5E-04	0.7%
1,3,5-Trimethylbenzene	1.0E-07	6.8E-08	NA	4.8E-05	1.5E-04	NA	NA	2.0E-04	0.6%
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	1.0E-08	6.8E-09	NA	3.5E-07	2.5E-06	NA	NA	2.9E-06	0.0%
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	3E-02	2E-03	1E-04	2E-03	2E-03	3E-07	2E-05	3E-02	100%
Percent Contribution	81.3%	7.0%	0.3%	5.4%	5.9%	0.0%	0.1%		

Abbreviations:
NA = not applicable

TABLE 24

SUMMARY OF NONCARCINOGENIC HAZARD INDEXES: HYPOTHETICAL FUTURE OFF-SITE RESIDENT DURING OPERATIONS[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Chemical	Soil Inhalation of Particulates	Hazard Index	Percent Contribution
Acenaphthene	NA	NA	NA
Acenaphthylene	NA	NA	NA
Anthracene	NA	NA	NA
Arsenic	NA	NA	NA
Barium	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Benzo(g,h,i)perylene	3E-09	2.7E-09	0.0%
Benzo(k)fluoranthene	NA	NA	NA
Chromium III	NA	NA	NA
Chrysene	NA	NA	NA
Cobalt	2E-03	1.7E-03	97.7%
Copper	NA	NA	NA
Cymene	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA
Fluoranthene	7E-08	7.5E-08	0.0%
Fluorene	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA
Lead	NA	NA	NA
Mercury (elemental)	1E-05	1.1E-05	0.6%
Methylene chloride	NA	NA	NA
Molybdenum	1E-07	1.5E-07	0.0%
Naphthalene	NA	NA	NA
Nickel	NA	NA	NA
Phenanthrene	NA	NA	NA
Pyrene	2E-07	1.8E-07	0.0%
Selenium	4E-07	4.1E-07	0.0%
Thallium	3E-05	2.7E-05	1.6%
1,2,4-Trimethylbenzene	NA	NA	NA
1,3,5-Trimethylbenzene	NA	NA	NA
Vanadium	NA	NA	NA
Xylenes	NA	NA	NA
Zinc	NA	NA	NA
Total	2E-03	2E-03	100%
Percent Contribution	100%	100%	

Notes:
1. Noncarcinogenic health effects for residents are based on exposures to children.

Abbreviations:
NA = not applicable

TABLE 25

SUMMARY OF EXCESS LIFETIME CANCER RISKS:
HYPOTHETICAL FUTURE CONSTRUCTION WORKER

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Chemical	Soil				Groundwater		Excess Cancer Risk	Percent Contribution
	Incidental Ingestion of Soil	Dermal Contact with Soil	Inhalation of Particulates	Inhalation of Volatiles in Ambient Air from Soil	Inhalation of Volatiles in Ambient Air from Groundwater	Dermal Contact with Groundwater		
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	1.8E-08	2.E-08	2.5%
Barium	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	5.0E-08	4.0E-08	4.7E-10	NA	NA	NA	9.E-08	13.0%
Benzo(a)pyrene	2.2E-07	1.7E-07	2.0E-09	NA	NA	NA	4.E-07	56.4%
Benzo(b)fluoranthene	1.0E-08	8.4E-09	9.8E-11	NA	NA	NA	2.E-08	2.7%
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	6.4E-09	5.1E-09	6.0E-11	NA	NA	NA	1.E-08	1.7%
Chromium III	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	1.5E-08	1.2E-08	1.4E-10	NA	NA	NA	3.E-08	4.0%
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA
Cymene	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	3.6E-08	2.9E-08	1.0E-09	NA	NA	NA	7.E-08	9.5%
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	5.8E-09	4.6E-09	5.5E-11	NA	NA	NA	1.E-08	1.5%
Lead	NA	NA	NA	NA	NA	9.3E-13	9.E-13	0.0%
Mercury (elemental)	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	9.1E-12	5.6E-12	NA	3.1E-10	1.5E-11	3.5E-13	3.E-10	0.0%
Molybdenum	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	8.0E-09	4.9E-09	NA	4.8E-08	NA	NA	6.E-08	8.7%
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA
Total	3.E-07	3.E-07	4.E-09	5.E-08	2.E-11	2.E-08	7.E-07	100%
Percent Contribution	50.1%	39.9%	0.6%	6.9%	0.0%	2.5%	100%	

Abbreviations:
NA = not applicable

TABLE 26

SUMMARY OF EXCESS LIFETIME CANCER RISKS: HYPOTHETICAL FUTURE OFF-SITE RESIDENT DURING CONSTRUCTION[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Chemical	Soil		Groundwater	Excess Cancer Risk	Percent Contribution
	Inhalation of Particulates	Inhalation of Volatiles in Ambient Air from Soil	Inhalation of Volatiles in Ambient Air from Groundwater		
Acenaphthene	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA
Benzo(a)anthracene	2.5E-08	NA	NA	2.5E-08	3%
Benzo(a)pyrene	1.1E-07	NA	NA	1.1E-07	12%
Benzo(b)fluoranthene	5.2E-09	NA	NA	5.2E-09	1%
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	3.2E-09	NA	NA	3.2E-09	0%
Chromium III	NA	NA	NA	NA	NA
Chrysene	7.7E-09	NA	NA	7.7E-09	1%
Cobalt	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA
Cymene	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	5.5E-08	NA	NA	5.5E-08	6%
Fluoranthene	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	2.9E-09	NA	NA	2.9E-09	0%
Lead	NA	NA	NA	NA	NA
Mercury (elemental)	NA	NA	NA	NA	NA
Methylene chloride	NA	4.6E-09	2.3E-10	4.8E-09	1%
Molybdenum	NA	NA	NA	NA	NA
Naphthalene	NA	7.2E-07	NA	7.2E-07	77%
Nickel	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA
Xylenes	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA
Total	2.1E-07	7.2E-07	2.3E-10	9.3E-07	100%
Percent Contribution	22%	78%	0%	100%	

Notes:

1. Theoretical excess cancer risks presented for the off-site residential scenario is the summation of the risks associated with both the child and adult resident and it assumes that the off-site resident is located at the site boundary. There are no residences located at the site boundary. The nearest residence is more than 2,000 feet from the MLGS boundary.

Abbreviations:

NA = not applicable

TABLE 27

SUMMARY OF EXCESS LIFETIME CANCER RISKS:
HYPOTHETICAL FUTURE ON-SITE WORKER DURING OPERATIONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Chemical	Soil					Groundwater		Excess Cancer Risk	Percent Contribution
	Incidental Ingestion of Soil	Dermal Contact with Soil	Inhalation of Particulates	Inhalation of Volatiles in Ambient Air from Soil	Inhalation of Volatiles in Indoor Air from Soil	Inhalation of Volatiles in Ambient Air from Groundwater	Inhalation of Volatiles in Indoor Air from Groundwater		
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	2.6E-07	2.2E-07	8.2E-12	NA	NA	NA	NA	4.8E-07	13%
Benzo(a)pyrene	1.1E-06	9.7E-07	3.6E-11	NA	NA	NA	NA	2.1E-06	57%
Benzo(b)fluoranthene	5.5E-08	4.7E-08	1.7E-12	NA	NA	NA	NA	1.0E-07	3%
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	3.3E-08	2.8E-08	1.0E-12	NA	NA	NA	NA	6.2E-08	2%
Chromium III	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	8.0E-08	6.9E-08	2.5E-12	NA	NA	NA	NA	1.5E-07	4%
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cymene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	1.9E-07	1.6E-07	1.8E-11	NA	NA	NA	NA	3.5E-07	10%
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3.0E-08	2.6E-08	9.5E-13	NA	NA	NA	NA	5.6E-08	2%
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (elemental)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	4.8E-11	3.1E-11	NA	9.9E-10	2.7E-08	4.9E-11	3.5E-09	3.2E-08	1%
Molybdenum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	4.2E-08	2.7E-08	NA	1.5E-07	1.1E-07	NA	NA	3.3E-07	9%
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	2E-06	2E-06	7E-11	2E-07	1E-07	5E-11	4E-09	4E-06	100%
Percent Contribution	49.7%	42.4%	0.0%	4.2%	3.6%	0.0%	0.1%		

Abbreviations:
NA = not applicable

TABLE 28

SUMMARY OF EXCESS LIFETIME CANCER RISKS: HYPOTHETICAL FUTURE OFF-SITE RESIDENT DURING OPERATIONS[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Chemical	Soil Inhalation of Particulates	Excess Cancer Risk	Percent Contribution
Acenaphthene	NA	NA	NA
Acenaphthylene	NA	NA	NA
Anthracene	NA	NA	NA
Arsenic	NA	NA	NA
Barium	NA	NA	NA
Benzo(a)anthracene	8.2E-11	8.2E-11	12%
Benzo(a)pyrene	3.6E-10	3.6E-10	52%
Benzo(b)fluoranthene	1.7E-11	1.7E-11	3%
Benzo(g,h,i)perylene	NA	NA	NA
Benzo(k)fluoranthene	1.0E-11	1.0E-11	2%
Chromium III	NA	NA	NA
Chrysene	2.5E-11	2.5E-11	4%
Cobalt	NA	NA	NA
Copper	NA	NA	NA
Cymene	NA	NA	NA
Dibenz(a,h)anthracene	1.8E-10	1.8E-10	27%
Fluoranthene	NA	NA	NA
Fluorene	NA	NA	NA
Indeno(1,2,3-cd)pyrene	9.5E-12	9.5E-12	1%
Lead	NA	NA	NA
Mercury (elemental)	NA	NA	NA
Methylene chloride	NA	NA	NA
Molybdenum	NA	NA	NA
Naphthalene	NA	NA	NA
Nickel	NA	NA	NA
Phenanthrene	NA	NA	NA
Pyrene	NA	NA	NA
Selenium	NA	NA	NA
Thallium	NA	NA	NA
1,2,4-Trimethylbenzene	NA	NA	NA
1,3,5-Trimethylbenzene	NA	NA	NA
Vanadium	NA	NA	NA
Xylenes	NA	NA	NA
Zinc	NA	NA	NA
Total	6.8E-10	6.8E-10	100%
Percent Contribution	100%	100%	

Notes:
1. Theoretical excess cancer risks presented for the residential scenario as the summation of the risks associated with both the child and adult resident.

Abbreviations:
NA = not applicable

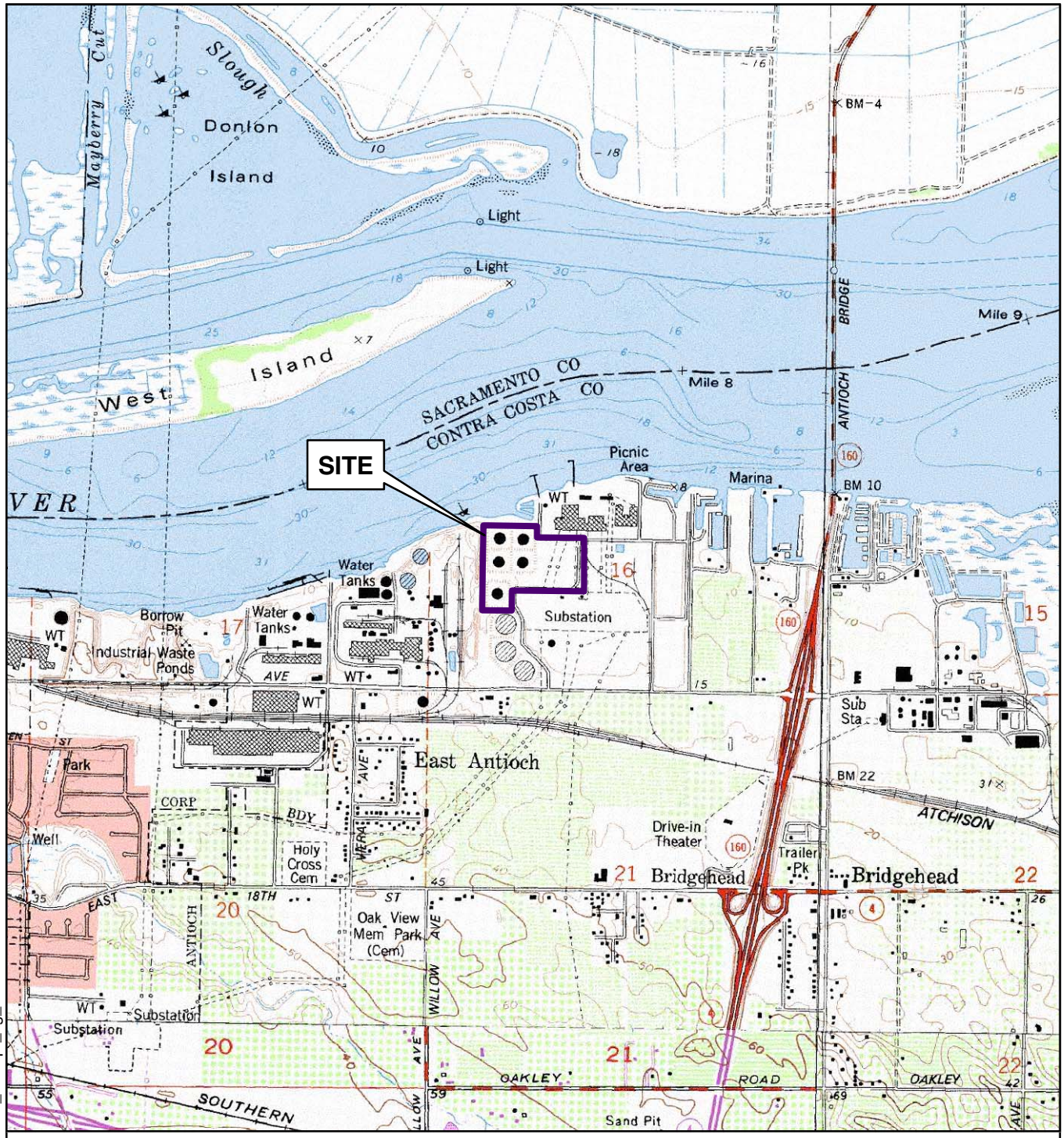
TABLE 29

SUMMARY OF POTENTIAL HUMAN HEALTH RISKS

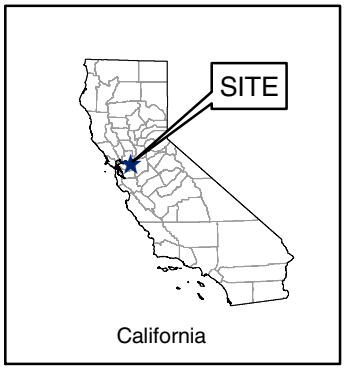
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Receptor	Theoretical Excess Lifetime Cancer Risk	Noncancer Hazard Index
During Construction		
Hypothetical Future Construction Worker	7E-07	3E-01
Hypothetical Future Off-site Resident	9E-07	5E-01
During Operations		
Hypothetical Future On-site Worker	4E-06	3E-02
Hypothetical Future Off-site Resident	7E-10	2E-03

FIGURES



Base map from USGS 7.5' Antioch North, Antioch South, Brentwood and Jersey Island, California topographic quadrangles.



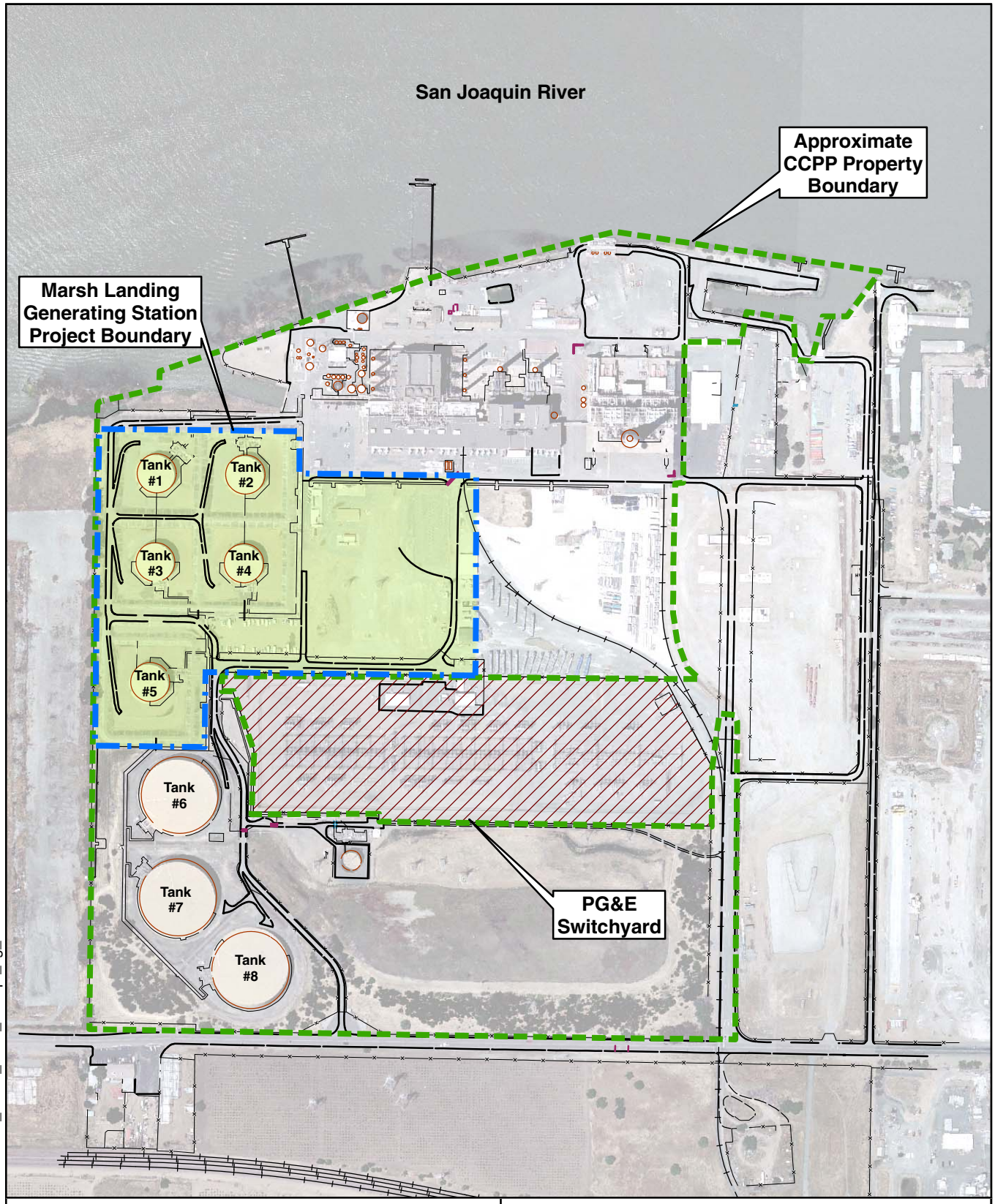
N

0 2,000 4,000 Feet

SITE LOCATION MAP
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

By: MMG	Date: 11/9/2009	Project No. 15317.000
AMEC Geomatrix		Figure 1

File path: S:\15300\15317\15317.000\task_02\09_1106_cecwp_fig_01.mxd



Aerial image from USGS digital orthophoto dated May 23, 2002.

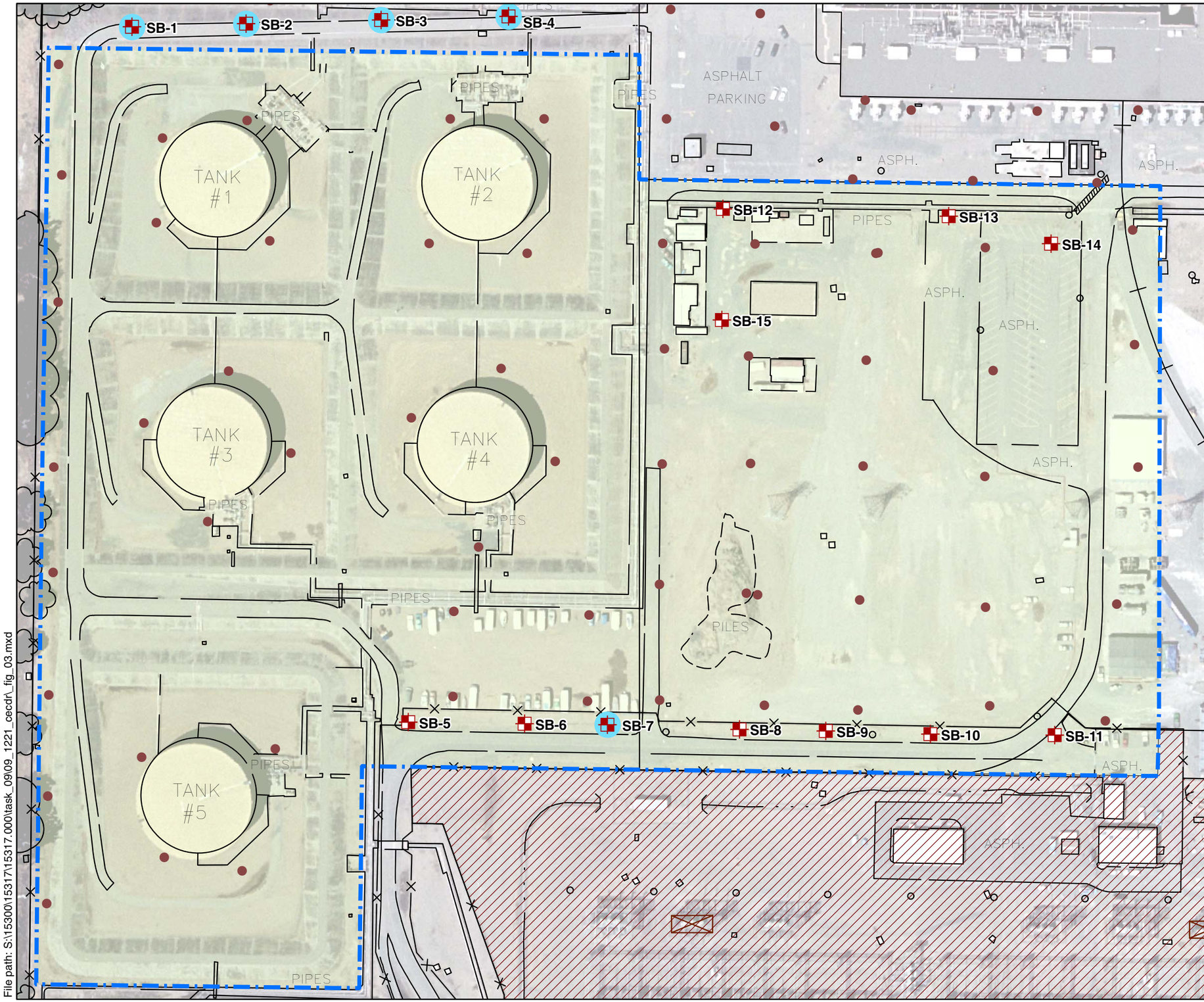
0 500 1,000 Feet

N

SITE PLAN AND FACILITY LAYOUT
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

By: MMG	Date: 11/20/2009	Project No. 15317.000
AMEC Geomatrix		Figure 2

File path: S:\15300\15317\15317.000\task_02\09_1106_cecwp_fig_02.mxd



Explanation

- Shallow soil and grab groundwater sample location
- Shallow soil sample location
- Previous sample location
- PG&E switchyard
- Marsh Landing Generating Station project boundary (the site)
- Reported oil-filled circuit breaker explosion site

N

0 120 240 Feet

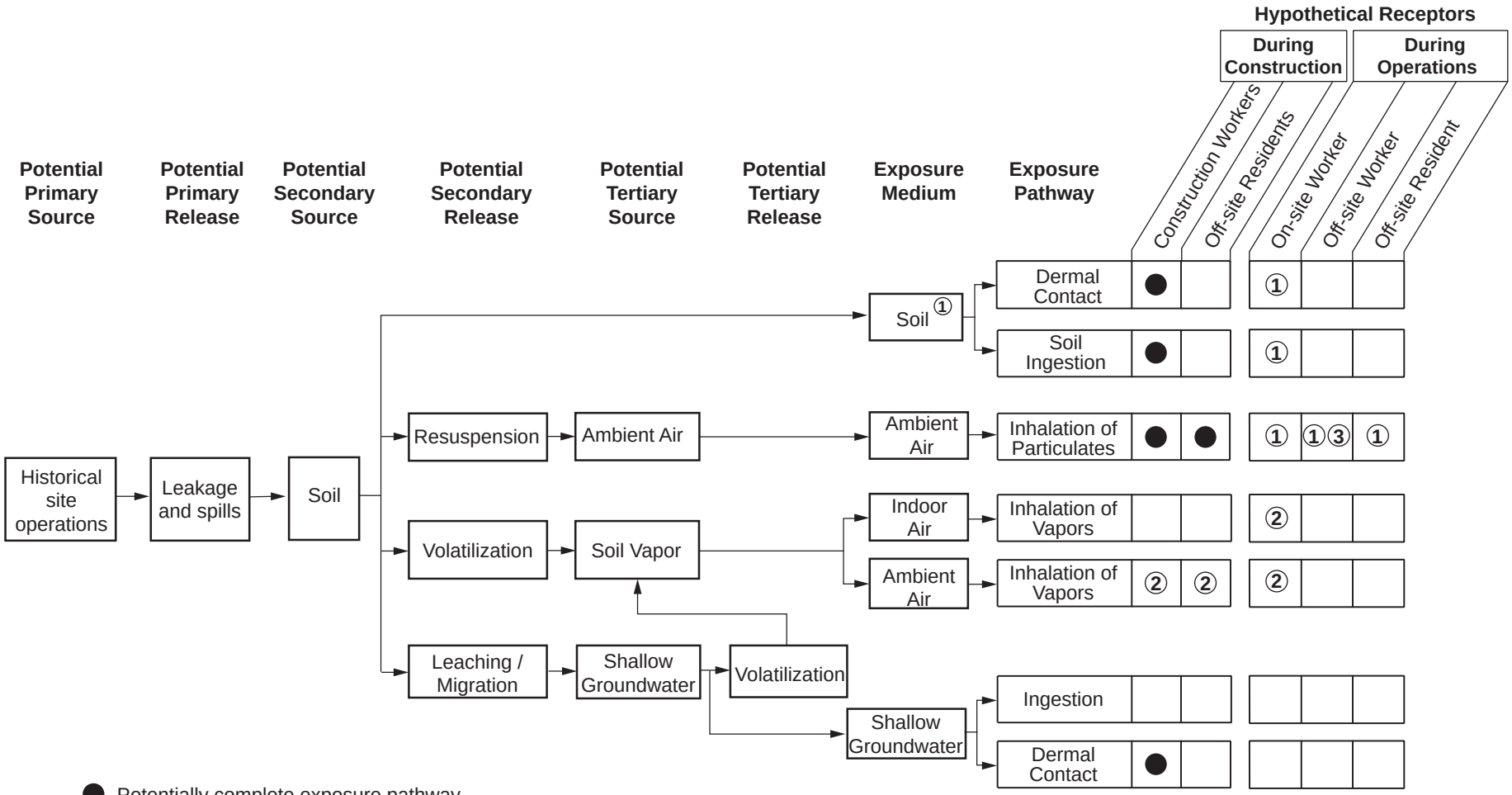
Aerial image from USGS digital orthophoto dated May 23, 2002.

DECEMBER 2009 SAMPLING LOCATIONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

By: JMS	Date: 1/5/2010	Project No. 15317.000
AMEC Geomatrix		Figure 3

File path: S:\15300\15317\15317.000\task_09\09_1221_cecdr_fig_03.mxd

S:\15300\15317\15317.pro_fig_04.ai



● Potentially complete exposure pathway.

① This pathway may not be complete once construction is finished because the majority of the site will be covered by power blocks and associated infrastructure, buildings, tanks, pavement, gravel, and compacted soil. However, potential exposure (assuming the site will not be covered) is evaluated.

② Potentially complete pathway, but expected to be insignificant based on historical site activities and existing data. Potential exposure is evaluated.

③ This pathway is evaluated qualitatively because exposure during operations for off-site workers is expected to be less than off-site residents and on-site workers.

PRELIMINARY SITE CONCEPTUAL MODEL
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

By: RC	Date: 11/09/09	Project No. 15317.000
AMEC Geomatrix		Figure 4

APPENDIX A

Compilation of Soil and Groundwater Analytical Data

TABLE A-1

SOIL ANALYTICAL RESULTS - METALS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Fluor Daniel GTI [1]																				
CB5-003	9/29/1997	0.5	<6.0	**1.2**	**44**	<0.50	<2.0	**15**	**5.3**	**6.9**	---	**3.3**	<0.050	<10	**17**	<1.0	<2.0	<1.0	**23**	**21**
		4.5	<6.0	**1.7**	**28**	<0.50	<2.0	**14**	**(4.6)**	**4.5**	---	**1.7**	<0.050	<10	**16**	<1.0	<2.0	<1.0	**22**	**19**
CB5-004	9/29/1997	0.5	<6.0	**2.8**	**36**	<0.50	<2.0	**13**	**(4.3)**	**5.7**	---	**3.2**	<0.050	<10	**14**	<1.0	<2.0	<1.0	**20**	**18**
		4.5	<6.0	**1.3**	**29**	<0.50	<2.0	**12**	**(3.8)**	**5.0**	---	**1.4**	<0.050	<10	**17**	<1.0	<2.0	<1.0	**17**	**19**
		4.5 (dup)	<6.0	**1.4**	**27**	<0.50	<2.0	**14**	**(3.9)**	**5.2**	---	**1.3**	<0.050	<10	**17**	<1.0	<2.0	<1.0	**19**	**16**
CB5-005	9/29/1997	0.5	<6.0	**6.9**	**49**	<0.50	<2.0	**630**	**17.0**	**51**	---	**30**	<0.050	<10	**400**	<1.0	<2.0	<1.0	**39**	**79**
		4.5	<6.0	**1.5**	**35**	<0.50	<2.0	**26**	**(4.8)**	**5.9**	---	**2.3**	<0.050	<10	**22**	<1.0	<2.0	<1.0	**19**	**20**
CB5-006	9/29/1997	0.5	<6.0	**1.1**	**41**	<0.50	<2.0	**13**	**(4.8)**	**5.8**	---	**1.6**	<0.050	<10	**15**	<1.0	<2.0	<1.0	**19**	**17**
		4.5	<6.0	**0.83**	**37**	<0.50	<2.0	**13**	**(4.2)**	**5.0**	---	**1.3**	<0.050	<10	**16**	<1.0	<2.0	<1.0	**18**	**16**
CB5-007	9/25/1997	0.5	<6.0	**2.2**	**130**	<0.50	<2.0	**26**	**9.3**	**15**	---	**2.7**	**(0.032)**	<10	**41**	<1.0	<2.0	<1.0	**37**	**33**
		5.5	<6.0	**1.0**	**33**	<0.50	<2.0	**12**	**(4.3)**	**4.8**	---	**1.2**	<0.050	<10	**15**	<1.0	<2.0	<1.0	**19**	**17**
CB5-014	9/29/1997	1.25	<6.0	**2.2**	**72**	<0.50	<2.0	**20**	**6.0**	**9.0**	---	**2.2**	<0.050	<10	**20**	<1.0	<2.0	<1.0	**28**	**21**
		4.5	<6.0	**1.5**	**32**	<0.50	<2.0	**12**	**(4.3)**	**4.9**	---	**1.5**	<0.050	<10	**18**	<1.0	<2.0	<1.0	**20**	**17**
CB5-015	9/29/1997	0.5	<6.0	**1.5**	**52**	<0.50	<2.0	**16**	**5.2**	**7.2**	---	**1.9**	<0.050	<10	**19**	<1.0	<2.0	<1.0	**24**	**21**
		4.5	<6.0	**1.6**	**45**	<0.50	<2.0	**14**	**(4.6)**	**5.8**	---	**1.9**	<0.050	<10	**17**	<1.0	<2.0	<1.0	**21**	**18**
CB5-016	9/29/1997	0.5	<6.0	**4.0**	**66**	<0.50	<2.0	**7.7**	**(3.2)**	**6.0**	---	**5.6**	<0.050	<10	**8.9**	<1.0	<2.0	<1.0	**32**	**16**
		4.5	<6.0	**0.99**	**44**	<0.50	<2.0	**10**	**(4.2)**	**5.3**	---	**1.4**	<0.050	<10	**12**	<1.0	<2.0	<1.0	**16**	**17**
CB5-017	9/29/1997	0.5	<6.0	**3.6**	**130**	<0.50	<2.0	**32**	**8.4**	**16**	---	**5.2**	<0.050	<10	**37**	<1.0	<2.0	<1.0	**33**	**43**
		4.5	<6.0	**1.5**	**41**	<0.50	<2.0	**12**	**(3.7)**	**6.2**	---	**2.1**	<0.050	<10	**12**	<1.0	<2.0	<1.0	**19**	**21**
CB5-018	9/23/1997	0.5	<6.0	**1.8**	**32**	<0.50	<2.0	**11**	**(3.8)**	**5.0**	---	**2.4**	**(0.011)**	<10	**14**	<1.0	<2.0	<1.0	**18**	**20**
		5.5	<6.0	**0.93**	**31**	<0.50	<2.0	**9.7**	**(3.5)**	**5.0**	---	**4.5**	<0.050	<10	**12**	<1.0	<2.0	<1.0	**14**	**23**
CB5-025	9/29/1997	0.5	<6.0	**1.9**	**84**	<0.50	<2.0	**31**	**6.4**	**9.7**	---	**2.3**	<0.050	<10	**26**	<1.0	<2.0	<1.0	**27**	**22**
		4.5	<6.0	**1.3**	**29**	<0.50	<2.0	**10**	**(2.5)**	**4.5**	---	**2.2**	<0.050	<10	**11**	<1.0	<2.0	<1.0	**16**	**20**
CB5-026	9/29/1997	0.5	<6.0	**5.5**	**170**	<0.50	<2.0	**36**	**9.6**	**23**	---	**6.5**	**0.072**	<10	**43**	<1.0	<2.0	<1.0	**45**	**50**
		4.5	<6.0	**1.4**	**47**	<0.50	<2.0	**15**	**(4.6)**	**5.0**	---	**1.8**	<0.050	<10	**17**	<1.0	<2.0	<1.0	**23**	**17**
CB5-027	9/25/1997	0.5	<6.0	**2.5**	**140**	<0.50	<2.0	**29**	**7.6**	**14**	---	**5.7**	**(0.047)**	<10	**33**	<1.0	<2.0	<1.0	**32**	**33**
		5.5	<6.0	**1.1**	**40**	<0.50	<2.0	**12**	**(3.6)**	**5.5**	---	**4.2**	<0.050	<10	**11**	<1.0	<2.0	<1.0	**20**	<21
C85-028	9/25/1997	0.5	<6.0	**2.6**	**83**	<0.50	<2.0	**22**	**7.2**	**13**	---	**8.0**	<0.050	<10	**5.6**	<1.0	<2.0	<1.0	**31**	**31**
		5.5	<6.0	**1.1**	**29**	<0.50	<2.0	**9.2**	**(3.2)**	**4.3**	---	**1.4**	<0.050	<10	**13**	<1.0	<2.0	<1.0	**14**	<17
CB5-029	9/23/1997	0.5	<6.0	**1.3**	**120**	<0.50	<2.0	**8.1**	**11**	**31**	---	**1.0**	**(0.02)**	<10	**6.6**	<1.0	<2.0	<1.0	**62**	**42**
		5.5	<6.0	**1.2**	**34**	<0.50	<2.0	**11**	**(3.5)**	**4.7**	---	**2.9**	<0.050	<10	**10**	<1.0	<2.0	<1.0	**16**	**19**
CB5-036	9/25/1997	0.5	<6.0	**3.0**	**120**	<0.50	<2.0	**32**	**7.2**	**14**	---	**4.7**	**(0.046)**	<10	**29**	<1.0	<2.0	<1.0	**34**	**26**
		5.5	<6.0	**1.3**	**28**	<0.50	<2.0	**8.8**	**(3.3)**	**4.2**	---	**2.0**	<0.050	<10	**12**	<1.0	<2.0	<1.0	**13**	<15
CB5-037	9/25/1997	0.5	<6.0	**1.7**	**82**	<0.50	<2.0	**32**	**7.5**	**21**	---	**20**	**0.13**	<10	**25**	<1.0	<2.0	<1.0	**31**	**46**
		5.5	<6.0	**1.2**	**27**	<0.50	<2.0	**11**	**(3.3)**	**4.5**	---	**4.3**	<0.050	<10	**11**	<1.0	<2.0	<1.0	**16**	<17
CB5-038	9/25/1997	0.5	<6.0	**1.2**	**43**	<0.50	<2.0	**15**	**(4.0)**	**5.6**	---	**2.3**	<0.050	<10	**16**	<1.0	<2.0	<1.0	**17**	<17
		5.5	<6.0	**1.2**	**36**	<0.50	<2.0	**12**	**(3.8)**	**5.0**	---	**3.0**	<0.050	<10	**10**	<1.0	<2.0	<1.0	**20**	<18

TABLE A-1

SOIL ANALYTICAL RESULTS - METALS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
CB5-039	9/25/1997	0.5	<6.0	**1.3**	**26**	<0.50	<2.0	**8.9**	**(3.0)**	**3.8**	---	**1.7**	**(0.03)**	<10	**11**	<1.0	<2.0	<1.0	**12**	<13
		5.5	<6.0	**1.0**	**39**	<0.50	<2.0	**13**	**(4.4)**	**5.6**	---	**1.9**	<0.050	<10	**12**	<1.0	<2.0	<1.0	**21**	<19
CB5-040	9/22/1997	0.5	<6.0	**1.1**	**34**	<0.50	<2.0	**11**	**(3.8)**	**6.4**	---	**3.4**	<0.050	<10	**15**	<1.0	<2.0	<1.0	**16**	**20**
		4.5	<6.0	**2.6**	**394**	<0.50	<2.0	**12**	**(4.6)**	**5.3**	---	**4.8**	<0.050	<10	**17**	**1.6**	<2.0	**1.5**	**16**	**19**
		9.5	<6.0	**0.92**	**36**	<0.50	<2.0	**12**	**(4.7)**	**4.7**	---	**1.4**	**(0.017)**	<10	**16**	<1.0	<2.0	<1.0	**19**	**17**
CB5-051	9/25/1997	0.5	<6.0	**3.8**	**170**	<0.50	<2.0	**37**	**9.6**	**18**	---	**5.2**	**(0.044)**	<10	**35**	<1.0	<2.0	<1.0	**34**	**32**
		4.5	<6.0	**1.3**	**32**	<0.50	<2.0	**11**	**(3.6)**	**5.4**	---	**1.5**	**(0.034)**	<10	**14**	<1.0	<2.0	<1.0	**17**	**16**
CB5-052	9/25/1997	1.5	<6.0	**1.7**	**82**	<0.50	<2.0	**26**	**12.0**	**63**	---	**3.7**	**0.14**	<10	**23**	<1.0	<2.0	<1.0	**42**	**23**
		5.5	<6.0	**1.2**	**34**	<0.50	<2.0	**14**	**(4.2)**	**6.0**	---	**1.9**	<0.050	<10	**16**	<1.0	<2.0	<1.0	**21**	**20**
CB5-053	9/25/1997	0.5	<6.0	**1.7**	**62**	<0.50	<2.0	**26**	**5.5**	**8.3**	---	**3.2**	<0.050	<10	**24**	<1.0	<2.0	<1.0	**24**	**25**
		5.5	<6.0	**1.3**	**34**	<0.50	<2.0	**10**	**(4.1)**	**4.8**	---	**1.3**	**(0.031)**	<10	**10.0**	<1.0	<2.0	<1.0	**17**	**14**
CB5-054	9/25/1997	0.5	<6.0	**1.7**	**99**	<0.50	<2.0	**28**	**10.0**	**26**	---	**2.6**	**0.41**	<10	**32**	<1.0	<2.0	<1.0	**43**	**36**
		5.5	<6.0	**1.2**	**43**	<0.50	<2.0	**12**	**(4.2)**	**5.2**	---	**2.0**	**0.28**	<10	**14**	<1.0	<2.0	<1.0	**16**	**18**
CB5-055	9/22/1997	0.5	<6.0	**1.3**	**39**	<0.50	<2.0	**31**	**9.7**	**17**	---	**6.4**	**(0.030)**	<10	**110**	<1.0	<2.0	<1.0	**21**	**20**
		4.5	<6.0	**1**	**43**	<0.50	<2.0	**14**	**5.3**	**7.7**	---	**1.7**	**(0.011)**	<10	**22**	<1.0	<2.0	<1.0	**17**	**20**
		9.5	<6.0	**0.84**	**26**	<0.50	<2.0	**14**	**(4.4)**	**4.7**	---	**1.6**	<0.050	<10	**16**	<1.0	<2.0	<1.0	**22**	**17**
CB5-066	12/3/1997	0.5	<6.0	**1.2**	**34**	<0.50	<2.0	**12**	**(4.2)**	**5.6**	**6700**	**2.6**	<0.050	<10	**15**	<1.0	<2.0	<1.0	**16**	**17**
		4.5	<6.0	**2.5**	**49**	<0.50	<2.0	**15**	**5.7**	**8.1**	**9600**	**2.0**	<0.050	<10	**23**	<1.0	<2.0	<1.0	**26**	**21**
		9.5	<6.0	**1.7**	**34**	<0.50	<2.0	**13**	**(4.5)**	**5.5**	**7100**	**1.5**	<0.050	<10	**18**	<1.0	<2.0	<1.0	**18**	**16**
AMEC Geomatrix, Inc. [3]																				
SB-5	12/14/2009	1.0	<0.4	**2.4**	**81**	<0.4	<0.4	**17**	**5.2**	**10**	---	**6.6**	<0.04	<0.4	**20**	<0.5	<0.4	<0.4	**26**	**36**
		2.0	<0.4	**1.7**	**59**	<0.4	<0.4	**17**	**4.9**	**8.2**	---	**3**	<0.04	<0.4	**17**	<0.5	<0.4	<0.4	**24**	**22**
SB-6	12/14/2009	1.0	<0.4	**2.6**	**76**	<0.4	<0.4	**22**	**6**	**13**	---	**15**	<0.04	**0.4**	**23**	<0.5	<0.4	<0.4	**32**	**54**
		2.0	<0.4	**1.2**	**54**	<0.4	<0.4	**16**	**4.6**	**6.9**	---	**2.4**	<0.04	<0.4	**16**	<0.5	<0.4	<0.4	**20**	**19**
SB-7	12/15/2009	1.0	<0.4	**3.2**	**59**	<0.4	<0.4	**18**	**4.9**	**10**	---	**14**	<0.04	**0.4**	**22**	<0.5	<0.4	<0.4	**26**	**56**
		2.0	<0.4	**1.3**	**45**	<0.4	<0.4	**13**	**4.2**	**6.5**	---	**2.3**	<0.04	<0.4	**15**	<0.5	<0.4	<0.4	**19**	**17**
SB-8	12/15/2009	0.5	<0.4	**1.8**	**35**	<0.4	<0.4	**13**	**3.8**	**6.2**	---	**2.9**	<0.04	**0.5**	**16**	<0.5	<0.4	<0.4	**19**	**17**
SB-12	12/14/2009	0.5	<0.4	**2.5**	**160**	<0.4	<0.4	**42**	**11**	**22**	---	**3.3**	**0.05**	**0.7**	**43**	<0.5	<0.4	<0.4	**40**	**30**
SB-13	12/14/2009	0.5	<0.4	**2.4**	**180**	<0.4	<0.4	**41**	**9.4**	**20**	---	**4.3**	<0.04	<0.4	**36**	<0.5	<0.4	<0.4	**39**	**28**
SB-14	12/14/2009	0.5	<0.4	**1.7**	**75**	<0.4	<0.4	**27**	**12**	**37**	---	**5.3**	**0.24**	<0.4	**28**	<0.5	<0.4	<0.4	**46**	**38**
SB-15	12/14/2009	0.5	<0.4	**0.5**	**15**	<0.4	<0.4	**59**	**16**	**80**	---	**4**	**0.29**	**0.4**	**18**	<0.5	<0.4	<0.4	**95**	**17**
Count			67	67	67	67	67	67	67	67	3	67	67	67	67	67	67	67	67	67
Number of Detects			0	67	67	0	0	67	67	67	3	67	20	5	67	1	0	1	67	59
Number of Non-Detects			0	67	67	0	0	67	67	67	3	67	20	5	67	1	0	1	67	59
Minimum Detection			0	0.5	15	0	0	7.7	2.5	3.8	6700	1	0.011	0.4	5.6	1.6	0	1.5	12	14
Maximum Detection			0	6.9	394	0	0	630	17	80	9600	30	0.41	0.7	400	1.6	0	1.5	95	79
Minimum Reporting Limit			0.4	0	0	0.4	0.4	0	0	0	0	0	0.04	0.4	0	0.5	0.4	0.4	0	13
Maximum Reporting Limit			6	0	0	0.5	2	0	0	0	0	0	0.05	10	0	1	2	1	0	21
Detection Frequency			0%	100%	100%	0%	0%	100%	100%	100%	100%	100%	30%	7%	100%	1%	0%	1%	100%	88%

Notes
1. Samples collected by Fluor Daniel GTI in 1997 and analyzed for metals using EPA Method 6000/7000 series. Analytical results from the 1997 investigation were compiled from data tables in Fluor Daniel GTI's June 1998 Phase II Environmental Site Assessment report; original laboratory data sheets were not available for review.
2. Detected concentrations are shown in **bold.**
3. Samples collected by AMEC Geomatrix, Inc., and analyzed by Creek Environmental Laboratories, Inc. of San Luis Obispo, California, for Title 22 metals using EPA Method 6020/7471A.

Abbreviations
( ) = detected concentration is less than reporting limit
< = constituent not detected above indicated reporting limit
bgs = below ground surface
dup = duplicate sample result
EPA = U.S. Environmental Protection Agency

TABLE A-2

SOIL ANALYTICAL RESULTS - PETROLEUM HYDROCARBONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Total Extractable Hydrocarbons	TPHd	TPHmo
Fluor Daniel GTI [1]					
CB4-068	10/8/1997	0.5	**37** [2]	--	--
		4.5	**1.7**	--	--
		7.5	<1.0	--	--
CB4-069	10/8/1997	0.5	**10.0**	--	--
		4.5	<1.0	--	--
		7.5	<1.0	--	--
CB4-070	10/1/1997	0.5	<1.1	--	--
		4.5	<1.5	--	--
CB4-071	10/1/1997	0.5	<1.4	--	--
		4.5	<1.5	--	--
CB4-072	10/8/1997	0.5	<6.1	--	--
		4.5	<1.5	--	--
		9.5	**(0.88)**	--	--
CB4-073	10/1/1997	0.5	<1.3	--	--
		4.5	<2.2	--	--
CB4-074	10/1/1997	0.5	**20**	--	--
		4.5	<2.2	--	--
CB4-075	10/7/1997	0.5	<1.2	--	--
		0.5	**(0.96)**	--	--
	10/8/1997	3.5	**(0.79)**	--	--
CB4-076	10/8/1997	0.5	**120**	--	--
		2.5	<1.0	--	--
CB4-077	10/8/1997	0.5	**51**	--	--
		4.5	<6.4	--	--
		9.5	<1.8	--	--
CB4-078	9/29/1997	0.5	**68**	--	--
		4.5	**4.8**	--	--
CB4-079	10/7/1997	0.5	**110**	--	--
		3.5	<1.2	--	--
CB4-080	10/7/1997	0.5	**160**	--	--
		3.5	<1.5	--	--
CB4-081	9/30/1997	0.5	**18**	--	--
		5.5	**(0.97)**	--	--
CB4-082	10/8/1997	0.5	<30	--	--
		0.5 (dup)	<12	--	--
		4.5	<1.2	--	--
		9.5	<1.5	--	--
CB4-083	9/30/1997	0.5	**5.0**	--	--
		4.5	<2.2	--	--
CB4-084	9/30/1997	0.5	<1.8	--	--
		4.5	<2.0	--	--
CB4-085	9/30/1997	0.5	**3.8**	--	--
		4.5	**(0.68)**	--	--
CB4-086	9/30/1997	0.5	**25**	--	--
		4.5	**1.3**	--	--
CB4-087	9/30/1997	0.5	**18**	--	--
		4.5	**1.5**	--	--
CB4-088	9/30/1997	0.5	**1.7**	--	--
		4.5	**5.4**	--	--

TABLE A-2

SOIL ANALYTICAL RESULTS - PETROLEUM HYDROCARBONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Total Extractable Hydrocarbons	TPHd	TPHmo
CB4-089	10/8/1997	0.5	**250**	--	--
		4.5	**44**	--	--
		11.5	<1.8	--	--
CB4-090	10/13/1997	0.5	**150**	--	--
		0.5 (dup)	**260**	--	--
		4.5	**3.7**	--	--
		9.5	<2.3	--	--
		13.5	<2.0	--	--
CB4-091	9/30/1997	0.5	<2.2	--	--
		4.5	<1.5	--	--
		10.75	<1.2	--	--
		15.75	**6.2**	--	--
CB4-092	9/30/1997	0.5	**38**	--	--
		4.5	<2.8	--	--
		4.5 (dup)	**(0.66)**	--	--
		10.75	**(0.70)**	--	--
		15.75	**(0.59)**	--	--
CB4-093	10/1/1997	0.5	**120**	--	--
		4.5	**(0.89)**	--	--
		10.75	**(0.72)**	--	--
		15.75	<1.0	--	--
CB4-094	10/1/1997	0.5	**16**	--	--
		4.5	<1.7	--	--
		10.75	<1.2	--	--
		15.75	<1.0	--	--
CB4-095	9/30/1997	0.5	**72**	--	--
		4.5	<1.4	--	--
		10.75	<1.2	--	--
		15.75	<1.1	--	--
CB4-096	9/30/1997	0.5	**20**	--	--
		8.5	**(0.67)**	--	--
		13.75	**5.0**	--	--
		17.75	<2.6	--	--
CB4-097	10/1/1997	0.5	**24**	--	--
		4.5	**3.7**	--	--
		10.75	**(0.75)**	--	--
		15.75	**(0.87)**	--	--
CB4-098	10/1/1997	0.5	**60**	--	--
		4.5	<4.8	--	--
		10.75	<2.0	--	--
		15.75	<1.1	--	--
		15.75 (dup)	<1.1	--	--
CB4-099	10/8/1997	0.5	**16**	--	--
	10/14/1997	0.5	**77**	--	--
		0.5 (dup)	**100**	--	--
		4.5	**87**	--	--
CB5-003	9/29/1997	0.5	**12**	--	--
		4.5	**5.1**	--	--
CB5-004	9/29/1997	0.5	**3.4**	--	--
		4.5	**2.3**	--	--
		4.5 (dup)	**2.0**	--	--

TABLE A-2

SOIL ANALYTICAL RESULTS - PETROLEUM HYDROCARBONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Total Extractable Hydrocarbons	TPHd	TPHmo
CB5-005	9/29/1997	0.5	**590**	--	--
		4.5	**6.5**	--	--
CB5-006	9/29/1997	0.5	**140**	--	--
		4.5	**13**	--	--
CB5-007	9/25/1997	0.5	**1900**[3]	--	--
		5.5	**(0.76)**	--	--
CB5-014	9/29/1997	1.25	**14**	--	--
		4.5	**2.4**	--	--
CB5-015	9/29/1997	0.5	<1.3	--	--
		4.5	<1.7	--	--
CB5-016	9/29/1997	0.5	**180**	--	--
		4.5	**3.5**	--	--
CB5-017	9/29/1997	0.5	**700**	--	--
		4.5	**6.6**	--	--
CB5-018	9/23/1997	0.5	<2.1	--	--
		5.5	**10.0**	--	--
CB5-025	9/29/1997	0.5	**33**	--	--
		4.5	**5.3**	--	--
CB5-026	9/29/1997	0.5	**370**	--	--
		4.5	**2.1**	--	--
CB5-027	9/25/1997	0.5	**420**[3]	--	--
		5.5	<1.2	--	--
CB5-028	9/25/1997	0.5	**140**[3]	--	--
		5.5	<2.8	--	--
CB5-029	9/23/1997	0.5	**45**	--	--
		5.5	**7.1**	--	--
CB5-036	9/25/1997	0.5	**110**[3]	--	--
		5.5	<2.3	--	--
CB5-037	9/25/1997	0.5	**110**[3]	--	--
		5.5	<1.9	--	--
CB5-038	9/25/1997	0.5	**81**[3]	--	--
		5.5	<1.3	--	--
CB5-039	9/25/1997	0.5	<2.2	--	--
		5.5	**8.2**[3]	--	--
CB5-040	9/22/1997	0.5	**4.4**	--	--
		4.5	**1.4**	--	--
		9.5	<1.0	--	--
CB5-051	9/25/1997	0.5	**140**	--	--
		4.5	**8.9**	--	--
CB5-052	9/25/1997	1.5	<1.7	--	--
		5.5	**4.7**	--	--
CB5-053	9/25/1997	0.5	**150**	--	--
		5.5	<1.9	--	--
CB5-054	9/25/1997	0.5	**180**[3]	--	--
		5.5	**(0.69)**	--	--
CB5-055	9/22/1997	0.5	**280**	--	--
		4.5	**38**	--	--
		9.5	**7.8**	--	--
CB5-066	12/3/1997	0.5	**25**	--	--
		4.5	<1.0	--	--
		9.5	<1.0	--	--
		14.5	<1.0	--	--

TABLE A-2

SOIL ANALYTICAL RESULTS - PETROLEUM HYDROCARBONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Total Extractable Hydrocarbons	TPHd	TPHmo
AMEC Geomatrix, Inc. [4]					
SB-5	12/14/2009	1.0	--	<10	<10
		2.0	--	<10	<10
SB-6	12/14/2009	1.0	--	<10	<10
		2.0	--	<10	<10
SB-7	12/15/2009	1.0	--	<10	**12**
		2.0	--	<10	<10
		3.5	--	<10	<10
SB-8	12/15/2009	0.5	--	<10	<10
		1.0	--	<10	<10
SB-9	12/14/2009	1.0	--	<10	<10
SB-10	12/14/2009	1.0	--	<10	**24**
SB-11	12/15/2009	1.0	--	<10	**25**
SB-12	12/14/2009	0.5	--	<10	**36**
SB-13	12/14/2009	0.5	--	<10	<10
SB-14	12/14/2009	1.0	--	<10	**48**
SB-15	12/14/2009	0.5	--	<10	**120**
		Count	152	10	10
		Number of Detects	93	0	4
		Number of Non-Detects	93	0	4
		Minimum Detection	0.59	0	24
		Maximum Detection	1900	0	120
		Minimum Reporting Limit	1	10	10
		Maximum Reporting Limit	30	10	10
		Detection Frequency	61%	0%	40%

Notes
1. Samples collected in 1997 by Fluor Daniel GTI and analyzed for TEH in the range of C_9 to C_{40} using Modified EPA Method 8015. Analytical results were compiled from data tables in Fluor Daniel GTI's June 1998 Phase II Environmental Site Assessment report; original laboratory data sheets were not available for review.
2. Detected concentrations are shown in **bold.**
3. Note on Fluor Daniel GTI data table indicates "Duplicate records found; data review required."
4. Samples collected in 2009 by AMEC Geomatrix, Inc., and analyzed for TPHd and TPHmo using silica gel cleanup (EPA 3630C) prior to analysis by EPA Method 8015M.

Abbreviations
( ) = detected concentration is less than reporting limit
< = constituent not detected above indicated reporting limit
-- = not analyzed
bgs = below ground surface
dup = duplicate sample result
EPA = U.S. Environmental Protection Agency
TEH = total extractable hydrocarbons
THPd = total petroleum hydrocarbons quantified as diesel
THPmo = total petroleum hydrocarbons quantified as motor oil

TABLE A-3

SOIL ANALYTICAL RESULTS - VOCs
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Benzene	Bromo-benzene	Bromo-form	Bromo-methane	Bromodi-chloro-methane	n-Butyl-benzene	sec-Butyl-benzene	tert-Butyl-benzene	Carbon Tetra-chloride	Bromo-chloro-methane	Chloro-ethane	Chloro-methane	2-Chloro-toluene	4-Chloro-toluene	Chloroform	Dibromochlo-ro-methane	1,2-Dibromo-3-chloro-propane	1,2-Dichloro-benzene	1,3-Dichloro-benzene	1,4-Dichloro-benzene	Dichloro-difluoro-methane
Fluor Daniel, GTI [1]																							
CB5-003	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-004	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/29/1997	4.5 (dup)	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-005	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-006	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-007	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-014	9/29/1997	1.25	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-015	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-016	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-017	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-018	9/23/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/23/1997	5.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-025	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-026	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-027	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-028	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-029	9/23/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/23/1997	5.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-036	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-037	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010

TABLE A-3

SOIL ANALYTICAL RESULTS - VOCs
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Benzene	Bromo-benzene	Bromo-form	Bromo-methane	Bromodi-chloro-methane	n-Butyl-benzene	sec-Butyl-benzene	tert-Butyl-benzene	Carbon Tetra-chloride	Bromo-chloro-methane	Chloro-ethane	Chloro-methane	2-Chloro-toluene	4-Chloro-toluene	Chloroform	Dibromochlo-ro-methane	1,2-Dibromo-3-chloro-propane	1,2-Dichloro-benzene	1,3-Dichloro-benzene	1,4-Dichloro-benzene	Dichloro-difluoro-methane
CB5-038	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-039	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-040	9/22/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/22/1997	4.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/22/1997	9.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-051	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/25/1997	4.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-052	9/25/1997	1.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-053	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-054	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
CB5-055	9/22/1997	0.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/22/1997	4.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
	9/22/1997	9.5	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.010	<0.010	<0.010
AMEC Geomatrix, Inc. [3]																							
SB-5	12/14/2009	1.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
		2.0	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
SB-6	12/14/2009	1.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
		2.0	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
SB-7	12/15/2009	1.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
		2.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Count			59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
Number of Detects			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Non-Detects			59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
Minimum Detection			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum Detection			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Reporting Limit			0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Maximum Reporting Limit			0.005	0.005	0.005	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.01	0.01
Detection Frequency			0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

TABLE A-3

SOIL ANALYTICAL RESULTS - VOCs
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	1,3-Dichloro-propane	2,2-Dichloro-propane	1,1-Dichloro-propene	Ethyl-benzene	Ethylene Dibromide	Hexa-chloro-butadiene	Iso-propyl-benzene	p-Iso-propyl-toluene	Methylene Chloride	Methylene Bromide	Chloro-benzene	Naph-thalene	n-Propyl-benzene	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetra-chloro-ethene	Toluene	1,2,3-Trichloro-benzene
Fluor Daniel, GTI [1]																											
CB5-003	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-004	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/29/1997	4.5 (dup)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-005	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-006	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-007	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-014	9/29/1997	1.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.015**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.018**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-015	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**(0.0058)**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**(0.0067)**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-016	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-017	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-018	9/23/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/23/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**(0.0033)**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-025	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.013**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.013**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-026	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.019**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.012**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-027	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-028	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**(0.0054)**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-029	9/23/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/23/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-036	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-037	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

TABLE A-3

SOIL ANALYTICAL RESULTS - VOCs
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	1,3-Dichloro-propane	2,2-Dichloro-propane	1,1-Dichloro-propene	Ethyl-benzene	Ethylene Dibromide	Hexa-chloro-butadiene	Iso-propyl-benzene	p-Iso-propyl-toluene	Methylene Chloride	Methylene Bromide	Chloro-benzene	Naph-thalene	n-Propyl-benzene	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetra-chloro-ethene	Toluene	1,2,3-Trichloro-benzene
CB5-038	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-039	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-040	9/22/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**(0.0071)**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/22/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**(0.0095)**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/22/1997	9.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**(0.0087)**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-051	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**(0.0028)**	**0.016**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/25/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.011**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-052	9/25/1997	1.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**(0.0096)**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**(0.0094)**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-053	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**(0.0096)**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-054	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
CB5-055	9/22/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.012**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/22/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**(0.0043)**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	9/22/1997	9.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**(0.0096)**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
AMEC Geomatrix, Inc. [3]																											
SB-5	12/14/2009	1.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.006	--	<0.001	<0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
		2.0	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.009	--	<0.002	<0.009	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
SB-6	12/14/2009	1.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	--	<0.001	<0.001	<0.001	<0.006	--	<0.001	<0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
		2.0	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	--	<0.002	<0.002	<0.002	<0.007	--	<0.002	<0.007	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
SB-7	12/15/2009	1.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	--	<0.005	<0.005	<0.005	<0.051 U	--	<0.005	<0.02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
		2.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	--	<0.005	<0.005	<0.005	<0.02	--	<0.005	<0.02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Count			59	59	59	59	59	59	59	59	59	59	53	59	59	59	59	53	59	59	59	59	59	59	59	59	59
Number of Detects			0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	0	0	0	0	0	0	0	0	0	0
Number of Non-Detects			59	59	59	59	59	59	59	59	59	59	53	59	59	58	38	53	59	59	59	59	59	59	59	59	59
Minimum Detection			0	0	0	0	0	0	0	0	0	0	0	0	0	0.0028	0.0033	0	0	0	0	0	0	0	0	0	0
Maximum Detection			0	0	0	0	0	0	0	0	0	0	0	0	0	0.0028	0.019	0	0	0	0	0	0	0	0	0	0
Minimum Reporting Limit			0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.001	0.001	0.001	0.006	0.005	0.001	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Maximum Reporting Limit			0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.051	0.005	0.005	0.02	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Detection Frequency			0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	36%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

TABLE A-3

SOIL ANALYTICAL RESULTS - VOCs
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	1,2,4-Trimethyl-benzene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	1,2,4-Trichloro-benzene	1,3,5-Trimethyl-benzene	Vinyl Chloride	Xylene (Mixed Isomers)	2-Chloro-ethylvinyl Ether	Dibromo-methane	cis-1,3-dichloro-propene	trans-1,3-dichloro-propene	Methyl tert-butyl ether
Fluor Daniel, GTI [1]																	
CB5-003	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-004	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	**(0.0021)**	---	---	---	---	---
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/29/1997	4.5 (dup)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-005	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-006	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-007	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-014	9/29/1997	1.25	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-015	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-016	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-017	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-018	9/23/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/23/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-025	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-026	9/29/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/29/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-027	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-028	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-029	9/23/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/23/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-036	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-037	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---

TABLE A-3

SOIL ANALYTICAL RESULTS - VOCs
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	1,2,4-Trimethyl-benzene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	1,2,4-Trichloro-benzene	1,3,5-Trimethyl-benzene	Vinyl Chloride	Xylene (Mixed Isomers)	2-Chloro-ethylvinyl Ether	Dibromo-methane	cis-1,3-dichloro-propene	trans-1,3-dichloro-propene	Methyl tert-butyl ether
CB5-038	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-039	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-040	9/22/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/22/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/22/1997	9.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-051	9/25/1997	0.5	**0.0064**	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0053	<0.0030	<0.0050	---	---	---	---	---
	9/25/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-052	9/25/1997	1.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-053	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-054	9/25/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/25/1997	5.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
CB5-055	9/22/1997	0.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/22/1997	4.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
	9/22/1997	9.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0050	---	---	---	---	---
AMEC Geomatrix, Inc. [3]																	
SB-5	12/14/2009	1.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.03	<0.001	<0.001	<0.001	<0.001
		2.0	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.04	<0.002	<0.002	<0.002	<0.002
SB-6	12/14/2009	1.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.03	<0.001	<0.001	<0.001	<0.001
		2.0	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.04	<0.002	<0.002	<0.002	<0.002
SB-7	12/15/2009	1.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005
		2.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005
Count			59	59	59	59	59	59	59	59	59	59	6	6	6	6	6
Number of Detects			1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Number of Non-Detects			58	59	59	59	59	59	59	58	59	58	6	6	6	6	6
Minimum Detection			0.0064	0	0	0	0	0	0	0.0053	0	0.0021	0	0	0	0	0
Maximum Detection			0.0064	0	0	0	0	0	0	0.0053	0	0.0021	0	0	0	0	0
Minimum Reporting Limit			0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.03	0.001	0.001	0.001	0.001
Maximum Reporting Limit			0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.1	0.005	0.005	0.005	0.005
Detection Frequency			2%	0%	0%	0%	0%	0%	0%	2%	0%	2%	0%	0%	0%	0%	0%

TABLE A-3

SOIL ANALYTICAL RESULTS - VOCs [1,2]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Notes
1. Samples collected in 1997 by Fluor Daniel GTI and analyzed for VOCs using EPA Method 8260. Analytical results were compiled from data tables in Fluor Daniel GTI's June 1998 Phase II Environmental Site Assessment report; original laboratory data sheets were not available for review.
2. Detected concentrations are shown in **bold.**
3. Samples collected in 2009 by AMEC Geomatrix, Inc. and analyzed for VOCs using EPA Method 8260B.

Abbreviations
( ) = detected concentration is less than reporting limit
< = constituent not detected above indicated reporting limit
--- = not analyzed
bgs = below ground surface
dup = duplicate sample result
EPA = U.S. Environmental Protection Agency
U = the analyte was analyzed for, but was not detected above the reported sample quantitation limit.
VOCs = Volatile organic compounds

TABLE A-4A

SOIL ANALYTICAL RESULTS FOR SHALLOW SAMPLES (0 TO 10 FEET BGS) - POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Acenaph-thene	Acenaph-thylene	Anthra-cene	Benzo-(ghi)-perylene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoran-thene	Benzo(k)-fluoran-thene	Chrysene	Dibenz-(a,h)an-thracene	Fluoran-thene	Fluorene	Indeno-(1,2,3-cd)-pyrene	Naphtha-lene	Phenan-threne	Pyrene
Fluor Daniel, GTI [1]																		
CB4-073	10/1/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-074	10/1/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-075	10/7/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		0.5 (dup)	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		3.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-076	10/8/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		2.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-077	10/8/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		9.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-078	9/29/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-079	10/7/1997	0.5	<0.50	<10	<0.50	<0.50	<0.50	<0.25	<0.50	<0.50	<0.50	<0.25	<0.50	<0.50	<0.30	<0.50	<0.50	<0.50
		3.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-080	10/7/1997	0.5	<0.50	<10	<0.50	<0.50	<0.50	<0.25	<0.50	<0.50	<0.50	<0.25	<0.50	<0.50	<0.30	<0.50	<0.50	<0.50
		3.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-081	9/30/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		5.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-082	10/08/1997	0.5	<0.50	<10	<0.50	<0.50	<0.50	<0.25	<0.50	<0.50	<0.50	<0.050	<0.50	<0.50	<0.30	<0.50	<0.50	<0.50
		0.5 (dup)	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<010	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		9.5	<010	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-083	09/30/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-084	9/30/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10

TABLE A-4A

SOIL ANALYTICAL RESULTS FOR SHALLOW SAMPLES (0 TO 10 FEET BGS) - POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Acenaph-thene	Acenaph-thylene	Anthra-cene	Benzo-(ghi)-perylene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoran-thene	Benzo(k)-fluoran-thene	Chrysene	Dibenz-(a,h)an-thracene	Fluoran-thene	Fluorene	Indeno-(1,2,3-cd)-pyrene	Naphtha-lene	Phenan-threne	Pyrene
CB4-085	9/30/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-086	9/30/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-087	9/30/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-088	9/30/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-089	10/8/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		4.5	<0.50	<10	<0.50	<0.50	<0.50	<0.25	<0.50	<0.50	<0.50	<0.25	<0.50	<0.50	<0.30	<0.50	<0.50	<0.50
CB4-090	10/13/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		0.5 (dup)	<5.0	<100	<5.0	<5.0	<5.0	<2.5	<5.0	<5.0	<5.0	<2.5	<5.0	<5.0	<3.0	<5.0	<5.0	<5.0
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		9.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-091	9/30/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-092	9/30/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5 (dup)	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-093	10/1/1997	0.5	<0.20	<4.0	<0.20	**(0.12)**	<0.20	<0.10	<0.20	<0.20	<0.20	**0.11**	<0.20	<0.20	<0.12	<0.20	<0.20	<0.20
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-094	10/1/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-095	9/30/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<010	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-096	9/30/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		8.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-097	10/1/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-098	10/1/1997	0.5	<0.20	<4.0	<0.20	<0.20	<0.20	<0.10	<0.20	<0.20	<0.20	<0.10	<0.20	<0.20	<0.12	<0.20	<0.20	<0.20
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10

TABLE A-4A

SOIL ANALYTICAL RESULTS FOR SHALLOW SAMPLES (0 TO 10 FEET BGS) - POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Acenaph-thene	Acenaph-thylene	Anthra-cene	Benzo-(ghi)-perylene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoran-thene	Benzo(k)-fluoran-thene	Chrysene	Dibenz-(a,h)an-thracene	Fluoran-thene	Fluorene	Indeno-(1,2,3-cd)-pyrene	Naphtha-lene	Phenan-threne	Pyrene
CB4-099	10/8/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
	10/14/1997	0.5	<0.50	<10	<0.50	<0.50	<0.50	<0.25	<0.50	<0.50	<0.50	<0.25	<0.50	<0.50	<0.30	<0.50	<0.50	<0.50
		0.5 (dup)	<1.0	<20	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.060	<1.0	<1.0	<1.0
		4.5	<1.0	<20	<1.0	**(0.59)**	**1.1**	**0.71**	**2.3**	**(0.85)**	**3.0**	**2.9**	<1.0	<1.0	**0.74**	<1.0	<1.0	<1.0
CB5-003	9/29/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-004	9/29/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5 (dup)	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-005	9/29/1997	0.5	**(9.0)**	<200	<10	<10	<10	**(3.6)**	<10	<10	<10	<5.0	**14**	<10	<6.0	**(7.0)**	**13**	**(9.5)**
		4.5	<0.10	<2.0	<0.10	<0.10	**(0.072)**	**0.093**	**(0.094)**	<0.10	**(0.089)**	**0.051**	**0.15**	<0.10	**(0.044)**	<0.10	<0.10	**0.15**
CB5-006	9/29/1997	0.5	**(1.6)**	<50	<2.5	**(2.3)**	**2.7**	**3.2**	**(1.7)**	<2.5	**(2.4)**	<1.2	**7.5**	<2.5	**2.1**	<2.5	**9.0**	**7.6**
		4.5	<0.10	<2.0	<0.10	**0.17**	**(0.061)**	**0.19**	**0.10**	**0.11**	**(0.081)**	<0.050	**(0.094)**	<0.10	<0.060	<0.10	<0.10	**0.17**
CB5-007	9/25/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		5.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-014	9/29/1997	1.25	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-015	9/29/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-016	9/29/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-017	9/29/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.050	<1.0	<1.0	<1.0	**(0.28)**	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-018	9/23/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		5.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	**(0.052)**	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-025	9/29/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.050	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-026	9/29/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	**(0.26)**	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-027	9/25/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.50	**(0.70)**	<1.0	<1.0	<0.50	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		5.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-028	9/25/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		5.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-029	9/23/1997	0.5	<0.20	<4.0	<0.20	<0.20	<0.20	<0.10	<0.20	<0.20	<0.20	<0.10	<0.20	<0.20	<0.12	<0.20	<0.20	<0.20
		5.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.1	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-036	9/25/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		5.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-037	9/25/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		5.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10

TABLE A-4A

SOIL ANALYTICAL RESULTS FOR SHALLOW SAMPLES (0 TO 10 FEET BGS) - POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Acenaph-thene	Acenaph-thylene	Anthra-cene	Benzo-(ghi)-perylene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoran-thene	Benzo(k)-fluoran-thene	Chrysene	Dibenz-(a,h)an-thracene	Fluoran-thene	Fluorene	Indeno-(1,2,3-cd)-pyrene	Naphtha-lene	Phenan-threne	Pyrene
CB5-038	9/25/1997	0.5	<0.50	<10	<0.50	<0.50	<0.50	<0.25	<0.50	<0.50	<0.50	<0.25	<0.50	<0.50	<0.30	<0.50	<0.50	<0.50
		5.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-039	9/25/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		5.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-040	9/22/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		9.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-051	09125/97	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-052	9/25/1997	1.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		5.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-053	9/25/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	**(0.45)**	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		5.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<010	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-054	9/25/1997	0.5	<1.0	<20	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<0.50	<1.0	<1.0	<0.60	<1.0	<1.0	<1.0
		5.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-055	9/22/1997	0.5	<2.0	<40	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<1.2	<2.0	<2.0	<2.0
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		9.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-066	12/3/1997	0.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		4.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		9.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		14.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10

TABLE A-4A

SOIL ANALYTICAL RESULTS FOR SHALLOW SAMPLES (0 TO 10 FEET BGS) - POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Acenaph-thene	Acenaph-thylene	Anthra-cene	Benzo-(ghi)-perylene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoran-thene	Benzo(k)-fluoran-thene	Chrysene	Dibenz-(a,h)an-thracene	Fluoran-thene	Fluorene	Indeno-(1,2,3-cd)-pyrene	Naphtha-lene	Phenan-threne	Pyrene
AMEC Geomatrix, Inc. [3]																		
SB-8	12/15/2009	0.5	<0.010	<0.010	<0.010	<0.010	<0.010	**0.012**	**0.023**	**0.016**	**0.024**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SB-9	12/14/2009	1.0	<0.010	<0.010	<0.010	**0.018**	**0.023**	**0.022**	**0.015**	**0.019**	**0.026**	<0.010	**0.033**	<0.010	**0.014**	<0.010	**0.014**	**0.062**
		3.0	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SB-10	12/14/2009	1.0	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
		3.0	<0.500	**4.9**	**2.5**	**2.5**	**27**	**8.6**	**2.5**	**2.3**	**32**	**1.1**	**29**	**0.5**	<0.500	**0.65**	**5.3**	**62**
SB-11	12/15/2009	1.0	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
		3.0	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**0.01**
SB-12	12/14/2009	0.5	<0.010	<0.010	<0.010	**0.051**	**0.017**	**0.035**	**0.026**	**0.031**	**0.029**	<0.010	**0.021**	<0.010	**0.038**	<0.010	<0.010	**0.036**
SB-13	12/14/2009	0.5	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SB-14	12/14/2009	1.0	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	**0.031**
SB-15	12/14/2009	0.5	<0.010	<0.010	<0.010	<0.010	<0.010	**0.018**	**0.011**	<0.010	**0.017**	<0.010	**0.012**	<0.010	<0.010	<0.010	<0.010	**0.014**
		Count	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
		Number of Detects	2	1	1	7	7	10	10	6	9	7	9	1	5	2	4	10
		Number of Non-Detects	2	1	1	7	7	10	10	6	9	7	9	1	5	2	4	10
		Minimum Detection	1.6	4.9	2.5	0.018	0.017	0.012	0.011	0.016	0.017	0.051	0.012	0.5	0.014	0.65	0.014	0.01
		Maximum Detection	9	4.9	2.5	2.5	27	8.6	2.5	2.3	32	2.9	29	0.5	2.1	7	13	62
		Minimum Reporting Limit	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
		Maximum Reporting Limit	10	200	10	10	10	2.5	10	10	10	5	5	10	6	5	5	5
		Detection Frequency	2%	1%	1%	5%	5%	8%	8%	5%	7%	5%	7%	1%	4%	2%	3%	8%

Notes
1. Samples collected in 1997 by Fluor Daniel GTI and analyzed for PAHs using Modified EPA Method 8081. Analytical results were compiled from data tables in Fluor Daniel GTI's June 1998 Phase II Environmental Site Assessment report; original laboratory data sheets were not available for review
2. Detected concentrations are shown in **bold.**
3. Samples collected in 2009 by AMEC Geomatrix, Inc. and analyzed for PAHs using Modified EPA Method 8270C-SIM.

Abbreviations
( ) = Detected concentration is less than reporting limit
< = Constituent not detected above indicated reporting limit
bgs = below ground surface
dup = duplicate sample result
EPA = U.S. Environmental Protection Agency
PAHs - Polynuclear aromatic hydrocarbons

TABLE A-4B

SOIL ANALYTICAL RESULTS (> 10 feet bgs) - POLYNUCLEAR AROMATIC HYDROCARBONS [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Acenaph-thene	Acenaph-thylene	Anthra-cene	Benzo-(ghi)-perylene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoran-thene	Benzo(k)-fluoran-thene	Chrysene	Dibenz-(a,h)an-thracene	Fluoran-thene	Fluorene	Indeno-(1,2,3-cd)-pyrene	Naphtha-lene	Phenan-threne	Pyrene
CB4-089	10/8/1997	11.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-090	10/13/1997	13.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-091	9/30/1997	10.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		15.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-092	9/30/1997	10.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		15.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-093	10/1/1997	10.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		15.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-094	10/1/1997	10.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		15.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-095	9/30/1997	10.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0:10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		15.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-096	9/30/1997	13.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		17.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-097	10/1/1997	10.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		15.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB4-098	10/1/1997	10.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		15.75	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		15.75 (dup)	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
CB5-066	12/3/1997	9.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		14.5	<0.10	<2.0	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10	<0.050	<0.10	<0.10	<0.060	<0.10	<0.10	<0.10
		Count	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
		Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Number of Non-Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Minimum Detection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Maximum Detection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Minimum Reporting Limit	0.1	2	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.05	0.1	0.1	0.06	0.1	0.1	0.1
		Maximum Reporting Limit	0.1	2	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.05	0.1	0.1	0.06	0.1	0.1	0.1
		Detection Frequency	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Notes
1. Samples collected by Fluor Daniel GTI and analyzed for PAHs using Modified EPA Method 8081. Analytical results were compiled from data tables in Fluor Daniel GTI's June 1998 Phase II Environmental Site Assessment report; original laboratory data sheets were not available for review.

Abbreviations
( ) = detected concentration is less than reporting limit
< = constituent not detected above indicated reporting limit
bgs = below ground surface
dup = duplicate sample result
EPA = U.S. Environmental Protection Agency
PAHs = polynuclear aromatic hydrocarbons

TABLE A-5

SOIL ANALYTICAL RESULTS - PCBs
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in milligrams per kilogram (mg/kg)

Sample Location	Date	Sample Depth (feet bgs)	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
Fluor Daniel, GTI [1]									
CB5-003	9/29/1997	0.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
		4.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
CB5-004	9/29/1997	0.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
		4.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
		4.5 (dup)	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
CB5-005	9/29/1997	0.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
		4.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
CB5-006	9/29/1997	0.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
		4.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
CB5-007	9/25/1997	0.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
		5.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
CB5-017	9/29/1997	4.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
CB5-066	12/3/1997	0.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
		4.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
		9.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
		14.5	<0.05	<0.08	<0.05	<0.05	<0.05	<0.05	<0.05
AMEC Geomatrix, Inc. [2]									
SB-5	12/14/2009	1.0	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
		2.0	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
SB-6	12/14/2009	1.0	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
		2.0	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
SB-7	12/15/2009	1.0	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
		2.0	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
SB-8	12/15/2009	0.5	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
		1.0	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
SB-9	12/14/2009	1.0	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
		3.0	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
SB-10	12/14/2009	1.0	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
		3.0	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
SB-11	12/15/2009	1.0	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
SB-12	12/14/2009	0.5	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
SB-13	12/14/2009	0.5	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
SB-14	12/14/2009	1.0	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033
SB-15	12/14/2009	0.5	<0.033	<0.067	<0.033	<0.033	<0.033	<0.033	<0.033

Notes
1. Samples collected by Fluor Daniel GTI and analyzed for PCBs using Modified EPA Method 8081. Analytical results were compiled from data tables in Fluor Daniel GTI's June 1998 Phase II Environmental Site Assessment report; original laboratory data sheets were not available for review.
2. Samples collected in 2009 by AMEC Geomatrix, Inc. and analyzed for PCBs using Modified EPA Method 8082.

Abbreviations
< = constituent not detected above indicated reporting limit
bgs = below ground surface
dup = duplicate sample result
EPA = U.S. Environmental Protection Agency
PCBs = polychlorinated biphenyls

APPENDIX A-6

GROUNDWATER ANALYTICAL RESULTS - METALS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Sample Location	Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese
Fluor Daniel, GTI [1]														
CB5-004	9/29/1997	<60	<10	<200	<5.0	<20	---	<30	<50	<25	---	<4.0	---	---
CB5-007	9/25/1997	<60	<10	<200	<5.0	<20	---	<30	<50	<25	---	<5.0	---	---
CB5-027	9/29/1997	<60	**44** [2]	<200	<5.0	<20	---	<30	<50	**(13)**	---	<4.0	---	---
CB5-051	9/29/1997	<60	**23**	<200	<5.0	<20	---	<30	<50	<25	---	<4.0	---	---
CB5-053	9/25/1997	<60	**64**	<200	<5.0	<20	---	<30	<50	**34**	---	<5.0	---	---
CB5-066	12/9/1997	<60 *[<60]* [3]	**37** ***[42]***	<200 ***[(120)]***	<5.0 *[<5.0]*	<20 *[<20]*	--- ***[30000]***	<30 *[<30]*	<50 *[<50]*	<25 *[<25]*	**71** ***[3500]***	**(2.7)** ***[<4.0]***	--- ***[16000]***	--- ***[1100]***
	2/17/1998	---	**57**	---	---	---	---	---	---	---	---	---	---	---
AMEC Geomatrix, Inc. [4]														
SB-1	12/15/2009	<8	<8	**74**	<8/<1	<8/<1	---	**13**	<8/<2.	<8/**5**	---	<8/**3**	---	---
SB-2	12/15/2009	<8	<8	**86**	<8/<1	<8/<1	---	<8.	<8/**1**	<8/<1	---	<8/<1	---	---
SB-2 duplicate[5]	12/15/2009	<8	<8	**74**	<8/<1	<8/<1	**--**	**8**	<8/**1**	<8/<1		<8/<1	--	--
SB-3	12/15/2009	<8	**65**	**55**	<8/<1	<8/<1	---	**46**	<8/**3**	<8/**6**	---	<8/**2**	---	---
SB-4	12/14/2009	<8	**21**	**15**	<8/<1	<8/<1	**--**	**26**	<8/<2	<8/**2**		<8/<1	--	--
SB-7	12/15/2009	<8	<8	<8	<8/<1	<8/<1	---	**21**	<8/<2	<8/**2**	---	<8/**1**	---	---
Count		12	13	12	12	12	0	12	12	12	1	12	0	0
Number of Detects		0	7	5	0	0	0	5	3	6	1	3	0	0
Number of Non-Detects		0	7	5	0	0	0	5	3	6	1	3	0	0
Minimum Detection		0	21	15	0	0	0	8	1	2	71	2	0	0
Maximum Detection		0	65	86	0	0	0	46	3	34	71	3	0	0
Minimum Reporting Limit		8	8	8	1	1	0	8	2	1	0	1	0	0
Maximum Reporting Limit		60	10	200	5	20	0	30	50	25	0	5	0	0
Detection Frequency		0%	54%	42%	0%	0%	0%	42%	25%	50%	100%	25%	0%	0%

APPENDIX A-6

GROUNDWATER ANALYTICAL RESULTS - METALS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Sample Location	Date	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Fluor Daniel, GTI [1]											
CB5-004	9/29/1997	<0.50	<100	<40	---	<50	<20	---	<10	<50	<110
CB5-007	9/25/1997	<0.50	<100	<40	---	<50	<20	---	<10	<50	<49
CB5-027	9/29/1997	<0.50	<100	<40	---	<50	<20	---	<10	**70**	<58
CB5-051	9/29/1997	<0.50	<100	<40	---	<50	<20	---	<10	**(37)**	<32
CB5-053	9/25/1997	<0.50	<100	**41**	---	**(14)**	<20	---	<10	**210**	**150**
CB5-066	12/9/1997	<0.50 *[<0.50]*	**(66)** ***[<100]***	<40 *[<40]*	--- ***[4100]***	<50 *[<50]*	<20 *[<20]*	--- ***[590000]***	<10 *[<10]*	**87** ***[100]***	<45 *[<68]*
	2/17/1998	---	---	---	---	---	---	---	---	---	---
AMEC Geomatrix, Inc. [4]											
SB-1	12/15/2009	<0.5<0.2	<8	<8	---	<8/<1	<8/<1	---	<8 / <1	<10	<80
SB-2	12/15/2009	<0.5<0.2	<8	<8	---	<8/<1	<8/<1	---	<8/ <1	<8	<80
SB-2 duplicate[5]	12/15/2009	<0.5<0.2	**16**	**9**	--	<8/<1	<8/<1	--	<8 / <1	<8	<80
SB-3	12/15/2009	<0.5<0.2	**14**	**16**	---	<8/<1	<8/<1	---	<8 / <1	**180**	<80
SB-4	12/14/2009	<0.5<0.2	**17**	<8	--	<8/<1	<8/<1U[6]	---	<8 / <1	**68**	<80
SB-7	12/15/2009	<0.5<0.2	<8	**8**	---	<8/**3**	<8/<1	---	<8 / <1	**19**	<80
	Count	12	12	12	0	12	12	0	12	12	12
	Number of Detects	0	4	4	0	2	0	0	0	7	1
	Number of Non-Detects	0	4	4	0	2	0	0	0	7	1
	Minimum Detection	0	14	8	0	3	0	0	0	19	150
	Maximum Detection	0	66	41	0	14	0	0	0	210	150
	Minimum Reporting Limit	0.2	8	8	0	1	1	0	1	8	32
	Maximum Reporting Limit	0.5	100	40	0	50	20	0	10	50	110
	Detection Frequency	0%	33%	33%	0%	17%	0%	0%	0%	58%	8%

Notes
1. Samples collected in 1997 and 1998 by Fluor Daniel GTI and analyzed for metals using EPA Method 6000/7000 series. Analytical results were compiled from data tables in Flu Daniel GTI's June 1998 Phase II Environmental Site Assessment report; original laboratory data sheets were not available for review.
2. Detected concentrations are shown in **bold.** Statistical summaries are only based on **filtered** samples.
3. Results shown in brackets and italics are for unfiltered samples.
4. Samples collected in 2009 by AMEC Geomatrix, Inc. and analyzed by Creek Laboratories, Inc. of San Luis Obispo, California, for Title 22 metals using EPA Method 6020/7471A. Select metals (beryllium, cadmium, cobalt, copper, lead, selenium, silver, and thallium) were also analyzed using EPA Method 200.8 and mercury was analyzed using EPA Method 7470 to achieve lower reporting limits; results for these metals analyses are shown after the "/". Samples were filtered in the field using a 0.45-micron filter prior to collection and analysis.
5. Duplicate sample collected immediately after the primary sample. The higher of the two analytical results were used in the human health risk assessment.
6. Silver was detected in sample SB-4-GW and the laboratory blank at the method detection limit of 0.1 µg/L. This result was flagged with a "U" to indicate that silver is considered not detected above the laboratory reporting limit.

Abbreviations
--- = not analyzed
( ) = detected concentration is less than reporting limit
< = constituent not detected above indicated reporting limit
EPA = U.S. Environmental Protection Agency
µg/L = micrograms per liter
U = The analyte was analyzed for, but was not detected above the reported sample quantitaion limit.

APPENDIX A-7

GROUNDWATER ANALYTICAL RESULTS - PETROLEUM HYDROCARBONS[1,2]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Sample Location	Date	Total Extractable Hydrocarbons	TPH as Diesel	TPH as Motor Oil
Fluor Daniel, GTI [1]				
CB4-068	10/8/1997	**(43)** [2]	NA	NA
CB4-074	10/8/1997	<82	NA	NA
CB4-076	10/13/1997	**220**	NA	NA
CB4-077	10/8/1997	**(40)**	NA	NA
CB4-078	10/1/1997	<50	NA	NA
CB4-081	10/1/1997	<54	NA	NA
CB4-090	10/20/1997	<50	NA	NA
CB4-096	10/1/1997	**(35)**	NA	NA
CB4-097	10/1/1997	**(26)**	NA	NA
CB5-004	9/29/1997	**(34)**	NA	NA
CB5-007	9/25/1997	**(47)**	NA	NA
CB5-027	9/29/1997	**(33)**	NA	NA
CB5-051	9/29/1997	**(39)**	NA	NA
CB5-053	9/25/1997	**(37)**	NA	NA
CB5-066	12/9/1997	**(30)**	NA	NA
AMEC Geomatrix, Inc. [3]				
SB-1	12/15/2009	NA	<50	<100
SB-2	12/15/2009	NA	<50	<100
SB-2 duplicate [4]	12/15/2009	NA	<50	<100
SB-3	12/15/2009	NA	<50	<100
SB-4	12/14/2009	NA	<50	<100
SB-7	12/15/2009	NA	<50 UJ	<100 UJ
	Count	15	6	6
	Number of Detects	11	0	0
	Number of Non-Detects	11	6	6
	Minimum Detection	26	ND	ND
	Maximum Detection	220	ND	ND
	Minimum Reporting Limit	50	50	50
	Maximum Reporting Limit	82	100	100
	Detection Frequency	73%	17%	17%

APPENDIX A-7

GROUNDWATER ANALYTICAL RESULTS - PETROLEUM HYDROCARBONS[1,2]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Notes

1. Samples collected in 1997 by Fluor Daniel GTI and analyzed for TEH in the range of C_9 to C_{40} using Modified EPA Method 8015. Analytical results were compiled from data tables in Fluor Daniel GTI's June 1998 Phase II Environmental Site Assessment report; original laboratory data sheets were not available for review.
2. Detected concentrations are shown in **bold.**
3. Samples collected in 2009 by AMEC Geomatrix, Inc., and analyzed for TPHd and TPHmo range hydrocarbons using silica gel cleanup (EPA 3630C) prior to analysis by EPA Method 8015M.
4. Duplicate sample collected immediately after the primary sample.

Abbreviations

-- = not applicable
( ) = detected concentration is less than reporting limit
< = constituent not detected above indicated reporting limit
EPA = U.S. Environmental Protection Agency
µg/L = micrograms per liter
NA = not analyzed
ND = not detected
TEH = total extractable hydrocarbons
TPHd = total petroleum hydrocarbons quantified as diesel
TPHmo = total petroleum hydrocarbons quantified as motor oil
UJ = the analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate.

APPENDIX A-8

GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Sample Location	Date	Carbon Tetra-chloride	Chloroform	Benzene	1,1,1-Trichloro-ethane	Bromo-methane	Chloromethane	Methylene Bromide	Bromochloro methane	Chloro-ethane	Vinyl Chloride	Methylene Chloride	Bromoform	Bromodi-chloro-methane
Fluor Daniel, GTI [1]														
CB5-004	9/29/1997	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<3.0	<5.0	<5.0	<5.0
CB5-007	9/25/1997	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<3.0	<5.0	<5.0	<5.0
CB5-027	9/29/1997	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<3.0	<5.0	<5.0	<5.0
CB5-051	9/29/1997	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<3.0	<5.0	<5.0	<5.0
CB5-053	9/25/1997	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<3.0	**(2.6)** [2]	<5.0	<5.0
AMEC Geomatrix, Inc. [3]														
SB-1	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<5	<0.5	<0.5
SB-2	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<5	<0.5	<0.5
SB-2 Duplicate [4]	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<5	<0.5	<0.5
SB-3	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<5	<0.5	<0.5
SB-4	12/14/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<5	<0.5	<0.5
SB-7	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<5	<0.5	<0.5
	Count	11	11	11	11	11	11	5	11	11	11	11	11	11
	Number of Detects	0	0	0	0	0	0	0	0	0	0	1	0	0
	Number of Non-Detects	11	11	11	11	11	11	5	11	11	11	10	11	11
	Minimum Detection	0	0	0	0	0	0	0	0	0	0	2.6	0	0
	Maximum Detection	0	0	0	0	0	0	0	0	0	0	2.6	0	0
	Minimum Reporting Limit	0.5	0.5	0.5	0.5	0.5	0.5	5	0.5	0.5	0.5	5	0.5	0.5
	Maximum Reporting Limit	5	5	5	5	10	5	5	5	5	3	5	5	5
	Detection Frequency	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	9%	0%	0%

APPENDIX A-8

GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Sample Location	Date	1,1-Dichloro-ethane	1,1-Dichloro-ethene	Trichloro-fluoro-methane	Dichloro-difluoro-methane	1,2-Dichloro-propane	1,1,2-Trichloro-ethane	Trichloro-ethene	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-benzene	Hexachloro-butadiene	Naph-thalene	2-Chloro-toluene	1,2-Dichloro-benzene	1,2,4-Trimethyl-benzene
Fluor Daniel, GTI [1]															
CB5-004	9/29/1997	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
CB5-007	9/25/1997	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
CB5-027	9/29/1997	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
CB5-051	9/29/1997	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
CB5-053	9/25/1997	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0
AMEC Geomatrix, Inc. [3]															
SB-1	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5
SB-2	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5
SB-2 Duplicate [4]	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5
SB-3	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5
SB-4	12/14/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5
SB-7	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5
	Count	11	11	11	11	11	11	11	11	11	11	11	11	11	11
	Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Number of Non-Detects	11	11	11	11	11	11	11	11	11	11	11	11	11	11
	Minimum Detection	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Maximum Detection	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Minimum Reporting Limit	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	0.5	0.5	0.5
	Maximum Reporting Limit	5	5	5	10	5	5	5	5	5	5	5	5	10	5
	Detection Frequency	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

APPENDIX A-8

GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Sample Location	Date	1,2-Dibromo-3-chloro-propane	1,2,3-Trichloro-propane	tert-Butyl-benzene	Isopropyl-benzene	p-Isopropyl-toluene	Ethyl-benzene	Styrene	n-Propyl-benzene	n-Butyl-benzene	4-Chloro-toluene	1,4-Dichloro-benzene	Chloro-benzene	1,2-Dibromo-ethane	1,2-Dichloro-ethane
Fluor Daniel, GTI [1]															
CB5-004	9/29/1997	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
CB5-007	9/25/1997	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
CB5-027	9/29/1997	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
CB5-051	9/29/1997	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
CB5-053	9/25/1997	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
AMEC Geomatrix, Inc. [3]															
SB-1	12/15/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB-2	12/15/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB-2 Duplicate [4]	12/15/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB-3	12/15/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB-4	12/14/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB-7	12/15/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Count	11	11	11	11	11	11	11	11	11	11	11	11	11	11
	Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Number of Non-Detects	11	11	11	11	11	11	11	11	11	11	11	11	11	11
	Minimum Detection	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Maximum Detection	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Minimum Reporting Limit	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Maximum Reporting Limit	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Detection Frequency	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

APPENDIX A-8

GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Sample Location	Date	1,3,5-Trimethyl-benzene	Bromo-benzene	Toluene	1,2,4-Trichloro-benzene	Dibromo-chloro-methane	Tetra-chloro-ethene	sec-Butyl-benzene	1,3-Dichloro-propane	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,3-Dichloro-benzene	1,1-Dichloro-propene	2,2-Dichloro-propane
Fluor Daniel, GTI [1]														
CB5-004	9/29/1997	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0
CB5-007	9/25/1997	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0
CB5-027	9/29/1997	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0
CB5-051	9/29/1997	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0
CB5-053	9/25/1997	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0
AMEC Geomatrix, Inc. [3]														
SB-1	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB-2	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB-2 Duplicate [4]	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB-3	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB-4	12/14/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SB-7	12/15/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Count	11	11	11	11	11	11	11	11	11	11	11	11	11
	Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Number of Non-Detects	11	11	11	11	11	11	11	11	11	11	11	11	11
	Minimum Detection	0	0	0	0	0	0	0	0	0	0	0	0	0
	Maximum Detection	0	0	0	0	0	0	0	0	0	0	0	0	0
	Minimum Reporting Limit	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Maximum Reporting Limit	5	5	5	5	5	5	5	5	5	5	10	5	5
	Detection Frequency	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

APPENDIX A-8

GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS (VOCs)
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Sample Location	Date	1,1,1,2-Tetra-chloro-ethane	Xylene (Mixed Isomers)	Methyl tert butyl ether	2-Chloro-vinyl ether	Dibromo-methane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	1,1,1,2-Tetrachloro-ethane
Fluor Daniel, GTI [1]									
CB5-004	9/29/1997	<5.0	<5.0	--	--	--	--	--	--
CB5-007	9/25/1997	<5.0	<5.0	--	--	--	--	--	--
CB5-027	9/29/1997	<5.0	<5.0	--	--	--	--	--	--
CB5-051	9/29/1997	<5.0	<5.0	--	--	--	--	--	--
CB5-053	9/25/1997	<5.0	<5.0	--	--	--	--	--	--
AMEC Geomatrix, Inc. [3]									
SB-1	12/15/2009	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5
SB-2	12/15/2009	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5
SB-2 Duplicate [4]	12/15/2009	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5
SB-3	12/15/2009	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5
SB-4	12/14/2009	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5
SB-7	12/15/2009	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5
	Count	11	11	6	6	6	6	6	6
	Number of Detects	0	0	0	0	0	0	0	0
	Number of Non-Detects	11	11	6	6	6	6	6	6
	Minimum Detection	0	0	0	0	0	0	0	0
	Maximum Detection	0	0	0	0	0	0	0	0
	Minimum Reporting Limit	0.5	0.5	0.5	20	0.5	0.5	0.5	0.5
	Maximum Reporting Limit	5	5	0.5	20	0.5	0.5	0.5	0.5
	Detection Frequency	0%	0%	0%	0%	0%	0%	0%	0%

Notes
1. Samples collected in 1997 by Fluor Daniel GTI and analyzed for VOCs using EPA Method 8260. Analytical results were compiled from data tables in Fluor Daniel GTI's June 1998 Phase II Environmental Site Assessment report; original laboratory data sheets were not available for review.
2. Detected concentrations are shown in **bold.**
3. Samples collected in 2009 by AMEC Geomatrix, Inc. and analyzed for VOCs using EPA Method 8260B.
4. Duplicate sample collected immediately after the primary sample. The higher of the two analytical results were used in the human health risk assessment.

Abbreviations
( ) = Detected concentration is less than reporting limit
< = Constituent not detected above indicated reporting limit
EPA = U.S. Environmental Protection Agency
VOCs = Volatile organic compounds

APPENDIX A-9

GROUNDWATER ANALYTICAL RESULTS - POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)[1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Sample Location	Date	Acenaph-thene	Acenaph-thylene	Anthra-cene	Benzo-(g,h,i)-perylene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoran-thene	Benzo(k)-fluoran-thene	Chrysene	Dibenz-(a,h)an-thracene	Fluoran-thene	Fluorene	Indeno-(1,2,3-cd)-pyrene	Naphtha-lene	Phenan-threne	Pyrene
CB4-068	10/8/1997	<2.2	<11	<2.2	<2.2	<0.56	<0.22	<0.56	<0.56	<2.2	<0.56	<2.2	<2.2	<0.56	<2.2	<2.2	<2.2
CB4-074	10/8/1997	<2.0	<10	<2.0	<2.0	<0.50	<0.20	<0.50	<0.50	<2.0	<0.50	<2.0	<2.0	<0.50	<2.0	<2.0	<2.0
CB4-076	10/13/1997	<2.0	<10	<2.0	<2.0	<0.50	<0.20	<0.50	<0.50	<2.0	<0.50	<2.0	<2.0	<0.50	<2.0	<2.0	<2.0
CB4-077	10/8/1997	<2.0	<10	<2.0	<2.0	<0.50	<0.20	<0.50	<0.50	<2.0	<0.50	<2.0	<2.0	<0.50	<2.0	<2.0	<2.0
CB4-078	10/1/1997	<2.0	<10	<2.0	<2.0	<0.50	<0.20	<0.50	<0.50	<2.0	<0.50	<2.0	<2.0	<0.50	<2.0	<2.0	<2.0
CB4-081	10/1/1997	<2.7	<14	<2.7	<2.7	<0.68	<0.27	<0.68	<0.68	<2.7	<0.68	<2.7	<2.7	<0.68	<2.7	<2.7	<2.7
CB4-090	10/20/1997	<2.0	<10	<2.0	<2.0	<0.50	<0.20	<0.50	<0.50	<2.0	<0.50	<2.0	<2.0	<0.50	<2.0	<2.0	<2.0
CB4-096	10/1/1997	<2.0	<10	<2.0	<2.0	<0.50	<0.20	<0.50	<0.50	<2.0	<0.50	<2.0	<2.0	<0.50	<2.0	<2.0	<2.0
CB4-097	10/1/1997	<2.0	<10	<2.0	<2.0	<0.50	<0.20	<0.50	<0.50	<2.0	<0.50	<2.0	<2.0	<0.50	<2.0	<2.0	<2.0
CB5-004	9/29/1997	<2.0	<10	<2.0	<2.0	<0.50	<0.20	<0.50	<0.50	<2.0	<0.50	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0
CB5-007	9/25/1997	<2.0	<10	<2.0	<2.0	<0.50	<0.20	<0.50	<0.50	<2.0	<0.50	<2.0	<2.0	<0.50	<2.0	<2.0	<2.0
CB5-027	9/29/1997	<2.0	<10	<2.0	<2.0	<0.50	<0.20	<0.50	<0.50	<2.0	<0.50	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0
CB5-051	9/29/1997	<2.0	<10	<2.0	<2.0	<0.50	<0.20	<0.50	<0.50	<2.0	<0.50	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0
CB5-053	9/25/1997	<2.0	<10	<2.0	<2.0	<0.50	<0.20	<0.50	<0.50	<2.0	<0.50	<2.0	<2.0	<0.50	<2.0	<2.0	<2.0
CB5-066	12/9/1997	<2.0	<10	<2.0	<2.0	<0.50	<0.20	<0.50	<0.50	<2.0	<0.50	<2.0	<2.0	<0.50	<2.0	<2.0	<2.0
Count		15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Number of Detects		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Non-Detects		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Detection		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum Detection		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Reporting Limit		2	10	2	2	0.5	0.2	0.5	0.5	2	0.5	2	2	0.5	2	2	2
Maximum Reporting Limit		2.7	14	2.7	2.7	0.68	0.27	0.68	0.68	2.7	0.68	2.7	2.7	1	2.7	2.7	2.7
Detection Frequency		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Note
1. Samples collected by Fluor Daniel GTI and analyzed for PAHs using EPA Method 8310. Samples were filtered prior to analysis. Analytical results were compiled from data tables in Fluor Daniel GTI's June 1998 Phase II Environmental Site Assessment report; original laboratory data sheets were not available for review.

Abbreviations
< = Constituent not detected above indicated reporting limit
EPA = U.S. Environmental Protection Agency
µg/L = micrograms per liter
PAHs = Polynuclear aromatic hydrocarbons

APPENDIX A-10

GROUNDWATER ANALYTICAL RESULTS - POLYCHORINATED BIPHENYLS (PCBs)

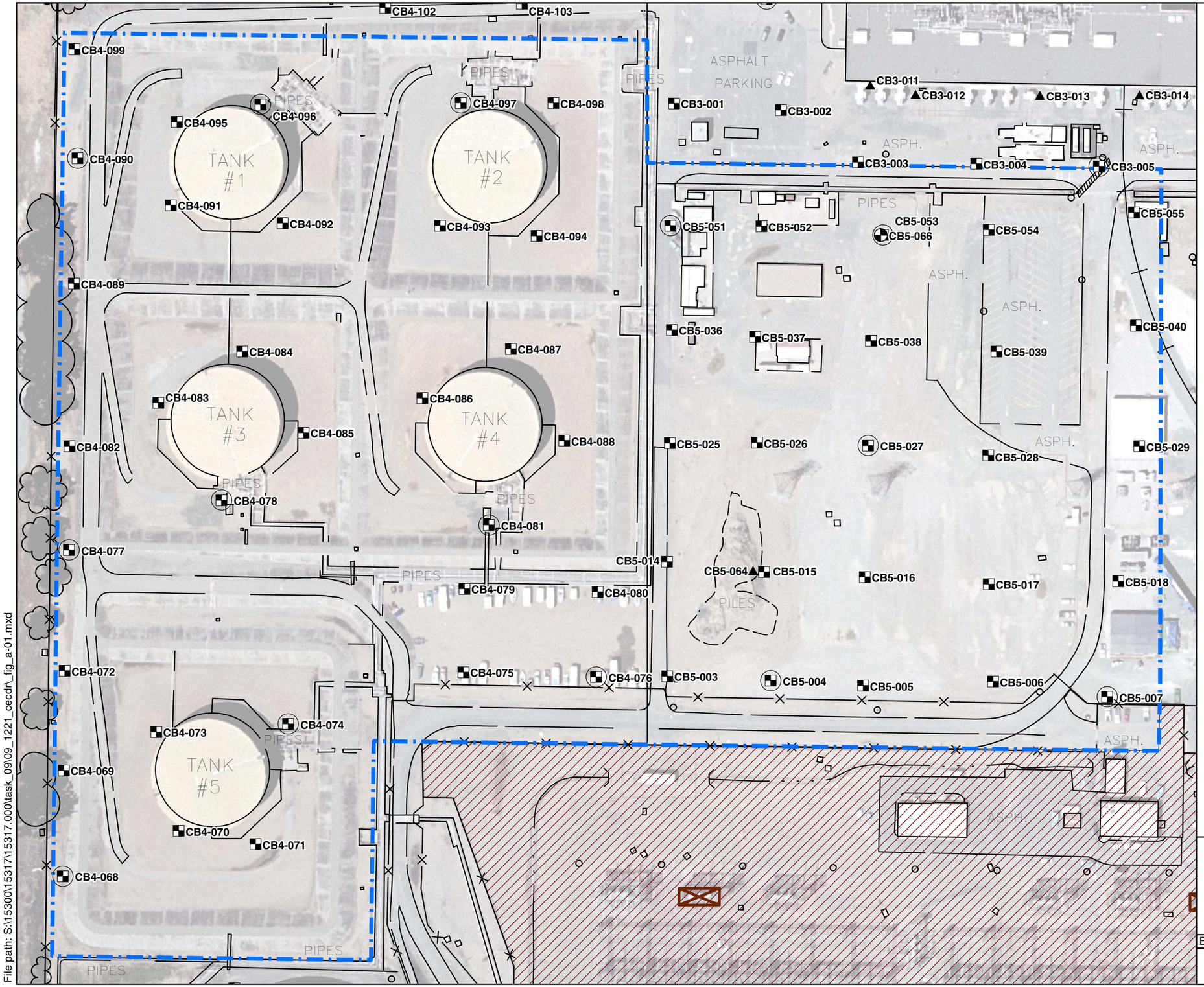
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Sample Location	Date	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
Fluor Daniel, GTI [1]								
CB5-004	9/29/1997	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50
CB5-007	9/25/1997	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50
CB5-066	12/9/1997	<0.50	<2	<0.50	<0.50	<0.50	<0.50	<0.50
AMEC Geomatrix, Inc. [2]								
SB-7	12/15/2009	<0.650	<1.00	<0.650	<0.650	<0.650	<0.650	<0.650

Note
1. Samples collected in 1997 by Fluor Daniel GTI and analyzed for PCBs using EPA Method 8081. Analytical results were compiled from data tables in Fluor Daniel GTI's June 1998 Phase II Environmental Site Assessment report; original laboratory data sheets were not available for review.
2. Samples collected by AMEC Geomatrix, Inc., and analyzed for PCBs using EPA Method 8082.

Abbreviations
< = Constituent not detected above indicated reporting limit
EPA = U.S. Environmental Protection Agency
µg/L = micrograms per liter
PCBs = Polychlorinated biphenyls



Explanation

- Previous soil boring sample location
- Previous hand auger sample location
- Previous soil boring and groundwater sample location
- Previous temporary monitoring well
- Marsh Landing Generating Station project boundary (the site)
- PG&E switchyard
- Reported oil-filled circuit breaker explosion site

N

0 120 240 Feet

Aerial image from USGS digital orthophoto dated May 23, 2002.

PREVIOUS SAMPLING LOCATIONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

By: JMS	Date: 1/5/2010	Project No. 15317.000
AMEC Geomatrix	Figure	A-1

File path: S:\15300\15317\15317.000\task_09\09_1221_cecdr_fig_a-01.mxd

APPENDIX B

Soil Boring Permit

CONTRA COSTA
HEALTH SERVICES

CONTRA COSTA
ENVIRONMENTAL HEALTH DIVISION
2120 DIAMOND BOULEVARD, SUITE 200
CONCORD, CA 94520
(925) 692-2500
www.cocoeh.org

Well Permit

WP0013620

PR Number:	**39442**	**PE Number:**	**4301**
Date Received:	**20 NOVEMBER 2009**	**Permit Number:**	**09B-1403**

Permit Approved/Issued by: **Date Issued: 01 DECEMBR 2009**

Environmental Health Specialist

NEW WELL	(15) SOIL BORINGS	WELL ABANDONMENT	REPAIR

The issuance of this permit by Contra Costa County Environmental Health Division does not guarantee a satisfactory and an indefinite operation of any well. Permit expires in 180 calendar days from date of approval. Permits are non-transferable, and can be suspended or revoked. If more time is required for the project, a time extension may be granted if reasons warrant it in writing.

PROJECT SITE INFORMATION

Site Address:	**(3201) WILBUR AVE, ANTIOCH**		
APN:	**051 031 014**	**Lot/Parcel #:**	
Subdivision #:		**Minor Subdivision #:**	

DRILLER / CONSULTANT INFORMATION

Driller:	**WOODWARD DRILLING**	**Contact Person:**	**SCOTT**
Phone #:	**707 374-4300**	**FAX#:**	**707 374-5677**
Consultant:	**AMEC**	**Contact Person:**	**JONATHAN SKAGGS**
Phone #:	**510 663-4100**	**FAX#:**	**510 663-4141**

LEGAL OWNER INFORMATION

Legal Owner Name:	**MIRAN CORP**		
Owner Address:	**3201 WILBUR AVE**		
City/State/Zip:	**ANTIOCH, CA 94509**		
Phone #:		**Alternate Phone #:**	

Prior to any drilling construction or destruction of a well, requests for inspection appointment must be received 48 hours in advance (excluding weekends, holidays and Mandatory County Furlough Days) by faxing your written request to (925) 692-2504 or email to ehlu@hsd.cccounty.us. Voice mail messages are not acceptable.

Well drillers must posses a valid C-57 license and must have on file a performance bond of $5,000.00 with Contra Costa County before commencing with any well construction, destruction or repairs.

WELL PERMIT CONDITIONS:

1. Proper annular seals and surface construction features are to be installed and required water analyses completed within 30 days of commencing drilling.
2. Monitoring well/soil boring shall be destroyed pursuant to County regulations within 30 days of completing monitoring activities.
3. Other: _____

_____

Final Approval by: _____ **Date:** _____

(06/08)

APPENDIX C

Field and Analytical Methodology

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APPENDIX C
FIELD METHODOLOGY
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

This appendix provides information on the field and analytical methods used to collect soil and groundwater samples as part of the focused site investigative activities conducted by AMEC Geomatrix, Inc. (AMEC), at the Marsh Landing Generating Station (the site; MLGS) which is located within the Contra Costa Power Plant (CCPP) property at 3201 Wilbur Avenue, Contra Costa County, California in December 2009. AMEC retained Engineering/Remediation Resources Group, Inc. (ERRG) of Martinez, California to assist with field activities, Woodward Drilling Company, Inc. (Woodward), of Rio Vista, California to perform drilling activities, and Creek Environmental Laboratories (Creek), of San Luis Obispo, California, a California-certified analytical laboratory, to perform analytical laboratory services.

C.1.0 PRE-FIELD ACTIVITIES

Prior to initiating field activities, a soil boring permit was obtained from the Contra Costa Environmental Health Division (CCEHD; Appendix B) and a site-specific health and safety plan was developed. Sampling locations were marked with white paint and Underground Service Alert, a regional subsurface utility notification service, was notified of proposed boring locations so that utility owners could mark utilities. Additionally, ERRG retained a private underground utility locator to clear proposed boring locations of subsurface utilities.

C.2.0 FIELD ACTIVITIES

A total of 15 soil borings were advanced at the site (Figure 3) by Woodward between December 14 and 15, 2009. All soil borings were advanced using a combination of hand augers and a direct-push drill rig fitted with a Geoprobe® DT22 dual-tube sampling system to collect soil and/or grab groundwater samples for chemical analysis.

C.2.1 SOIL SAMPLING METHODOLOGY

As a safety measure, all soil borings were hand augered to approximately 8 feet below ground surface (bgs) to clear each boring of subsurface utilities. A nearly-continuous core was generated at each boring location and a lithologic log was prepared for each boring by an ERRG field geologist. Select intervals were screened for volatile organic vapors with a photoionization detector (PID). Lithologic logs, which include PID readings, are presented in Appendix D.

Soil samples were collected from various depths, depending on the objective of the sampling (Table 1). The soil boring was advanced to 6 inches above the desired bottom depth for the soil samples using a hand auger. Then, soil samples were collected by driving a soil sampler fitted with 2-inch-diameter and 6-inch-long, new brass sleeves attached to a slide hammer into the bottom of the boring. The brass sleeves were then recovered from the soil samples; sealed with Teflon® sheets, plastic end caps, and silicone tape; labeled with unique sample identifiers designating the locations and depths (e.g., SB-5-1.0 for location SB-5 from between 0.5 and 1.0 feet bgs); sealed in plastic bags; and placed in coolers with ice prior to delivery to Creek under AMEC chain-of-custody procedures.

Prior to and between coring and sampling at each borehole, non-dedicated down-hole equipment was cleaned by Woodward using high-pressure steam. Following sample collection, the boreholes were destroyed with Portland Type I-II neat cement grout placed from total depth to ground surface in accordance with the CCEHD drilling permit.

C.2.2 GROUNDWATER SAMPLING METHODOLOGY

Grab groundwater samples were collected following installation of temporary well points. Well points were constructed by advancing the DT22 dual-tube sampling system to between approximately 4 and 5 feet below first-observed groundwater (between 3.5 and 19 bgs) and retracting the drive casing approximately 5 feet. Then, 5 feet of 1.4-inch outer diameter pre-packed screens constructed with 0.75-inch inner diameter Schedule 40 PVC, 0.010-inch, factory-slotted screen, filled with 20/40 silica sand, and wrapped with 0.0065-inch mesh stainless steel screen was attached to up to 19 feet of Schedule 40 PVC blank riser and placed into the borehole. A peristaltic pump fitted with new, disposable polyethylene and silicone tubing was used to purge then collected samples at select boring locations. Samples were decanted directly into laboratory-supplied sample bottles, with the exception of samples to be analyzed for metals. Prior to the collection of groundwater samples for metals analysis, the groundwater was field-filtered using 0.45-micron in-line barrel filters and then decanted into laboratory-supplied sample bottles. All depth-discrete groundwater samples were labeled appropriately and placed in ice-filled coolers, prior to delivery under AMEC chain-of-custody procedures to Creek.

C.2.3 ANALYTICAL METHODS

A summary of the analytical program is presented in Table 1 of the main report. Details regarding the analytical program are described below.

Soil samples were analyzed for one or more of the following:

- total petroleum hydrocarbons quantified as diesel (TPHd) and total petroleum hydrocarbons quantifies as motor oil (TPHmo) using United States Environmental Protection Agency (EPA) Method 8015B following silica gel cleanup;
- polynuclear aromatic hydrocarbons (PAHs) using EPA Method 8270C with selective ion monitoring (SIM);
- polychlorinated biphenyls (PCBs) using EPA Method 8082;
- volatile organic compounds (VOCs) using EPA Method 8260B; and
- Title 221 metals using EPA Methods 6010B/7471A.

Grab groundwater samples were analyzed for one or more of the following:

- TPHd and TPHmo using EPA Method 8015B following silica gel cleanup;
- PCBs using EPA Method 8082;
- VOCs using EPA Method 8260B; and
- Title 22 metals using EPA Methods 6010B/7471A and select metals using EPA Methods 200.8/7470.

C.2.4 QUALITY ASSURANCE/QUALITY CONTROL

The soil and grab groundwater sampling and analysis program also involved the collection and analysis of quality assurance/quality control (QA/QC) samples, including approximately one groundwater blind duplicate sample per 10 primary samples and one trip blank.

One blind duplicate groundwater sample was collected from boring SB-2 (labeled SB-20-GW) immediately following collection of the primary samples. The trip blank sample was prepared and provided by the laboratory and accompanied the sample shipment.

A QA/QC summary evaluation is presented in Section 4.4 of the main report.

1 California Code of Regulations, Title 22, Section 66216.24

APPENDIX D

Boring Logs

Project Symbol Explanation

Material Graphics

- Asphalt
- USCS Clayey Gravel
- USCS Silty Gravel
- USCS Silt
- USCS Silt-clay
- USCS Clayey Sand
- USCS Silty Sand
- USCS Poorly-graded Sand
- USCS Well-graded Sand
- USCS Well-graded Sand with Silt

Sampler Graphics

- Shelby Tube

29-204 AMEC MLGS.GPJ 1/15/10

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Fax: 925-969-0751

Project Name: AMEC PG&E Marsh Landing
Location: Mirant/PG&E Marsh Landing Gen. Stn
Number: 29-204

Project: AMEC PG&E Marsh Landing Generating Station | Boring: **SB-01** | Pg. 1 of 1

Drilling Co: Woodward | Drilling Method: DPT | Date Started: 12/15/09

Location: MLGS | Sampler: Dual Tube | Date Completed: 12/15/09

Logged by: KSM | Reviewed by:

Water Level ▽ ATD 19.5

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
						ASPHALT	ASPHALT				
1			0			Silty, Clayey Gravel with Sand, Brown, dry, loose, gravel up to 1.5" diameter (Aggregate Base - Fill)	GM	60	25	15	
			0			Silty, Clayey Sand with Gravel , Reddish Brown; slightly moist, loose, (Fill)	SC	25	40	35	
2						Well Graded Sand with Silt, light yellowish brown, loose, slightly moist					
3											
4											
5											
6											
7						Color Change to Brown Increase in Silt					
8			0						90	10	
9			0								
10											
11							SW				
12											
13			0			Increase in moisture					
14						Dry					
15			0								
16			0			Slightly moist					
17			0								
18			0								
19			0			Moderately dense Pre-packed PVC well screen set from 19-24 Feet bgs					
20			0			Groundwater samples collected from boring					
			0			Small brown stain					
21						0.25 Inch layer of Brown Staining immediately preceding the color change	ML-CL		40	60	
						Color change to Greenish Gray	SP				
22						Sandy Silt with Clay, Greenish Gray, soft, wet, medium to coarse grain sands					
						Sand, Greenish Gray, loose, wet, coarse grained					
23						Grades to Fine Grained Sitly Sand, Greenish Gray, loose, wet	SM				
24						Bottom of boring at 24 feet					

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Lithologic Log for SB-01
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	1

Project: AMEC PG&E Marsh Landing Generating Station | Boring: **SB-02** | Pg. 1 of 1

Drilling Co: Woodward | Drilling Method: DPT | Date Started: 12/15/09

Location: MLGS | Sampler: Dual Tube | Date Completed: 12/15/09

Logged by: KSM | Reviewed by:

Water Level ▽ ATD 16.5

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
						ASPHALT	ASPHALT				
			0			Silty, Clayey Gravel with Sand, Brown, dry, loose, gravel up to 1.5" diameter (Aggregate Base - Fill)	GM	60	25	15	
1			0			Silty, Clayey Sand with Gravel , Reddish Brown; slightly moist, loose, (Fill)	SC	25	40	35	
2						Well Graded Sand with Silt, light yellowish brown, loose, slightly moist					
3											
4											
5											
6											
7						Color Change to Brown; Increase in Silt					
8			0						95	5	
9						Slightly moist					
10			0				SW				
11			0			Increasing Moisture					
12			0								
13			0								
14			0			Increasing Silt and Moisture			90	10	
15			0			Pre-packed PVC well screen set from 15-20 Feet bgs Groundwater samples collected from boring					
16	▽		0			Saturated; Slightly Dense					
17			0								
18			0								
19			0			Silty Sand, Light Greenish Gray, wet, medium dense, fine grained sand	SM		75	25	
20						Bottom of boring at 20 feet					

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Lithologic Log for SB-02
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	2

Project: AMEC PG&E Marsh Landing Generating Station Boring: **SB-03** Pg. 1 of 1

Drilling Co: Woodward Drilling Method: DPT Date Started: 12/14/09

Location: MLGS Sampler: Dual Tube Date Completed: 12/15/09

Logged by: KSM Reviewed by:

Water Level ▽ ATD 12

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
						ASPHALT	ASPHALT				
1						Silty, Clayey Gravel with Sand, Brown, dry, loose, gravel up to 1.5" diameter (Aggregate Base - Fill)	GM				
						Silty, Clayey Sand with Gravel , Reddish Brown; slightly moist, loose, (Fill)	SC				
2						Well Graded Sand with Silt, light yellowish brown, loose, slightly moist					
3											
4											
5											
6											
7						Color Change to Brown Increase in Silt	SM				
8			0						90	10	
9			0			Moist	SW				
10											
11			0								
12 ▽			0			Pre-packed PVC well screen set from 11-16 Feet bgs Groundwater samples collected from boring Saturated					
13											
14			0			Increasing Silt			80	20	
15											
16						Bottom of boring at 16 feet					

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Lithologic Log for SB-03
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	3

Project: AMEC PG&E Marsh Landing Generating Station | Boring: **SB-04** | Pg. 1 of 1

Drilling Co: Woodward | Drilling Method: DPT | Date Started: 12/14/09

Location: MLGS | Sampler: Dual Tube | Date Completed: 12/14/09

Logged by: KSM | Reviewed by:

Water Level ▽ ATD 9.0

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
						ASPHALT	ASPHALT				
			0			Silty, Clayey Gravel with Sand, Brown, dry, loose, gravel up to 1.5" diameter (Aggregate Base - Fill)	GM	60	25	15	
1			0			Silty, Clayey Sand with Gravel , Reddish Brown; slightly moist, loose, (Fill)	SC	25	40	35	
			0			Well Graded Sand with Silt, light yellowish brown, loose, slightly moist			90	10	
2			0								
3			0								
4			0								
5											
6											
7			0			Color Change to Brown Increase in Silt			80	20	
8							SW				
9 ▽			0			Slightly Dense Pre-packed PVC well screen set from 9-14 Feet bgs Groundwater samples collected from boring					
10			0			Loose					
11											
12											
13			0			Increase in Silt Slightly Dense			70	30	
14						Bottom of boring at 14 feet					

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Lithologic Log for SB-04
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	4

Project: AMEC PG&E Marsh Landing Generating Station Boring: **SB-05** Pg. 1 of 1

Drilling Co: Woodward Drilling Method: HA Date Started: 12/14/09

Location: MLGS Sampler: 6" Shelby Date Completed: 12/14/09

Logged by: KSM Reviewed by:

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
			0			Sand with Silt, Brown, loose, slightly moist			90	10	
1			0				SM				
2			0								
						Bottom of boring at 2 feet					

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Lithologic Log for SB-05
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	5

Project: AMEC PG&E Marsh Landing Generating Station Boring: **SB-06** Pg. 1 of 1

Drilling Co: Woodward Drilling Method: HA Date Started: 12/14/09

Location: MLGS Sampler: 6" Shelby Date Completed: 12/14/09

Logged by: KSM Reviewed by:

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
						Sand with Silt, Brown, loose, slightly moist					
1							SM				
2											
						Bottom of boring at 2 feet					

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Lithologic Log for SB-06
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	6

Project: AMEC PG&E Marsh Landing Generating Station | Boring: **SB-07** | Pg. 1 of 1

Drilling Co: Woodward | Drilling Method: HA/DPT | Date Started: 12/15/09

Location: MLGS | Sampler: Dual Tube | Date Completed: 12/15/09

Logged by: KSM | Reviewed by:

Water Level ▽ ATD 3.5

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
			0			Gravelly Sand, Light brown, slightly moist, loose, fine to medium grained sand	SP	40	60		
			0			Sand with Silt, Light brown, slightly moist, loose, fine to medium grained sand			100		
1			0	■							
2			0	■							
3						Moist					
▽			0	■					90	10	
4						Wet, Some Silt, trace clay Increasing grain size to medium to coarse	SW SW-SM				
5			0								
6											
7			0						80	20	
8						Increasing Silty Sand globules					
						Bottom of boring at 8.5 feet					

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Lithologic Log for SB-07
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	7

Project: AMEC PG&E Marsh Landing Generating Station Boring: **SB-08** Pg. 1 of 1

Drilling Co: Woodward Drilling Method: HA Date Started: 12/15/09

Location: MLGS Sampler: 6" Shelby Date Completed: 12/15/09

Logged by: KSM Reviewed by:

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
						6" Stainless Steel Shelby Tube samples collected					
1						6" Stainless Steel Shelby Tube samples collected					
						Bottom of boring at 1 feet					

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Lithologic Log for SB-08
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	8

Project: AMEC PG&E Marsh Landing Generating Station Boring: **SB-09** Pg. 1 of 1

Drilling Co: Woodward Drilling Method: HA Date Started: 12/14/09

Location: MLGS Sampler: 6" Shelby Date Completed: 12/14/09

Logged by: KSM Reviewed by:

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
			0			Brown Sand with Silt, loose, moist, fine to medium grained, trace coarse grains			90	10	
1			0								
2							SM				
3			0								
						Bottom of boring at 3 feet					

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Lithologic Log for SB-09
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	9

Project: AMEC PG&E Marsh Landing Generating Station Boring: **SB-10** Pg. 1 of 1

Drilling Co: Woodward Drilling Method: HA Date Started: 12/14/09

Location: MLGS Sampler: 6" Shelby Date Completed: 12/14/09

Logged by: KSM Reviewed by:

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
			0			Sand with Gravel, brown, moist, loose	SW	15	85		
			0			Sandy Gravel with Clay, moist, slightly dense	GC				
1						Silt with Sand, Gray, moist, slightly stiff,	ML				
						Sand with Silt, brown, loose, moist			90	10	
2							SM				
			0								
3						Bottom of boring at 3 feet					

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Lithologic Log for SB-10
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	10

Project: AMEC PG&E Marsh Landing Generating Station Boring: **SB-11** Pg. 1 of 1

Drilling Co: Woodward Drilling Method: HA Date Started: 12/14/09

Location: MLGS Sampler: 6" Shelby Date Completed: 12/14/09

Logged by: KSM Reviewed by:

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
			0			Sand with Gravel, Brown, loose, moist, fine to medium grained, trace coarse grains	SW	15	85		
1			0			Sand with Silt, loose, moist	SM		90	10	
2											
3			0								
						Bottom of boring at 3 feet					

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Lithologic Log for SB-11
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	11

Project: AMEC PG&E Marsh Landing Generating Station Boring: **SB-12** Pg. 1 of 1

Drilling Co: Woodward Drilling Method: HA Date Started: 12/14/09

Location: MLGS Sampler: 6" Shelby Date Completed: 12/14/09

Logged by: KSM Reviewed by:

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
				■		6" Stainless Steel Shelby Tube samples collected					
						Bottom of boring at 0.5 feet					

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Lithologic Log for SB-12
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	12

Project: AMEC PG&E Marsh Landing Generating Station Boring: **SB-13** Pg. 1 of 1

Drilling Co: Woodward Drilling Method: HA Date Started: 12/14/09

Location: MLGS Sampler: 6" Shelby Date Completed: 12/14/09

Logged by: KSM Reviewed by:

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
				■		6" Stainless Steel Shelby Tube samples collected					
						Bottom of boring at 0.5 feet					

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Lithologic Log for SB-13
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	13

Project: AMEC PG&E Marsh Landing Generating Station Boring: **SB-14** Pg. 1 of 1

Drilling Co: Woodward Drilling Method: HA Date Started: 12/14/09

Location: MLGS Sampler: 6" Shelby Date Completed: 12/14/09

Logged by: KSM Reviewed by:

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
						Asphalt					
1				■		6" Stainless Steel Shelby Tube samples collected					
						Bottom of boring at 1 feet					

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Lithologic Log for SB-14
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	14

Project: AMEC PG&E Marsh Landing Generating Station Boring: **SB-15** Pg. 1 of 1

Drilling Co: Woodward Drilling Method: HA Date Started: 12/14/09

Location: MLGS Sampler: 6" Shelby Date Completed: 12/14/09

Logged by: KSM Reviewed by:

DEPTH - FT.	BLOW COUNT	% RECOVERY	FID\PID (ppm)	SAMPLES	GRAPHIC LOG	DESCRIPTION	USCS SYMBOL	ESTIMATED % OF GR	SA	FI	MOISTURE
				■		6" Stainless Steel Shelby Tube samples collected					
						Bottom of boring at 0.5 feet					

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Lithologic Log for SB-15
AMEC Geomatrix

Project Location:	Project No.	Fig.
Mirant/PG&E Marsh Landing Gen. Stn	29-204	15

APPENDIX E

Analytical Laboratory Reports and Chain-of-Custody Records

CHAIN-OF-CUSTODY RECORD

Q6666 16707

PROJECT NAME: MARSH LANDING

PROJECT NUMBER: 15317.000

RESULTS TO: jonathan.skaggs@amec.com; heidi.dietrich@amec.com

TURNAROUND TIME: 4 DAY

SAMPLE SHIPMENT METHOD: Fed Ex

LABORATORY NAME: Creek Env. Laboratory

LABORATORY ADDRESS: San Luis Obispo

LABORATORY CONTACT: Judy

LABORATORY PHONE NUMBER:

CLIENT INFORMATION:

DATE: 12/14/09 PAGE 1 OF 1

REPORTING REQUIREMENTS:

GEOTRACKER REQUIRED YES NO

SITE SPECIFIC GLOBAL ID NO.

SAMPLERS (SIGNATURE):

ANALYSES

DATE	TIME	SAMPLE NUMBER	TPH diesel 8015M	TPH motor oil 8015M	Silica Gel Cleanup	PAHs 8270C SIM	PCBs 8082 (*)	Title 22 Metals 6010	Mercury 7471A	VOCs by 8260B	CONTAINER TYPE AND SIZE	Soil (S), Water (W), Vapor (V), or Other (O)	Filtered	Preservative Type	Cooled	MS/MSD	No. of Containers	ADDITIONAL COMMENTS
12/14/09	1420	SB-12-0.5	X	X	X	X	X	X	X		6-inch liner	S	N	None	Y	N	1	18363
	1425	SB-13-0.5	X	X	X	X	X	X	X								1	18364
	1430	SB-15-0.5	X	X	X	X	X	X	X								1	18365
	1455	SB-14-1.0	X	X	X	X	X	X	X								1	18366
	1530	SB-9-1.0	X	X	X	X	X										1	18367
	1540	SB-9-3.0				X	X										1	18368
	1540	SB-5-1.0	X	X	X		X	X	X		6-inch liner						1	A 18369
										X	40 mL VOA			MeOH + NaHSO4			3	MeOH + NaHSO4 B, C, D
	1550	SB-5-2.0	X	X	X		X	X	X		6-inch liner			None			1	A 18370
										X	40 mL VOA			MeOH + NaHSO4			3	MeOH + NaHSO4 B, C
	1605	SB-6-1.0	X	X	X		X	X	X		6-inch liner			None			1	A 18371
		~~SB-6-2.0~~								X	40 mL VOA			MeOH + NaHSO4			3	MeOH + NaHSO4 B, C,
	1615	SB-6-2.0	X	X	X		X	X	X	X	6 inch liner + 40 mL VOAs		N	See comment	Y	N	4	Liner - unpreserved 40 ML MeOH + NaHSO4
	1605	SB-10-1.0	X	X	X	X	X				6-inch liner		N	None	Y	N	1	18373
	1615	SB-10-3.0				X	X				6-inch liner		N	None	Y	N	1	18374

18372 liner A VOA's B, C, D

TOTAL NUMBER OF CONTAINERS: 24

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
SIGNATURE:	12/14/09	1800	SIGNATURE: Kathy Wensloff	12/15/09	11:30
PRINTED NAME: Tiffany Klibke			PRINTED NAME: Kathy Wensloff		
COMPANY: Amec Geomatrix			COMPANY: Creek Env. Labs		
SIGNATURE:			SIGNATURE:		
PRINTED NAME:			PRINTED NAME:		
COMPANY:			COMPANY:		
SIGNATURE:			SIGNATURE:		
PRINTED NAME:			PRINTED NAME:		
COMPANY:			COMPANY:		

SAMPLING COMMENTS: For each sample, split a portion of the sample and place on HOLD for TPH Fractionation analysis. If analyzed, report TPH Fractionation in a separate lab report.

(*) Report PCB's on Dry Wt. @ 12/15

Temp. 1.0

Custody Seal Opened 12/15/09 10:36 KEW

amec

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Date: December 22, 2009

CASE NARRATIVE Q6666

Client: **Amec Geomatrix**
Project: **PG&E Marsh Landing**
Sample(s): **09-C18363 to 09-C18374**
Sampled: **12/14/09** **Received: 12/15/09**

Samples 09-C18363 to 09-C18374 were received at the laboratory at 1.0 °C with no anomaly except for the following remarks:

- PCBs analysis was subcontracted to American Scientific Laboratories.

Diesel range (C10-C25) and motor oil range (C25-C40) petroleum hydrocarbons (TPH) were extracted by mechanical shaker method (CA LUFT) and the extracts were treated with silica gel cleanup (EPA 3630C) prior to analysis by GC/FID (EPA 8015M).

Polynuclear aromatic hydrocarbons (PAH) were extracted by ultrasonic method (EPA 3550B) and analyzed by selective ion mode GC/MS (EPA 8270C-SIM).

Volatile organic compounds were extracted by closed-system purge-and-trap method (EPA 5035) and analyzed by GC/MS (EPA 8260B).

CAM metals were digested by EPA 3050B method and analyzed by ICP-MS (EPA 6020), except for mercury, which was analyzed by CVAAS method (EPA 7471A).

All samples were extracted and analyzed within holding time. All analytical quality control parameters were within acceptable limits. There was no analytical anomaly except for the following remarks:

- PAH reporting limits for sample 09-C18366 were raised due to a higher final extract volume. The extract became viscous and could not be further concentrated.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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141 SUBURBAN ROAD, SUITE C • SAN LUIS OBISPO, CA 93401 • (805) 545-9838 • FAX (805) 545-0107

Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18363
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-12-0.5	Tiffany Klitzke	12/14/09@14:20	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	0.05	0.04	1	mg/Kg	EPA 7471	12/18/09	12/17/09	4859
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
TPH as Motor Oil, SGT	36	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
Acenaphthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Acenaphthylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benz[a]anthracene	17	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[a]pyrene	35	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[b]fluoranthene	26	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[ghi]perylene	51	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[k]fluoranthene	31	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Chrysene	29	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Dibenz[a,h]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluoranthene	21	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluorene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Indeno[1,2,3-cd]pyrene	38	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Naphthalene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Phenanthrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Pyrene	36	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Antimony	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Arsenic	2.5	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Barium	160	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Beryllium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cadmium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Chromium	42	1	2	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cobalt	11	1	2	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Copper	22	1	2	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Lead	3.3	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Molybdenum	0.7	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776

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Jonathan Skaggs
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2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18363
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-12-0.5	Tiffany Klitzke	12/14/09@14:20	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Nickel	43	1	2	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Selenium	Not Detected	0.5	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Silver	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Thallium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Vanadium	40	1	2	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Zinc	30	4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18364
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-13-0.5	Tiffany Klitzke	12/14/09@14:25	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.04	1	mg/Kg	EPA 7471	12/18/09	12/17/09	4859
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
TPH as Motor Oil, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
Acenaphthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Acenaphthylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benz[a]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[a]pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[b]fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[ghi]perylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[k]fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Chrysene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Dibenz[a,h]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluorene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Indeno[1,2,3-cd]pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Naphthalene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Phenanthrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Antimony	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Arsenic	2.4	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Barium	180	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Beryllium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cadmium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Chromium	41	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cobalt	9.4	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Copper	20	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Lead	4.3	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Molybdenum	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776

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Jonathan Skaggs
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2101 Webster St.
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Log Number: 09-C18364
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-13-0.5	Tiffany Klitzke	12/14/09@14:25	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Nickel	36	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Selenium	Not Detected	0.5	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Silver	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Thallium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Vanadium	39	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Zinc	28	4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
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2101 Webster St.
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Log Number: 09-C18365
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-15-0.5	Tiffany Klitzke	12/14/09@14:30	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	0.29	0.04	1	mg/Kg	EPA 7471	12/18/09	12/17/09	4859
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
TPH as Motor Oil, SGT	120	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
Acenaphthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Acenaphthylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benz[a]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[a]pyrene	18	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[b]fluoranthene	11	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[ghi]perylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[k]fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Chrysene	17	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Dibenz[a,h]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluoranthene	12	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluorene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Indeno[1,2,3-cd]pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Naphthalene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Phenanthrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Pyrene	14	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Antimony	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Arsenic	0.5	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Barium	15	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Beryllium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cadmium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Chromium	59	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cobalt	16	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Copper	80	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Lead	4.0	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Molybdenum	0.4	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776

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Jonathan Skaggs
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2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18365
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-15-0.5	Tiffany Klitzke	12/14/09@14:30	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Nickel	18	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Selenium	Not Detected	0.5	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Silver	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Thallium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Vanadium	95	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Zinc	17	4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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2101 Webster St.
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Log Number: 09-C18366
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-14-1.0	Tiffany Klitzke	12/14/09@14:55	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	0.24	0.04	1	mg/Kg	EPA 7471	12/18/09	12/17/09	4859
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
TPH as Motor Oil, SGT	48	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
Acenaphthene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Acenaphthylene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Anthracene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benz[a]anthracene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[a]pyrene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[b]fluoranthene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[ghi]perylene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[k]fluoranthene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Chrysene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Dibenz[a,h]anthracene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluoranthene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluorene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Indeno[1,2,3-cd]pyrene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Naphthalene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Phenanthrene	Not Detected	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Pyrene	31	30	3	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Antimony	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Arsenic	1.7	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Barium	75	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Beryllium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cadmium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Chromium	27	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cobalt	12	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Copper	37	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Lead	5.3	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Molybdenum	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776

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Log Number: 09-C18366
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-14-1.0	Tiffany Klitzke	12/14/09@14:55	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Nickel	28	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Selenium	Not Detected	0.5	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Silver	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Thallium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Vanadium	46	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Zinc	38	4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18367
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-9-1.0	Tiffany Klitzke	12/14/09@15:30	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
TPH as Motor Oil, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
Acenaphthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Acenaphthylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benz[a]anthracene	23	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[a]pyrene	22	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[b]fluoranthene	15	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[ghi]perylene	18	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[k]fluoranthene	19	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Chrysene	26	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Dibenz[a,h]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluoranthene	33	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluorene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Indeno[1,2,3-cd]pyrene	14	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Naphthalene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Phenanthrene	14	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Pyrene	62	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
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2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18368
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-9-3.0	Tiffany Klitzke	12/14/09@15:40	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Acenaphthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Acenaphthylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benz[a]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[a]pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[b]fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[ghi]perylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[k]fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Chrysene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Dibenz[a,h]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluorene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Indeno[1,2,3-cd]pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Naphthalene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Phenanthrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Log Number: 09-C18369
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-5-1.0	Tiffany Klitzke	12/14/09@15:40	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.04	1	mg/Kg	EPA 7471	12/18/09	12/17/09	4859
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
TPH as Motor Oil, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
Benzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Bromobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Bromochloromethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Bromodichloromethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Bromoform	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Bromomethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
t-Butylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
n-Butylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
sec-Butyl Benzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Carbon Tetrachloride	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Chlorobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Chloroethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
2-Chloroethylvinyl ether	Not Detected	30	0	ug/Kg	EPA 8260	12/17/09		4847
Chloroform	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Chloromethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
2-Chlorotoluene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
4-Chlorotoluene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dibromo-3-Chloropropane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Dibromochloromethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Dibromomethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dibromoethane (EDB)	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Dichlorodifluoromethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dichlorobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,3-Dichlorobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,4-Dichlorobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1-Dichloroethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847

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Log Number: 09-C18369
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-5-1.0	Tiffany Klitzke	12/14/09@15:40	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
1,2-Dichloroethane (EDC)	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1-Dichloroethene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
cis-1,2-Dichloroethene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
trans-1,2-Dichloethene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dichloropropane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,3-Dichloropropane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
2,2-Dichloropropane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1-Dichloropropene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
cis-1,3-Dichloropropene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
trans-1,3-Dichloropropene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Ethylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Hexachlorobutadiene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Isopropylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
4-Isopropyltoluene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Methylene Chloride	Not Detected	6	0	ug/Kg	EPA 8260	12/17/09		4847
Methyl t-Butyl Ether (MTBE)	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Naphthalene	Not Detected	6	0	ug/Kg	EPA 8260	12/17/09		4847
n-Propylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Styrene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,1,2-Tetrachloroethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,2,2-Tetrachloroethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Tetrachloroethene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Toluene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2,3-Trichlorobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2,4-Trichlorobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,1-Trichloroethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,2-Trichloroethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Trichloroethene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Trichlorofluoromethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847

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Log Number: 09-C18369
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-5-1.0	Tiffany Klitzke	12/14/09@15:40	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
1,2,3-Trichloropropane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2,4-Trimethylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,3,5-Trimethylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Vinyl Chloride	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
m,p-Xylene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
o-Xylene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Antimony	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Arsenic	2.4	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Barium	81	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Beryllium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cadmium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Chromium	17	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cobalt	5.2	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Copper	10	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Lead	6.6	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Molybdenum	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Nickel	20	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Selenium	Not Detected	0.5	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Silver	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Thallium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Vanadium	26	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Zinc	36	4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Log Number: 09-C18369
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-5-1.0	Tiffany Klitzke	12/14/09@15:40	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Log Number: 09-C18370
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-5-2.0	Tiffany Klitzke	12/14/09@15:50	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.04	1	mg/Kg	EPA 7471	12/18/09	12/17/09	4859
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
TPH as Motor Oil, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
Benzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Bromobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Bromochloromethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Bromodichloromethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Bromoform	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Bromomethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
t-Butylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
n-Butylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
sec-Butyl Benzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Carbon Tetrachloride	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Chlorobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Chloroethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
2-Chloroethylvinyl ether	Not Detected	40	0	ug/Kg	EPA 8260	12/17/09		4847
Chloroform	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Chloromethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
2-Chlorotoluene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
4-Chlorotoluene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dibromo-3-Chloropropane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Dibromochloromethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Dibromomethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dibromoethane (EDB)	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Dichlorodifluoromethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dichlorobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,3-Dichlorobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,4-Dichlorobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1-Dichloroethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847

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Log Number: 09-C18370
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-5-2.0	Tiffany Klitzke	12/14/09@15:50	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
1,2-Dichloroethane (EDC)	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1-Dichloroethene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
cis-1,2-Dichloroethene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
trans-1,2-Dichloethene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dichloropropane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,3-Dichloropropane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
2,2-Dichloropropane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1-Dichloropropene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
cis-1,3-Dichloropropene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
trans-1,3-Dichloropropene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Ethylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Hexachlorobutadiene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Isopropylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
4-Isopropyltoluene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Methylene Chloride	Not Detected	9	0	ug/Kg	EPA 8260	12/17/09		4847
Methyl t-Butyl Ether (MTBE)	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Naphthalene	Not Detected	9	0	ug/Kg	EPA 8260	12/17/09		4847
n-Propylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Styrene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,1,2-Tetrachloroethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,2,2-Tetrachloroethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Tetrachloroethene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Toluene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2,3-Trichlorobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2,4-Trichlorobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,1-Trichloroethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,2-Trichloroethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Trichloroethene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Trichlorofluoromethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847

CREEK ENVIRONMENTAL LABORATORIES, INC.
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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18370
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-5-2.0	Tiffany Klitzke	12/14/09@15:50	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
1,2,3-Trichloropropane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2,4-Trimethylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,3,5-Trimethylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Vinyl Chloride	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
m,p-Xylene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
o-Xylene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Antimony	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Arsenic	1.7	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Barium	59	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Beryllium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cadmium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Chromium	17	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cobalt	4.9	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Copper	8.2	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Lead	3.0	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Molybdenum	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Nickel	17	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Selenium	Not Detected	0.5	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Silver	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Thallium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Vanadium	24	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Zinc	22	4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Log Number: 09-C18370
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-5-2.0	Tiffany Klitzke	12/14/09@15:50	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-6-1.0	Tiffany Klitzke	12/14/09@16:05	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.04	1	mg/Kg	EPA 7471	12/18/09	12/17/09	4859
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
TPH as Motor Oil, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
Benzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Bromobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Bromochloromethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Bromodichloromethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Bromoform	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Bromomethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
t-Butylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
n-Butylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
sec-Butyl Benzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Carbon Tetrachloride	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Chlorobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Chloroethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
2-Chloroethylvinyl ether	Not Detected	30	0	ug/Kg	EPA 8260	12/17/09		4847
Chloroform	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Chloromethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
2-Chlorotoluene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
4-Chlorotoluene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dibromo-3-Chloropropane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Dibromochloromethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Dibromomethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dibromoethane (EDB)	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Dichlorodifluoromethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dichlorobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,3-Dichlorobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,4-Dichlorobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1-Dichloroethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847

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Log Number: 09-C18371
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-6-1.0	Tiffany Klitzke	12/14/09@16:05	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
1,2-Dichloroethane (EDC)	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1-Dichloroethene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
cis-1,2-Dichloroethene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
trans-1,2-Dichloethene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dichloropropane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,3-Dichloropropane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
2,2-Dichloropropane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1-Dichloropropene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
cis-1,3-Dichloropropene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
trans-1,3-Dichloropropene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Ethylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Hexachlorobutadiene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Isopropylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
4-Isopropyltoluene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Methylene Chloride	Not Detected	6	0	ug/Kg	EPA 8260	12/17/09		4847
Methyl t-Butyl Ether (MTBE)	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Naphthalene	Not Detected	6	0	ug/Kg	EPA 8260	12/17/09		4847
n-Propylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Styrene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,1,2-Tetrachloroethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,2,2-Tetrachloroethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Tetrachloroethene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Toluene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2,3-Trichlorobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2,4-Trichlorobenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,1-Trichloroethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,2-Trichloroethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Trichloroethene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Trichlorofluoromethane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18371
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-6-1.0	Tiffany Klitzke	12/14/09@16:05	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
1,2,3-Trichloropropane	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,2,4-Trimethylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
1,3,5-Trimethylbenzene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Vinyl Chloride	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
m,p-Xylene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
o-Xylene	Not Detected	1	0	ug/Kg	EPA 8260	12/17/09		4847
Antimony	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Arsenic	2.6	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Barium	76	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Beryllium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cadmium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Chromium	22	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cobalt	6.0	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Copper	13	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Lead	15	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Molybdenum	0.4	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Nickel	23	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Selenium	Not Detected	0.5	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Silver	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Thallium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Vanadium	32	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Zinc	54	4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Log Number: 09-C18371
Order: Q6666
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Received: 12/15/09
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REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-6-1.0	Tiffany Klitzke	12/14/09@16:05	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Log Number: 09-C18372
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-6-2.0	Tiffany Klitzke	12/14/09@16:15	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.04	1	mg/Kg	EPA 7471	12/18/09	12/17/09	4859
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
TPH as Motor Oil, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
Benzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Bromobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Bromochloromethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Bromodichloromethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Bromoform	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Bromomethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
t-Butylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
n-Butylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
sec-Butyl Benzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Carbon Tetrachloride	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Chlorobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Chloroethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
2-Chloroethylvinyl ether	Not Detected	40	0	ug/Kg	EPA 8260	12/17/09		4847
Chloroform	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Chloromethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
2-Chlorotoluene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
4-Chlorotoluene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dibromo-3-Chloropropane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Dibromochloromethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Dibromomethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dibromoethane (EDB)	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Dichlorodifluoromethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dichlorobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,3-Dichlorobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,4-Dichlorobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1-Dichloroethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847

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REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-6-2.0	Tiffany Klitzke	12/14/09@16:15	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
1,2-Dichloroethane (EDC)	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1-Dichloroethene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
cis-1,2-Dichloroethene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
trans-1,2-Dichloethene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2-Dichloropropane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,3-Dichloropropane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
2,2-Dichloropropane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1-Dichloropropene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
cis-1,3-Dichloropropene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
trans-1,3-Dichloropropene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Ethylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Hexachlorobutadiene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Isopropylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
4-Isopropyltoluene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Methylene Chloride	Not Detected	7	0	ug/Kg	EPA 8260	12/17/09		4847
Methyl t-Butyl Ether (MTBE)	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Naphthalene	Not Detected	7	0	ug/Kg	EPA 8260	12/17/09		4847
n-Propylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Styrene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,1,2-Tetrachloroethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,2,2-Tetrachloroethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Tetrachloroethene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Toluene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2,3-Trichlorobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2,4-Trichlorobenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,1-Trichloroethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,1,2-Trichloroethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Trichloroethene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Trichlorofluoromethane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18372
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-6-2.0	Tiffany Klitzke	12/14/09@16:15	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
1,2,3-Trichloropropane	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,2,4-Trimethylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
1,3,5-Trimethylbenzene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Vinyl Chloride	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
m,p-Xylene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
o-Xylene	Not Detected	2	0	ug/Kg	EPA 8260	12/17/09		4847
Antimony	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Arsenic	1.2	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Barium	54	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Beryllium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cadmium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Chromium	16	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Cobalt	4.6	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Copper	6.9	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Lead	2.4	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Molybdenum	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Nickel	16	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Selenium	Not Detected	0.5	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Silver	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Thallium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Vanadium	20	0.4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776
Zinc	19	4	1	mg/Kg	EPA 6020	12/16/09	12/16/09	4776

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18372
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-6-2.0	Tiffany Klitzke	12/14/09@16:15	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18373
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-10-1.0	Tiffany Klitzke	12/14/09@16:05	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
TPH as Motor Oil, SGT	24	10	1	mg/Kg	EPA 8015/LUFT	12/17/09	12/15/09	4846
Acenaphthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Acenaphthylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benz[a]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[a]pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[b]fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[ghi]perylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[k]fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Chrysene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Dibenz[a,h]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluorene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Indeno[1,2,3-cd]pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Naphthalene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Phenanthrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18374
Order: Q6666
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-10-3.0	Tiffany Klitzke	12/14/09@16:15	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Acenaphthene	Not Detected	500	50	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Acenaphthylene	4,900	500	50	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Anthracene	2,500	500	50	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benz[a]anthracene	27,000	5000	500	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[a]pyrene	8,600	500	50	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[b]fluoranthene	2,500	500	50	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[ghi]perylene	2,500	500	50	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Benzo[k]fluoranthene	2,300	500	50	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Chrysene	32,000	5000	500	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Dibenz[a,h]anthracene	1,100	500	50	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluoranthene	29,000	5000	500	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Fluorene	500	500	50	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Indeno[1,2,3-cd]pyrene	Not Detected	500	50	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Naphthalene	650	500	50	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Phenanthrene	5,300	500	50	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881
Pyrene	62,000	5000	500	ug/Kg	EPA 8270 SIM	12/21/09	12/17/09	4881

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Quality Control Results

Order No.: Q6666
Laboratory Reagent Blank

Analyte	Method	Results	Units	Batch
Mercury	EPA 7471	< 0.04	mg/Kg	4859
TPH as Diesel, SGT	EPA 8015/LUFT	< 10	mg/Kg	4846
TPH as Motor Oil, SGT	EPA 8015/LUFT	< 10	mg/Kg	4846
Benzene	EPA 8260	< 5	ug/Kg	4847
Bromobenzene	EPA 8260	< 5	ug/Kg	4847
Bromochloromethane	EPA 8260	< 5	ug/Kg	4847
Bromodichloromethane	EPA 8260	< 5	ug/Kg	4847
Bromoform	EPA 8260	< 5	ug/Kg	4847
Bromomethane	EPA 8260	< 5	ug/Kg	4847
t-Butylbenzene	EPA 8260	< 5	ug/Kg	4847
n-Butylbenzene	EPA 8260	< 5	ug/Kg	4847
sec-Butyl Benzene	EPA 8260	< 5	ug/Kg	4847
Carbon Tetrachloride	EPA 8260	< 5	ug/Kg	4847
Chlorobenzene	EPA 8260	< 5	ug/Kg	4847
Chloroethane	EPA 8260	< 5	ug/Kg	4847
2-Chloroethylvinyl ether	EPA 8260	< 100	ug/Kg	4847
Chloroform	EPA 8260	< 5	ug/Kg	4847
Chloromethane	EPA 8260	< 5	ug/Kg	4847
2-Chlorotoluene	EPA 8260	< 5	ug/Kg	4847
4-Chlorotoluene	EPA 8260	< 5	ug/Kg	4847
1,2-Dibromo-3-Chloropropane	EPA 8260	< 5	ug/Kg	4847
Dibromochloromethane	EPA 8260	< 5	ug/Kg	4847
Dibromomethane	EPA 8260	< 5	ug/Kg	4847
1,2-Dibromoethane (EDB)	EPA 8260	< 5	ug/Kg	4847
Dichlorodifluoromethane	EPA 8260	< 5	ug/Kg	4847
1,2-Dichlorobenzene	EPA 8260	< 5	ug/Kg	4847
1,3-Dichlorobenzene	EPA 8260	< 5	ug/Kg	4847
1,4-Dichlorobenzene	EPA 8260	< 5	ug/Kg	4847
1,1-Dichloroethane	EPA 8260	< 5	ug/Kg	4847
1,2-Dichloroethane (EDC)	EPA 8260	< 5	ug/Kg	4847
1,1-Dichloroethene	EPA 8260	< 5	ug/Kg	4847
cis-1,2-Dichloroethene	EPA 8260	< 5	ug/Kg	4847
trans-1,2-Dichloethene	EPA 8260	< 5	ug/Kg	4847
1,2-Dichloropropane	EPA 8260	< 5	ug/Kg	4847
1,3-Dichloropropane	EPA 8260	< 5	ug/Kg	4847
2,2-Dichloropropane	EPA 8260	< 5	ug/Kg	4847
1,1-Dichloropropene	EPA 8260	< 5	ug/Kg	4847
cis-1,3-Dichloropropene	EPA 8260	< 5	ug/Kg	4847
trans-1,3-Dichloropropene	EPA 8260	< 5	ug/Kg	4847
Ethylbenzene	EPA 8260	< 5	ug/Kg	4847
Hexachlorobutadiene	EPA 8260	< 5	ug/Kg	4847
Isopropylbenzene	EPA 8260	< 5	ug/Kg	4847
4-Isopropyltoluene	EPA 8260	< 5	ug/Kg	4847
Methylene Chloride	EPA 8260	< 20	ug/Kg	4847
Methyl t-Butyl Ether (MTBE)	EPA 8260	< 5	ug/Kg	4847

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Quality Control Results

Order No.: Q6666

Laboratory Reagent Blank (continued)

Analyte	Method	Result	Units	Batch
Naphthalene	EPA 8260	< 20	ug/Kg	4847
n-Propylbenzene	EPA 8260	< 5	ug/Kg	4847
Styrene	EPA 8260	< 5	ug/Kg	4847
1,1,1,2-Tetrachloroethane	EPA 8260	< 5	ug/Kg	4847
1,1,2,2-Tetrachloroethane	EPA 8260	< 5	ug/Kg	4847
Tetrachloroethene	EPA 8260	< 5	ug/Kg	4847
Toluene	EPA 8260	< 5	ug/Kg	4847
1,2,3-Trichlorobenzene	EPA 8260	< 5	ug/Kg	4847
1,2,4-Trichlorobenzene	EPA 8260	< 5	ug/Kg	4847
1,1,1-Trichloroethane	EPA 8260	< 5	ug/Kg	4847
1,1,2-Trichloroethane	EPA 8260	< 5	ug/Kg	4847
Trichloroethene	EPA 8260	< 5	ug/Kg	4847
Trichlorofluoromethane	EPA 8260	< 5	ug/Kg	4847
1,2,3-Trichloropropane	EPA 8260	< 5	ug/Kg	4847
1,2,4-Trimethylbenzene	EPA 8260	< 5	ug/Kg	4847
1,3,5-Trimethylbenzene	EPA 8260	< 5	ug/Kg	4847
Vinyl Chloride	EPA 8260	< 5	ug/Kg	4847
m,p-Xylene	EPA 8260	< 5	ug/Kg	4847
o-Xylene	EPA 8260	< 5	ug/Kg	4847
Acenaphthene	EPA 8270 SIM	< 10	ug/Kg	4881
Acenaphthylene	EPA 8270 SIM	< 10	ug/Kg	4881
Anthracene	EPA 8270 SIM	< 10	ug/Kg	4881
Benz[a]anthracene	EPA 8270 SIM	< 10	ug/Kg	4881
Benzo[a]pyrene	EPA 8270 SIM	< 10	ug/Kg	4881
Benzo[b]fluoranthene	EPA 8270 SIM	< 10	ug/Kg	4881
Benzo[ghi]perylene	EPA 8270 SIM	< 10	ug/Kg	4881
Benzo[k]fluoranthene	EPA 8270 SIM	< 10	ug/Kg	4881
Chrysene	EPA 8270 SIM	< 10	ug/Kg	4881
Dibenz[a,h]anthracene	EPA 8270 SIM	< 10	ug/Kg	4881
Fluoranthene	EPA 8270 SIM	< 10	ug/Kg	4881
Fluorene	EPA 8270 SIM	< 10	ug/Kg	4881
Indeno[1,2,3-cd]pyrene	EPA 8270 SIM	< 10	ug/Kg	4881
Naphthalene	EPA 8270 SIM	< 10	ug/Kg	4881
Phenanthrene	EPA 8270 SIM	< 10	ug/Kg	4881
Pyrene	EPA 8270 SIM	< 10	ug/Kg	4881
Antimony	EPA 6020	< 0.4	mg/Kg	4776
Arsenic	EPA 6020	< 0.4	mg/Kg	4776
Barium	EPA 6020	< 0.4	mg/Kg	4776
Beryllium	EPA 6020	< 0.4	mg/Kg	4776
Cadmium	EPA 6020	< 0.4	mg/Kg	4776
Chromium	EPA 6020	< 0.4	mg/Kg	4776
Cobalt	EPA 6020	< 0.4	mg/Kg	4776
Copper	EPA 6020	< 0.4	mg/Kg	4776
Lead	EPA 6020	< 0.4	mg/Kg	4776

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Quality Control Results

Order No.: Q6666

Laboratory Reagent Blank (continued)

Analyte	Method	Result	Units	Batch
Molybdenum	EPA 6020	< 0.4	mg/Kg	4776
Nickel	EPA 6020	< 0.4	mg/Kg	4776
Selenium	EPA 6020	< 0.5	mg/Kg	4776
Silver	EPA 6020	< 0.4	mg/Kg	4776
Thallium	EPA 6020	< 0.4	mg/Kg	4776
Vanadium	EPA 6020	< 0.4	mg/Kg	4776
Zinc	EPA 6020	< 4	mg/Kg	4776

Laboratory Known Analysis (LCS)

Analyte	Method	Recovery	Spike Amount	Units	Recovery Limits	Batch
Mercury	EPA 7471	105%	0.8	mg/Kg	56 - 148	4859
TPH as Diesel, SGT	EPA 8015/LUFT	60%	250	mg/Kg	50 - 150	4846
Benzene	EPA 8260	104%	50	ug/Kg	60 - 140	4847
Chlorobenzene	EPA 8260	106%	50	ug/Kg	60 - 140	4847
1,1-Dichloroethene	EPA 8260	98%	50	ug/Kg	60 - 140	4847
Toluene	EPA 8260	102%	50	ug/Kg	60 - 140	4847
Trichloroethene	EPA 8260	102%	50	ug/Kg	60 - 140	4847
Acenaphthene	EPA 8270 SIM	55%	67	ug/Kg	31 - 137	4881
Acenaphthylene	EPA 8270 SIM	36%	67	ug/Kg	26 - 119	4881
Anthracene	EPA 8270 SIM	57%	67	ug/Kg	44 - 110	4881
Benz[a]anthracene	EPA 8270 SIM	76%	67	ug/Kg	38 - 134	4881
Benzo[a]pyrene	EPA 8270 SIM	64%	67	ug/Kg	36 - 121	4881
Benzo[b]fluoranthene	EPA 8270 SIM	78%	67	ug/Kg	37 - 129	4881
Benzo[ghi]perylene	EPA 8270 SIM	79%	67	ug/Kg	31 - 128	4881
Benzo[k]fluoranthene	EPA 8270 SIM	76%	67	ug/Kg	36 - 135	4881
Chrysene	EPA 8270 SIM	76%	67	ug/Kg	38 - 128	4881
Dibenz[a,h]anthracene	EPA 8270 SIM	79%	67	ug/Kg	28 - 134	4881
Fluoranthene	EPA 8270 SIM	78%	67	ug/Kg	37 - 126	4881
Fluorene	EPA 8270 SIM	64%	67	ug/Kg	29 - 119	4881
Indeno[1,2,3-cd]pyrene	EPA 8270 SIM	81%	67	ug/Kg	25 - 125	4881
Naphthalene	EPA 8270 SIM	16%	67	ug/Kg	15 - 119	4881
Phenanthrene	EPA 8270 SIM	78%	67	ug/Kg	38 - 124	4881
Pyrene	EPA 8270 SIM	75%	67	ug/Kg	35 - 142	4881
Antimony	EPA 6020	112%	50	mg/Kg	10 - 120	4776
Arsenic	EPA 6020	87%	50	mg/Kg	50 - 130	4776
Barium	EPA 6020	98%	50	mg/Kg	60 - 140	4776
Beryllium	EPA 6020	95%	50	mg/Kg	60 - 140	4776
Cadmium	EPA 6020	97%	50	mg/Kg	60 - 140	4776
Chromium	EPA 6020	102%	50	mg/Kg	60 - 140	4776
Cobalt	EPA 6020	102%	50	mg/Kg	60 - 140	4776
Copper	EPA 6020	103%	50	mg/Kg	60 - 140	4776
Lead	EPA 6020	108%	50	mg/Kg	60 - 140	4776

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Quality Control Results

Order No.: Q6666

Laboratory Known Analysis (LCS)

Analyte	Method	Recovery	Spike Amount	Units	Recovery Limits	Batch
Molybdenum	EPA 6020	94%	50	mg/Kg	60 - 140	4776
Nickel	EPA 6020	94%	50	mg/Kg	60 - 140	4776
Selenium	EPA 6020	94%	200	mg/Kg	60 - 140	4776
Silver	EPA 6020	98%	50	mg/Kg	50 - 130	4776
Thallium	EPA 6020	105%	50	mg/Kg	60 - 140	4776
Vanadium	EPA 6020	96%	50	mg/Kg	60 - 140	4776
Zinc	EPA 6020	102%	50	mg/Kg	60 - 140	4776

Matrix Spike/Matrix Spike Duplicates

Analyte	Method	MS Rec.	MSD Rec.	RPD	Matrix Sample	Spike Amount	Units	Recovery Limits	RPD Limit	Batch
Mercury	EPA 7471	104%	108%	5	09-C18369	0.8	mg/Kg	56 - 148	30	4859
TPH as Diesel, SGT	EPA 8015/LUFT	77%	64%	18	09-C18368	250	mg/Kg	50 - 150	30	4846
Antimony	EPA 6020	43%	36%	18	09-C18369	50	mg/Kg	10 - 120	30	4776
Arsenic	EPA 6020	95%	91%	4	09-C18369	50	mg/Kg	50 - 130	30	4776
Barium	EPA 6020	71%	87%	7	09-C18369	50	mg/Kg	60 - 140	30	4776
Beryllium	EPA 6020	92%	95%	4	09-C18369	50	mg/Kg	60 - 140	30	4776
Cadmium	EPA 6020	110%	109%	1	09-C18369	50	mg/Kg	60 - 140	30	4776
Chromium	EPA 6020	93%	95%	2	09-C18369	50	mg/Kg	60 - 140	30	4776
Cobalt	EPA 6020	95%	99%	4	09-C18369	50	mg/Kg	60 - 140	30	4776
Copper	EPA 6020	99%	107%	6	09-C18369	50	mg/Kg	60 - 140	30	4776
Lead	EPA 6020	101%	108%	6	09-C18369	50	mg/Kg	60 - 140	30	4776
Molybdenum	EPA 6020	102%	104%	2	09-C18369	50	mg/Kg	60 - 140	30	4776
Nickel	EPA 6020	91%	94%	2	09-C18369	50	mg/Kg	60 - 140	30	4776
Selenium	EPA 6020	105%	101%	4	09-C18369	200	mg/Kg	60 - 140	30	4776
Silver	EPA 6020	98%	96%	2	09-C18369	50	mg/Kg	50 - 130	30	4776
Thallium	EPA 6020	105%	109%	3	09-C18369	50	mg/Kg	60 - 140	30	4776
Vanadium	EPA 6020	95%	99%	3	09-C18369	50	mg/Kg	60 - 140	30	4776
Zinc	EPA 6020	86%	94%	5	09-C18369	50	mg/Kg	60 - 140	30	4776

Sample Duplicate

Analyte	Method	Sample ID	Sample Value	Sample Duplicate	RPD	Units	RPD Limit	Batch
Benzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Bromobenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Bromochloromethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Bromodichloromethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Bromoform	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Bromomethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	50.	4847
t-Butylbenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
n-Butylbenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
sec-Butyl Benzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847

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Quality Control Results

Order No.: Q6666

Sample Duplicate

Analyte	Method	Sample ID	Sample Value	Sample Duplicate	RPD	Units	RPD Limit	Batch
Carbon Tetrachloride	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Chlorobenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Chloroethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	50.	4847
2-Chloroethylvinyl ether	EPA 8260	09-C18372	< 35	< 32	9	ug/Kg	50.	4847
Chloroform	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Chloromethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	50.	4847
2-Chlorotoluene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
4-Chlorotoluene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,2-Dibromo-3-Chloropropane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	40.	4847
Dibromochloromethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Dibromomethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,2-Dibromoethane (EDB)	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Dichlorodifluoromethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	50.	4847
1,2-Dichlorobenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,3-Dichlorobenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,4-Dichlorobenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,1-Dichloroethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,2-Dichloroethane (EDC)	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	40.	4847
1,1-Dichloroethene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
cis-1,2-Dichloroethene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
trans-1,2-Dichloethene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,2-Dichloropropane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,3-Dichloropropane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
2,2-Dichloropropane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,1-Dichloropropene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
cis-1,3-Dichloropropene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
trans-1,3-Dichloropropene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Ethylbenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Hexachlorobutadiene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	40.	4847
Isopropylbenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
4-Isopropyltoluene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Methylene Chloride	EPA 8260	09-C18372	< 7	< 6	15	ug/Kg	40.	4847
Methyl t-Butyl Ether (MTBE)	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	40.	4847
Naphthalene	EPA 8260	09-C18372	< 7	< 6	15	ug/Kg	40.	4847
n-Propylbenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Styrene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,1,1,2-Tetrachloroethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,1,2,2-Tetrachloroethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Tetrachloroethene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Toluene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,2,3-Trichlorobenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,2,4-Trichlorobenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,1,1-Trichloroethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,1,2-Trichloroethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847

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Order No.: Q6666

Sample Duplicate

Analyte	Method	Sample ID	Sample Value	Sample Duplicate	RPD	Units	RPD Limit	Batch
Trichloroethene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Trichlorofluoromethane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	50.	4847
1,2,3-Trichloropropane	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	40.	4847
1,2,4-Trimethylbenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
1,3,5-Trimethylbenzene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
Vinyl Chloride	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	50.	4847
m,p-Xylene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847
o-Xylene	EPA 8260	09-C18372	< 2	< 2	0	ug/Kg	30.	4847

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Surrogate Report

Sample Number	Batch	Method	Surrogate	% Recovery	QC Limits
09-C18363	4881	EPA 8270	Pyrene-d10 (Aromatic)	63.	16-127
09-C18363	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	86.	50-150
09-C18364	4881	EPA 8270	Pyrene-d10 (Aromatic)	57.	16-127
09-C18364	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	80.	50-150
09-C18365	4881	EPA 8270	Pyrene-d10 (Aromatic)	48.	16-127
09-C18365	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	99.	50-150
09-C18366	4881	EPA 8270	Pyrene-d10 (Aromatic)	46.	16-127
09-C18366	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	78.	50-150
09-C18367	4881	EPA 8270	Pyrene-d10 (Aromatic)	50.	16-127
09-C18367	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	100.	50-150
09-C18368	4881	EPA 8270	Pyrene-d10 (Aromatic)	65.	16-127
09-C18369	4847	EPA 8260	Dibromofluoromethane	104.	80-130
09-C18369	4847	EPA 8260	Toluene-d8	106.	70-126
09-C18369	4847	EPA 8260	4-BFB	112.	57-124
09-C18369	4847	EPA 8260	1,2-Dichloroethane-d4	106.	60-143
09-C18369	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	80.	50-150
09-C18370	4847	EPA 8260	Dibromofluoromethane	105.	80-130
09-C18370	4847	EPA 8260	Toluene-d8	102.	70-126
09-C18370	4847	EPA 8260	4-BFB	101.	57-124
09-C18370	4847	EPA 8260	1,2-Dichloroethane-d4	105.	60-143
09-C18370	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	74.	50-150
09-C18371	4847	EPA 8260	Dibromofluoromethane	106.	80-130
09-C18371	4847	EPA 8260	Toluene-d8	107.	70-126
09-C18371	4847	EPA 8260	4-BFB	116.	57-124
09-C18371	4847	EPA 8260	1,2-Dichloroethane-d4	108.	60-143
09-C18371	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	89.	50-150
09-C18372	4847	EPA 8260	Dibromofluoromethane	104.	80-130
09-C18372	4847	EPA 8260	Toluene-d8	103.	70-126
09-C18372	4847	EPA 8260	4-BFB	101.	57-124
09-C18372	4847	EPA 8260	1,2-Dichloroethane-d4	103.	60-143
09-C18372	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	67.	50-150
09-C18373	4881	EPA 8270	Pyrene-d10 (Aromatic)	56.	16-127
09-C18373	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	103.	50-150
09-C18374	4881	EPA 8270	Pyrene-d10 (Aromatic)	90.	16-127
blank	4847	EPA 8260	Dibromofluoromethane	106.	80-130
LCS	4847	EPA 8260	Dibromofluoromethane	101.	80-130
09-C18372 dup.	4847	EPA 8260	Dibromofluoromethane	106.	80-130
blank	4847	EPA 8260	Toluene-d8	100.	70-126
LCS	4847	EPA 8260	Toluene-d8	100.	70-126
09-C18372 dup.	4847	EPA 8260	Toluene-d8	103.	70-126
blank	4847	EPA 8260	4-BFB	100.	57-124
LCS	4847	EPA 8260	4-BFB	100.	57-124
09-C18372 dup.	4847	EPA 8260	4-BFB	98.	57-124
blank	4881	EPA 8270	Pyrene-d10 (Aromatic)	70.	16-127
LCS	4881	EPA 8270	Pyrene-d10 (Aromatic)	69.	16-127
blank	4847	EPA 8260	1,2-Dichloroethane-d4	113.	60-143

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Surrogate Report

Sample Number	Batch	Method	Surrogate	% Recovery	QC Limits
LCS	4847	EPA 8260	1,2-Dichloroethane-d4	99.	60-143
09-C18372 dup.	4847	EPA 8260	1,2-Dichloroethane-d4	106.	60-143
blank	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	69.	50-150
LCS	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	69.	50-150
09-C18368 MS	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	92.	50-150
09C18368 MSD	4846	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	74.	50-150

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Environmental Testing Services
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ANALYTICAL RESULTS

Ordered By

Creek Environmental Labs, Inc.
141 Suburban Rd Suite C-5
San Luis Obispo, CA 93401

Telephone: (805)545-9838
Attn: Orval Osborne
Page: 2
Project ID: Q6666

ASL Job Number	Submitted	Client
44132	12/16/2009	CREEK

Method: 8082, Polychlorinated Biphenyls(PCBs) by Gas Chromatography

QC Batch No: 121709-1

Our Lab I.D.		246338	246339	246340	246341	246342
Client Sample I.D.		(18363B) SB-12-0.5	(18364B) SB-13-0.5	(18365B) SB-15-05	(18366B) SB-14-1.0	(18367B) SB-9-1.0
Date Sampled		12/14/2009	12/14/2009	12/14/2009	12/14/2009	12/14/2009
Date Prepared		12/17/2009	12/17/2009	12/17/2009	12/17/2009	12/17/2009
Preparation Method						
Date Analyzed		12/17/2009	12/17/2009	12/17/2009	12/17/2009	12/17/2009
Matrix		Soil	Soil	Soil	Soil	Soil
Units		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor		1	1	1	1	1
Analytes	PQL	Results	Results	Results	Results	Results
Aroclor-1016 (PCB-1016)	33.0	ND	ND	ND	ND	ND
Aroclor-1221 (PCB-1221)	67.0	ND	ND	ND	ND	ND
Aroclor-1232 (PCB-1232)	33.0	ND	ND	ND	ND	ND
Aroclor-1242 (PCB-1242)	33.0	ND	ND	ND	ND	ND
Aroclor-1248 (PCB-1248)	33.0	ND	ND	ND	ND	ND
Aroclor-1254 (PCB-1254)	33.0	ND	ND	ND	ND	ND
Aroclor-1260 (PCB-1260)	33.0	ND	ND	ND	ND	ND

Our Lab I.D.		246338	246339	246340	246341	246342
Surrogates	% Rec Limit	% Rec.	% Rec.	% Rec.	% Rec.	% Rec.
Surrogate Percent Recovery						
Decachlorobiphenyl	43-169	115	102	111	75	105

QUALITY CONTROL REPORT

QC Batch No: 121709-1

Analytes	MS % REC	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit	LCS % REC	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit
Aroclor-1260 (PCB-1260)	92	96	4.3	39-150	<30	81	82	1.2	39-150	<30

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ANALYTICAL RESULTS

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Project ID: Q6666

ASL Job Number	Submitted	Client
44132	12/16/2009	CREEK

Method: 8082, Polychlorinated Biphenyls(PCBs) by Gas Chromatography

QC Batch No: 121709-1

Our Lab I.D.		246343	246344	246345	246346	246347
Client Sample I.D.		(18368B) SB-9-3.0	(18369E) SB-5-1.0	(18370E) SB-5-2.0	(18371E) SB-6-1.0	(18372E) SB-6-2.0
Date Sampled		12/14/2009	12/14/2009	12/14/2009	12/14/2009	12/14/2009
Date Prepared		12/17/2009	12/17/2009	12/17/2009	12/17/2009	12/17/2009
Preparation Method						
Date Analyzed		12/17/2009	12/17/2009	12/17/2009	12/17/2009	12/17/2009
Matrix		Soil	Soil	Soil	Soil	Soil
Units		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor		1	1	1	1	1
Analytes	PQL	Results	Results	Results	Results	Results
Aroclor-1016 (PCB-1016)	33.0	ND	ND	ND	ND	ND
Aroclor-1221 (PCB-1221)	67.0	ND	ND	ND	ND	ND
Aroclor-1232 (PCB-1232)	33.0	ND	ND	ND	ND	ND
Aroclor-1242 (PCB-1242)	33.0	ND	ND	ND	ND	ND
Aroclor-1248 (PCB-1248)	33.0	ND	ND	ND	ND	ND
Aroclor-1254 (PCB-1254)	33.0	ND	ND	ND	ND	ND
Aroclor-1260 (PCB-1260)	33.0	ND	ND	ND	ND	ND

Our Lab I.D.		246343	246344	246345	246346	246347
Surrogates	% Rec Limit	% Rec.	% Rec.	% Rec.	% Rec.	% Rec.
Surrogate Percent Recovery						
Decachlorobiphenyl	43-169	79	90	78	95	80

QUALITY CONTROL REPORT

QC Batch No: 121709-1

Analytes	MS % REC	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit	LCS % REC	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit
Aroclor-1260 (PCB-1260)	92	96	4.3	39-150	<30	81	82	1.2	39-150	<30

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ANALYTICAL RESULTS

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Project ID: Q6666

ASL Job Number	Submitted	Client
44132	12/16/2009	CREEK

Method: 8082, Polychlorinated Biphenyls(PCBs) by Gas Chromatography

QC Batch No: 121709-1

Our Lab I.D.		246348	246349			
Client Sample I.D.		(18373B) SB-10-1.0	(18374B) SB-10-3.0			
Date Sampled		12/14/2009	12/14/2009			
Date Prepared		12/17/2009	12/17/2009			
Preparation Method						
Date Analyzed		12/17/2009	12/17/2009			
Matrix		Soil	Soil			
Units		ug/kg	ug/kg			
Dilution Factor		1	1			
Analytes	PQL	Results	Results			
Aroclor-1016 (PCB-1016)	33.0	ND	ND			
Aroclor-1221 (PCB-1221)	67.0	ND	ND			
Aroclor-1232 (PCB-1232)	33.0	ND	ND			
Aroclor-1242 (PCB-1242)	33.0	ND	ND			
Aroclor-1248 (PCB-1248)	33.0	ND	ND			
Aroclor-1254 (PCB-1254)	33.0	ND	ND			
Aroclor-1260 (PCB-1260)	33.0	ND	ND			

Our Lab I.D.		246348	246349			
Surrogates	% Rec Limit	% Rec.	% Rec.			
Surrogate Percent Recovery						
Decachlorobiphenyl	43-169	96	85			

QUALITY CONTROL REPORT

QC Batch No: 121709-1

Analytes	MS % REC	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit	LCS % REC	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit
Aroclor-1260 (PCB-1260)	92	96	4.3	39-150	<30	81	82	1.2	39-150	<30

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ANALYTICAL RESULTS

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Project ID: Q6666

ASL Job Number	Submitted	Client
44132	12/16/2009	CREEK

Method: SM2540-G, Percent Solids

QC Batch No: 121709-1

Our Lab I.D.		246338	246339	246340	246341	246342
Client Sample I.D.		(18363B) SB-12-0.5	(18364B) SB-13-0.5	(18365B) SB-15-05	(18366B) SB-14-1.0	(18367B) SB-9-1.0
Date Sampled		12/14/2009	12/14/2009	12/14/2009	12/14/2009	12/14/2009
Date Prepared		12/17/2009	12/17/2009	12/17/2009	12/17/2009	12/17/2009
Preparation Method						
Date Analyzed		12/17/2009	12/17/2009	12/17/2009	12/17/2009	12/17/2009
Matrix		Soil	Soil	Soil	Soil	Soil
Units		percent(%)	percent(%)	percent(%)	percent(%)	percent(%)
Dilution Factor		1	1	1	1	1
Analytes	PQL	Results	Results	Results	Results	Results
Conventionals						
% Solids	1.00	90.4	88.8	94.2	88.9	91.2

QUALITY CONTROL REPORT

QC Batch No: 121709-1

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit						
Conventionals										
% Solids	90.4	90.9	<1	20						

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ANALYTICAL RESULTS

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Project ID: Q6666

ASL Job Number	Submitted	Client
44132	12/16/2009	CREEK

Method: SM2540-G, Percent Solids

QC Batch No: 121709-1

Our Lab I.D.		246343	246344	246345	246346	246347
Client Sample I.D.		(18368B) SB-9-3.0	(18369E) SB-5-1.0	(18370E) SB-5-2.0	(18371E) SB-6-1.0	(18372E) SB-6-2.0
Date Sampled		12/14/2009	12/14/2009	12/14/2009	12/14/2009	12/14/2009
Date Prepared		12/17/2009	12/17/2009	12/17/2009	12/17/2009	12/17/2009
Preparation Method						
Date Analyzed		12/17/2009	12/17/2009	12/17/2009	12/17/2009	12/17/2009
Matrix		Soil	Soil	Soil	Soil	Soil
Units		percent(%)	percent(%)	percent(%)	percent(%)	percent(%)
Dilution Factor		1	1	1	1	1
Analytes	PQL	Results	Results	Results	Results	Results
Conventionals						
% Solids	1.00	92.5	89.4	87.8	91.9	89.5

QUALITY CONTROL REPORT

QC Batch No: 121709-1

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit						
Conventionals										
% Solids	90.4	90.9	<1	20						

AMERICAN SCIENTIFIC LABORATORIES, LLC
Environmental Testing Services
2520 N. San Fernando Rd., Los Angeles, CA 90065 Tel: (323) 223-9700 Fax: (323) 223-9500

ANALYTICAL RESULTS

Ordered By

Creek Environmental Labs, Inc.
141 Suburban Rd Suite C-5
San Luis Obispo, CA 93401-

Telephone: (805)545-9838
Attn: Orval Osborne

Page: 7
Project ID: Q6666

ASL Job Number	Submitted	Client
44132	12/16/2009	CREEK

Method: SM2540-G, Percent Solids

QC Batch No: 121709-1

Our Lab I.D.		246348	246349			
Client Sample I.D.		(18373B) SB-10-1.0	(18374B) SB-10-3.0			
Date Sampled		12/14/2009	12/14/2009			
Date Prepared		12/17/2009	12/17/2009			
Preparation Method						
Date Analyzed		12/17/2009	12/17/2009			
Matrix		Soil	Soil			
Units		percent(%)	percent(%)			
Dilution Factor		1	1			
Analytes	PQL	Results	Results			
Conventionals						
% Solids	1.00	84.6	93.5			

QUALITY CONTROL REPORT

QC Batch No: 121709-1

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit						
Conventionals										
% Solids	90.4	90.9	<1	20						

CHAIN-OF-CUSTODY RECORD

Q6701 OAK 16152

PROJECT NAME: MARSH LANDING
PROJECT NUMBER: 15317.000
RESULTS TO: See comments
TURNAROUND TIME: 4 DAY
SAMPLE SHIPMENT METHOD: Fed Ex

LABORATORY NAME: Creek Env. Lab
LABORATORY ADDRESS: San Luis Obispo
LABORATORY CONTACT: Judy
LABORATORY PHONE NUMBER:

CLIENT INFORMATION:

DATE: 12/15/09 PAGE 1 OF 1
REPORTING REQUIREMENTS:
GEOTRACKER REQUIRED YES NO
SITE SPECIFIC GLOBAL ID NO.

SAMPLERS (SIGNATURE):

ANALYSES

DATE	TIME	SAMPLE NUMBER	TPH diesel 8015M	TPH motor oil 8015M	Silica Gel Cleanup	PAHs 8270C SIM	PCBs 8082	VOCs by 8260B	Title 22 Metals 6010	Mercury 7471A	CONTAINER TYPE AND SIZE	Soil (S), Water (W), Vapor (V), or Other (O)	Filtered	Preservative Type	Cooled	MS/MSD	No. of Containers	ADDITIONAL COMMENTS
12/15/09	0835	SB-8-0.5	X	X	X	X	X		X	X	6 inch liner	S	N	None	Y	N	1	18495
	0837	SB-8-1.0	X	X	X		X				6 inch liner	S	N	None	Y	N	1	18496
	0848	SB-7-1.0	X	X	X		X	X	X	X	1 liner, 3 40mL VOAs	S	N	→	Y	N	4	Liner unpreserved 18497 VOAs - MeOH, NaHSO4
	0855	SB-7-2.0	X	X	X		X	X	X	X	1 liner, 3 40mL VOAs	S	N	→	Y	N	4	Liner unpreserved 18498 VOAs - MeOH + NaHSO4
	0920	SB-7-3.5	X	X	X						6 inch liner	S	N	None	Y	N	1	18499
	0950	SB-11-1.0	X	X	X	X	X				6 inch liner	S	N	None	Y	N	1	18500
	0955	SB-11-3.0				X					6 inch liner	S	N	None	Y	N	1	18501

Added per Jonathan e-mail

TOTAL NUMBER OF CONTAINERS: 13

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
SIGNATURE:	12/15/09	820	SIGNATURE: Kathy Wenslott	12/16/09	11:06
PRINTED NAME: Tiffany Klitke			PRINTED NAME: Kathy Wenslott		
COMPANY: AMEC Geomatrix			COMPANY: Creek Env. Lab		
SIGNATURE:			SIGNATURE:		
PRINTED NAME:			PRINTED NAME:		
COMPANY:			COMPANY:		
SIGNATURE:			SIGNATURE:		
PRINTED NAME:			PRINTED NAME:		
COMPANY:			COMPANY:		

SAMPLING COMMENTS: ① Send results to jonathan.skaggs@amec.com and Heidi.Dietrich@amec.com
② SPLIT samples SB-8-0.5, SB-8-1.0, SB-7-1.0, SB-7-2.0, SB-7-3.5 and SB-11-1.0 and place on HOLD for TPH fractionation. If analyzed, send results in a separate report.

2101 Webster Street, 12th Floor
Oakland, California 94612-3066
Tel 510.663.4100 Fax 510.663.4141

amec

Custody seal opened 12/16/09 11:06 KEW

3.8 Temp.

CREEK ENVIRONMENTAL LABORATORIES, INC.
A Minority-owned Business Enterprise
141 SUBURBAN ROAD, SUITE C • SAN LUIS OBISPO, CA 93401 • (805) 545-9838 • FAX (805) 545-0107

Date: December 22, 2009

CASE NARRATIVE Q6701

Client: **Amec Geomatrix**
Project: **PG&E Marsh Landing**
Sample(s): **09-C18495 to 09-C18501**
Sampled: **12/15/09** **Received: 12/16/09**

Samples 09-C18495 to 09-C18501 were received at the laboratory at 3.8 °C with no anomaly except for the following remarks:

- PCBs analysis was subcontracted to American Scientific Laboratories.

Diesel range (C10-C25) and motor oil range (C25-C40) petroleum hydrocarbons (TPH) were extracted by mechanical shaker method (CA LUFT) and the extracts were treated with silica gel cleanup (EPA 3630C) prior to analysis by GC/FID (EPA 8015M).

Polynuclear aromatic hydrocarbons (PAH) were extracted by ultrasonic method (EPA 3550B) and analyzed by selective ion mode GC/MS (EPA 8270C-SIM).

Volatile organic compounds were extracted by purge-and-trap method (EPA 5030B) and analyzed by GC/MS (EPA 8260B).

- Samples 09-C18497 and 09-C18498 were provided with EPA 5035 vials but the soil quantity in the vials was too large to perform the closed-system purge-and-trap method. So the regular purge-and-trap method was performed with soil samples taken from the tubes. (The soil amount collected in each vial was about 15 grams, instead of the normal size of 5 grams. The large soil quantity prevents proper agitation by the stir-bars and also causes blockage of the purge pathway.)

CAM metals were digested by EPA 3050B method and analyzed by ICP-MS (EPA 6020), except for mercury, which was analyzed by CVAAS method (EPA 7471A).

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All samples were extracted and analyzed within holding time. All analytical quality control parameters were within acceptable limits. There was no analytical anomaly except for the above comments and the following remarks:

- The methylene chloride result reported in the VOC analysis of sample 09-C18497 is suspect. It is likely due to laboratory contamination as methylene chloride is a common laboratory extraction solvent. Sample 09-C18497 was taken from the tube, instead of the 5035 vial, for reasons stated above. By then the sample tube had already been open and had been exposed to the atmosphere in the extraction laboratory.

- The VOC analysis on sample 09-C18498 was performed in two ways: taking 5 grams of subsample from the tube and also from the 5035 vial. The results clearly confirm the detection of methylene chloride was due to laboratory contamination: The subsample of 09-C18498 from 5035 vial was not detected in methylene chloride but the subsample from the tube had substantial detection of methylene chloride.

- There was no more viable 5035 vials left for 09-C18497 to perform reanalysis to confirm that the detected methylene chloride was due to laboratory contamination. All the vials had been consumed after multiple attempts to analyze the unusually large soil volumes failed. The methylene chloride result for 09-C18497 was therefore reported with qualification.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18495
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-8-0.5	Tiffany Klitzke	12/15/09@08:35	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.04	1	mg/Kg	EPA 7471	12/18/09	12/17/09	4859
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/21/09	12/17/09	4916
TPH as Motor Oil, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/21/09	12/17/09	4916
Acenaphthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Acenaphthylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benz[a]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benzo[a]pyrene	12	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benzo[b]fluoranthene	23	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benzo[ghi]perylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benzo[k]fluoranthene	16	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Chrysene	24	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Dibenz[a,h]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Fluorene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Indeno[1,2,3-cd]pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Naphthalene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Phenanthrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Antimony	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Arsenic	1.8	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Barium	35	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Beryllium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Cadmium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Chromium	13	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Cobalt	3.8	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Copper	6.2	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Lead	2.9	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Molybdenum	0.5	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18495
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-8-0.5	Tiffany Klitzke	12/15/09@08:35	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Nickel	16	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Selenium	Not Detected	0.5	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Silver	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Thallium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Vanadium	19	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Zinc	17	4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18496
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-8-1.0	Tiffany Klitzke	12/15/09@08:37	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/21/09	12/17/09	4916
TPH as Motor Oil, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/21/09	12/17/09	4916

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
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2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18497
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-7-1.0	Tiffany Klitzke	12/15/09@08:48	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.04	1	mg/Kg	EPA 7471	12/18/09	12/17/09	4859
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/21/09	12/17/09	4916
TPH as Motor Oil, SGT	12	10	1	mg/Kg	EPA 8015/LUFT	12/21/09	12/17/09	4916
Benzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Bromobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Bromochloromethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Bromodichloromethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Bromoform	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Bromomethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
t-Butylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
n-Butylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
sec-Butyl Benzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Carbon Tetrachloride	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Chlorobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Chloroethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
2-Chloroethylvinyl ether	Not Detected	100	1	ug/Kg	EPA 8260	12/22/09		4927
Chloroform	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Chloromethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
2-Chlorotoluene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
4-Chlorotoluene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2-Dibromo-3-Chloropropane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Dibromochloromethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Dibromomethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2-Dibromoethane (EDB)	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Dichlorodifluoromethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2-Dichlorobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,3-Dichlorobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,4-Dichlorobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1-Dichloroethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18497
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-7-1.0	Tiffany Klitzke	12/15/09@08:48	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
1,2-Dichloroethane (EDC)	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1-Dichloroethene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
cis-1,2-Dichloroethene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
trans-1,2-Dichloethene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2-Dichloropropane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,3-Dichloropropane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
2,2-Dichloropropane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1-Dichloropropene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
cis-1,3-Dichloropropene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
trans-1,3-Dichloropropene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Ethylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Hexachlorobutadiene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Isopropylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
4-Isopropyltoluene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Methylene Chloride	<51 U	20	1	ug/Kg	EPA 8260	12/22/09		4927
Methyl t-Butyl Ether (MTBE)	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Naphthalene	Not Detected	20	1	ug/Kg	EPA 8260	12/22/09		4927
n-Propylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Styrene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1,1,2-Tetrachloroethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1,2,2-Tetrachloroethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Tetrachloroethene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Toluene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2,3-Trichlorobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2,4-Trichlorobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1,1-Trichloroethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1,2-Trichloroethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Trichloroethene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Trichlorofluoromethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18497
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-7-1.0	Tiffany Klitzke	12/15/09@08:48	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
1,2,3-Trichloropropane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2,4-Trimethylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,3,5-Trimethylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Vinyl Chloride	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
m,p-Xylene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
o-Xylene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Antimony	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Arsenic	3.2	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Barium	59	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Beryllium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Cadmium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Chromium	18	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Cobalt	4.9	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Copper	10	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Lead	14	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Molybdenum	0.4	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Nickel	22	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Selenium	Not Detected	0.5	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Silver	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Thallium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Vanadium	26	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Zinc	56	4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18497
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-7-1.0	Tiffany Klitzke	12/15/09@08:48	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18498
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-7-2.0	Tiffany Klitzke	12/15/09@08:55	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.04	1	mg/Kg	EPA 7471	12/18/09	12/17/09	4859
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/21/09	12/17/09	4916
TPH as Motor Oil, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/21/09	12/17/09	4916
Benzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Bromobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Bromochloromethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Bromodichloromethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Bromoform	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Bromomethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
t-Butylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
n-Butylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
sec-Butyl Benzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Carbon Tetrachloride	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Chlorobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Chloroethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
2-Chloroethylvinyl ether	Not Detected	100	1	ug/Kg	EPA 8260	12/22/09		4927
Chloroform	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Chloromethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
2-Chlorotoluene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
4-Chlorotoluene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2-Dibromo-3-Chloropropane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Dibromochloromethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Dibromomethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2-Dibromoethane (EDB)	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Dichlorodifluoromethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2-Dichlorobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,3-Dichlorobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,4-Dichlorobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1-Dichloroethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927

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Jonathan Skaggs
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2101 Webster St.
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Log Number: 09-C18498
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-7-2.0	Tiffany Klitzke	12/15/09@08:55	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
1,2-Dichloroethane (EDC)	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1-Dichloroethene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
cis-1,2-Dichloroethene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
trans-1,2-Dichloethene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2-Dichloropropane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,3-Dichloropropane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
2,2-Dichloropropane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1-Dichloropropene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
cis-1,3-Dichloropropene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
trans-1,3-Dichloropropene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Ethylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Hexachlorobutadiene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Isopropylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
4-Isopropyltoluene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Methylene Chloride	Not Detected	20	1	ug/Kg	EPA 8260	12/22/09		4927
Methyl t-Butyl Ether (MTBE)	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Naphthalene	Not Detected	20	1	ug/Kg	EPA 8260	12/22/09		4927
n-Propylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Styrene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1,1,2-Tetrachloroethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1,2,2-Tetrachloroethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Tetrachloroethene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Toluene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2,3-Trichlorobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2,4-Trichlorobenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1,1-Trichloroethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,1,2-Trichloroethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Trichloroethene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Trichlorofluoromethane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927

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Jonathan Skaggs
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2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18498
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-7-2.0	Tiffany Klitzke	12/15/09@08:55	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
1,2,3-Trichloropropane	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,2,4-Trimethylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
1,3,5-Trimethylbenzene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Vinyl Chloride	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
m,p-Xylene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
o-Xylene	Not Detected	5	1	ug/Kg	EPA 8260	12/22/09		4927
Antimony	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Arsenic	1.3	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Barium	45	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Beryllium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Cadmium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Chromium	13	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Cobalt	4.2	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Copper	6.5	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Lead	2.3	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Molybdenum	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Nickel	15	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Selenium	Not Detected	0.5	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Silver	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Thallium	Not Detected	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Vanadium	19	0.4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887
Zinc	17	4	1	mg/Kg	EPA 6020	12/21/09	12/17/09	4887

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Log Number: 09-C18498
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-7-2.0	Tiffany Klitzke	12/15/09@08:55	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
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2101 Webster St.
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Log Number: 09-C18499
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-7-3.5	Tiffany Klitzke	12/15/09@09:20	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/21/09	12/17/09	4916
TPH as Motor Oil, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/21/09	12/17/09	4916

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
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2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18500
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-11-1.0	Tiffany Klitzke	12/15/09@09:50	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
TPH as Diesel, SGT	Not Detected	10	1	mg/Kg	EPA 8015/LUFT	12/21/09	12/17/09	4916
TPH as Motor Oil, SGT	25	10	1	mg/Kg	EPA 8015/LUFT	12/21/09	12/17/09	4916
Acenaphthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Acenaphthylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benz[a]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benzo[a]pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benzo[b]fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benzo[ghi]perylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benzo[k]fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Chrysene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Dibenz[a,h]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Fluorene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Indeno[1,2,3-cd]pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Naphthalene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Phenanthrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18501
Order: Q6701
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-11-3.0	Tiffany Klitzke	12/15/09@09:55	Solid

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Acenaphthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Acenaphthylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benz[a]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benzo[a]pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benzo[b]fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benzo[ghi]perylene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Benzo[k]fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Chrysene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Dibenz[a,h]anthracene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Fluoranthene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Fluorene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Indeno[1,2,3-cd]pyrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Naphthalene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Phenanthrene	Not Detected	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881
Pyrene	10	10	1	ug/Kg	EPA 8270 SIM	12/18/09	12/17/09	4881

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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141 SUBURBAN ROAD, SUITE C • SAN LUIS OBISPO, CA 93401 • (805) 545-9838 • FAX (805) 545-0107

Order No.: Q6701
Laboratory Reagent Blank

Analyte	Method	Results	Units	Batch
Mercury	EPA 7471	< 0.04	mg/Kg	4859
TPH as Diesel, SGT	EPA 8015/LUFT	< 10	mg/Kg	4916
TPH as Motor Oil, SGT	EPA 8015/LUFT	< 10	mg/Kg	4916
Benzene	EPA 8260	< 5	ug/Kg	4927
Bromobenzene	EPA 8260	< 5	ug/Kg	4927
Bromochloromethane	EPA 8260	< 5	ug/Kg	4927
Bromodichloromethane	EPA 8260	< 5	ug/Kg	4927
Bromoform	EPA 8260	< 5	ug/Kg	4927
Bromomethane	EPA 8260	< 5	ug/Kg	4927
t-Butylbenzene	EPA 8260	< 5	ug/Kg	4927
n-Butylbenzene	EPA 8260	< 5	ug/Kg	4927
sec-Butyl Benzene	EPA 8260	< 5	ug/Kg	4927
Carbon Tetrachloride	EPA 8260	< 5	ug/Kg	4927
Chlorobenzene	EPA 8260	< 5	ug/Kg	4927
Chloroethane	EPA 8260	< 5	ug/Kg	4927
2-Chloroethylvinyl ether	EPA 8260	< 100	ug/Kg	4927
Chloroform	EPA 8260	< 5	ug/Kg	4927
Chloromethane	EPA 8260	< 5	ug/Kg	4927
2-Chlorotoluene	EPA 8260	< 5	ug/Kg	4927
4-Chlorotoluene	EPA 8260	< 5	ug/Kg	4927
1,2-Dibromo-3-Chloropropane	EPA 8260	< 5	ug/Kg	4927
Dibromochloromethane	EPA 8260	< 5	ug/Kg	4927
Dibromomethane	EPA 8260	< 5	ug/Kg	4927
1,2-Dibromoethane (EDB)	EPA 8260	< 5	ug/Kg	4927
Dichlorodifluoromethane	EPA 8260	< 5	ug/Kg	4927
1,2-Dichlorobenzene	EPA 8260	< 5	ug/Kg	4927
1,3-Dichlorobenzene	EPA 8260	< 5	ug/Kg	4927
1,4-Dichlorobenzene	EPA 8260	< 5	ug/Kg	4927
1,1-Dichloroethane	EPA 8260	< 5	ug/Kg	4927
1,2-Dichloroethane (EDC)	EPA 8260	< 5	ug/Kg	4927
1,1-Dichloroethene	EPA 8260	< 5	ug/Kg	4927
cis-1,2-Dichloroethene	EPA 8260	< 5	ug/Kg	4927
trans-1,2-Dichloethene	EPA 8260	< 5	ug/Kg	4927
1,2-Dichloropropane	EPA 8260	< 5	ug/Kg	4927
1,3-Dichloropropane	EPA 8260	< 5	ug/Kg	4927
2,2-Dichloropropane	EPA 8260	< 5	ug/Kg	4927
1,1-Dichloropropene	EPA 8260	< 5	ug/Kg	4927
cis-1,3-Dichloropropene	EPA 8260	< 5	ug/Kg	4927
trans-1,3-Dichloropropene	EPA 8260	< 5	ug/Kg	4927
Ethylbenzene	EPA 8260	< 5	ug/Kg	4927
Hexachlorobutadiene	EPA 8260	< 5	ug/Kg	4927
Isopropylbenzene	EPA 8260	< 5	ug/Kg	4927
4-Isopropyltoluene	EPA 8260	< 5	ug/Kg	4927
Methylene Chloride	EPA 8260	< 20	ug/Kg	4927
Methyl t-Butyl Ether (MTBE)	EPA 8260	< 5	ug/Kg	4927

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Order No.: Q6701

Laboratory Reagent Blank (continued)

Analyte	Method	Result	Units	Batch
Naphthalene	EPA 8260	< 20	ug/Kg	4927
n-Propylbenzene	EPA 8260	< 5	ug/Kg	4927
Styrene	EPA 8260	< 5	ug/Kg	4927
1,1,1,2-Tetrachloroethane	EPA 8260	< 5	ug/Kg	4927
1,1,2,2-Tetrachloroethane	EPA 8260	< 5	ug/Kg	4927
Tetrachloroethene	EPA 8260	< 5	ug/Kg	4927
Toluene	EPA 8260	< 5	ug/Kg	4927
1,2,3-Trichlorobenzene	EPA 8260	< 5	ug/Kg	4927
1,2,4-Trichlorobenzene	EPA 8260	< 5	ug/Kg	4927
1,1,1-Trichloroethane	EPA 8260	< 5	ug/Kg	4927
1,1,2-Trichloroethane	EPA 8260	< 5	ug/Kg	4927
Trichloroethene	EPA 8260	< 5	ug/Kg	4927
Trichlorofluoromethane	EPA 8260	< 5	ug/Kg	4927
1,2,3-Trichloropropane	EPA 8260	< 5	ug/Kg	4927
1,2,4-Trimethylbenzene	EPA 8260	< 5	ug/Kg	4927
1,3,5-Trimethylbenzene	EPA 8260	< 5	ug/Kg	4927
Vinyl Chloride	EPA 8260	< 5	ug/Kg	4927
m,p-Xylene	EPA 8260	< 5	ug/Kg	4927
o-Xylene	EPA 8260	< 5	ug/Kg	4927
Acenaphthene	EPA 8270 SIM	< 10	ug/Kg	4881
Acenaphthylene	EPA 8270 SIM	< 10	ug/Kg	4881
Anthracene	EPA 8270 SIM	< 10	ug/Kg	4881
Benz[a]anthracene	EPA 8270 SIM	< 10	ug/Kg	4881
Benzo[a]pyrene	EPA 8270 SIM	< 10	ug/Kg	4881
Benzo[b]fluoranthene	EPA 8270 SIM	< 10	ug/Kg	4881
Benzo[ghi]perylene	EPA 8270 SIM	< 10	ug/Kg	4881
Benzo[k]fluoranthene	EPA 8270 SIM	< 10	ug/Kg	4881
Chrysene	EPA 8270 SIM	< 10	ug/Kg	4881
Dibenz[a,h]anthracene	EPA 8270 SIM	< 10	ug/Kg	4881
Fluoranthene	EPA 8270 SIM	< 10	ug/Kg	4881
Fluorene	EPA 8270 SIM	< 10	ug/Kg	4881
Indeno[1,2,3-cd]pyrene	EPA 8270 SIM	< 10	ug/Kg	4881
Naphthalene	EPA 8270 SIM	< 10	ug/Kg	4881
Phenanthrene	EPA 8270 SIM	< 10	ug/Kg	4881
Pyrene	EPA 8270 SIM	< 10	ug/Kg	4881
Antimony	EPA 6020	< 0.4	mg/Kg	4887
Arsenic	EPA 6020	< 0.4	mg/Kg	4887
Barium	EPA 6020	< 0.4	mg/Kg	4887
Beryllium	EPA 6020	< 0.4	mg/Kg	4887
Cadmium	EPA 6020	< 0.4	mg/Kg	4887
Chromium	EPA 6020	< 0.4	mg/Kg	4887
Cobalt	EPA 6020	< 0.4	mg/Kg	4887
Copper	EPA 6020	< 0.4	mg/Kg	4887
Lead	EPA 6020	< 0.4	mg/Kg	4887

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Order No.: Q6701

Laboratory Reagent Blank (continued)

Analyte	Method	Result	Units	Batch
Molybdenum	EPA 6020	< 0.4	mg/Kg	4887
Nickel	EPA 6020	< 0.4	mg/Kg	4887
Selenium	EPA 6020	< 0.5	mg/Kg	4887
Silver	EPA 6020	< 0.4	mg/Kg	4887
Thallium	EPA 6020	< 0.4	mg/Kg	4887
Vanadium	EPA 6020	< 0.4	mg/Kg	4887
Zinc	EPA 6020	< 4	mg/Kg	4887

Laboratory Known Analysis (LCS)

Analyte	Method	Recovery	Spike Amount	Units	Recovery Limits	Batch
Mercury	EPA 7471	105%	0.8	mg/Kg	56 - 148	4859
TPH as Diesel, SGT	EPA 8015/LUFT	60%	250	mg/Kg	50 - 150	4916
Benzene	EPA 8260	106%	50	ug/Kg	60 - 140	4927
Ethylbenzene	EPA 8260	114%	50	ug/Kg	60 - 140	4927
Toluene	EPA 8260	108%	50	ug/Kg	60 - 140	4927
m,p-Xylene	EPA 8260	114%	100	ug/Kg	60 - 140	4927
o-Xylene	EPA 8260	114%	50	ug/Kg	60 - 140	4927
Acenaphthene	EPA 8270 SIM	55%	67	ug/Kg	31 - 137	4881
Acenaphthylene	EPA 8270 SIM	36%	67	ug/Kg	26 - 119	4881
Anthracene	EPA 8270 SIM	57%	67	ug/Kg	44 - 110	4881
Benz[a]anthracene	EPA 8270 SIM	76%	67	ug/Kg	38 - 134	4881
Benzo[a]pyrene	EPA 8270 SIM	64%	67	ug/Kg	36 - 121	4881
Benzo[b]fluoranthene	EPA 8270 SIM	78%	67	ug/Kg	37 - 129	4881
Benzo[ghi]perylene	EPA 8270 SIM	79%	67	ug/Kg	31 - 128	4881
Benzo[k]fluoranthene	EPA 8270 SIM	76%	67	ug/Kg	36 - 135	4881
Chrysene	EPA 8270 SIM	76%	67	ug/Kg	38 - 128	4881
Dibenz[a,h]anthracene	EPA 8270 SIM	79%	67	ug/Kg	28 - 134	4881
Fluoranthene	EPA 8270 SIM	78%	67	ug/Kg	37 - 126	4881
Fluorene	EPA 8270 SIM	64%	67	ug/Kg	29 - 119	4881
Indeno[1,2,3-cd]pyrene	EPA 8270 SIM	81%	67	ug/Kg	25 - 125	4881
Naphthalene	EPA 8270 SIM	16%	67	ug/Kg	15 - 119	4881
Phenanthrene	EPA 8270 SIM	78%	67	ug/Kg	38 - 124	4881
Pyrene	EPA 8270 SIM	75%	67	ug/Kg	35 - 142	4881
Antimony	EPA 6020	114%	50	mg/Kg	10 - 120	4887
Arsenic	EPA 6020	92%	50	mg/Kg	50 - 130	4887
Barium	EPA 6020	98%	50	mg/Kg	60 - 140	4887
Beryllium	EPA 6020	97%	50	mg/Kg	60 - 140	4887
Cadmium	EPA 6020	104%	50	mg/Kg	60 - 140	4887
Chromium	EPA 6020	97%	50	mg/Kg	60 - 140	4887
Cobalt	EPA 6020	103%	50	mg/Kg	60 - 140	4887
Copper	EPA 6020	106%	50	mg/Kg	60 - 140	4887
Lead	EPA 6020	102%	50	mg/Kg	60 - 140	4887

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Order No.: Q6701

Laboratory Known Analysis (LCS)

Analyte	Method	Recovery	Spike Amount	Units	Recovery Limits	Batch
Molybdenum	EPA 6020	97%	50	mg/Kg	60 - 140	4887
Nickel	EPA 6020	94%	50	mg/Kg	60 - 140	4887
Selenium	EPA 6020	96%	200	mg/Kg	60 - 140	4887
Silver	EPA 6020	92%	50	mg/Kg	50 - 130	4887
Thallium	EPA 6020	105%	50	mg/Kg	60 - 140	4887
Vanadium	EPA 6020	101%	50	mg/Kg	60 - 140	4887
Zinc	EPA 6020	100%	50	mg/Kg	60 - 140	4887

Matrix Spike/Matrix Spike Duplicates

Analyte	Method	MS Rec.	MSD Rec.	RPD	Matrix Sample	Spike Amount	Units	Recovery Limits	RPD Limit	Batch
Mercury	EPA 7471	104%	108%	5	09-C18369	0.8	mg/Kg	56 - 148	30	4859
Antimony	EPA 6020	47%	49%	5	09-C18498	50	mg/Kg	10 - 120	30	4887
Arsenic	EPA 6020	106%	105%	1	09-C18498	50	mg/Kg	50 - 130	30	4887
Barium	EPA 6020	92%	89%	2	09-C18498	50	mg/Kg	60 - 140	30	4887
Beryllium	EPA 6020	94%	90%	3	09-C18498	50	mg/Kg	60 - 140	30	4887
Cadmium	EPA 6020	114%	113%	1	09-C18498	50	mg/Kg	60 - 140	30	4887
Chromium	EPA 6020	89%	88%	2	09-C18498	50	mg/Kg	60 - 140	30	4887
Cobalt	EPA 6020	93%	91%	2	09-C18498	50	mg/Kg	60 - 140	30	4887
Copper	EPA 6020	108%	96%	10	09-C18498	50	mg/Kg	60 - 140	30	4887
Lead	EPA 6020	100%	98%	2	09-C18498	50	mg/Kg	60 - 140	30	4887
Molybdenum	EPA 6020	107%	107%	0	09-C18498	50	mg/Kg	60 - 140	30	4887
Nickel	EPA 6020	95%	93%	1	09-C18498	50	mg/Kg	60 - 140	30	4887
Selenium	EPA 6020	111%	110%	0	09-C18498	200	mg/Kg	60 - 140	30	4887
Silver	EPA 6020	101%	100%	1	09-C18498	50	mg/Kg	50 - 130	30	4887
Thallium	EPA 6020	102%	101%	1	09-C18498	50	mg/Kg	60 - 140	30	4887
Vanadium	EPA 6020	98%	96%	1	09-C18498	50	mg/Kg	60 - 140	30	4887
Zinc	EPA 6020	96%	92%	3	09-C18498	50	mg/Kg	60 - 140	30	4887

Sample Duplicate

Analyte	Method	Sample ID	Sample Value	Sample Duplicate	RPD	Units	RPD Limit	Batch
Benzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Bromobenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Bromochloromethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Bromodichloromethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Bromoform	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Bromomethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	50.	4927
t-Butylbenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
n-Butylbenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
sec-Butyl Benzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Carbon Tetrachloride	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927

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Order No.: Q6701

Sample Duplicate

Analyte	Method	Sample ID	Sample Value	Sample Duplicate	RPD	Units	RPD Limit	Batch
Chlorobenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Chloroethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	50.	4927
2-Chloroethylvinyl ether	EPA 8260	09-C18498	< 100	< 100	0	ug/Kg	50.	4927
Chloroform	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Chloromethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	50.	4927
2-Chlorotoluene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
4-Chlorotoluene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,2-Dibromo-3-Chloropropane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	40.	4927
Dibromochloromethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Dibromomethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,2-Dibromoethane (EDB)	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Dichlorodifluoromethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	50.	4927
1,2-Dichlorobenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,3-Dichlorobenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,4-Dichlorobenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,1-Dichloroethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,2-Dichloroethane (EDC)	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	40.	4927
1,1-Dichloroethene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
cis-1,2-Dichloroethene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
trans-1,2-Dichloethene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,2-Dichloropropane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,3-Dichloropropane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
2,2-Dichloropropane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,1-Dichloropropene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
cis-1,3-Dichloropropene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
trans-1,3-Dichloropropene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Ethylbenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Hexachlorobutadiene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	40.	4927
Isopropylbenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
4-Isopropyltoluene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Methylene Chloride	EPA 8260	09-C18498	< 20	< 20	0	ug/Kg	40.	4927
Methyl t-Butyl Ether (MTBE)	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	40.	4927
Naphthalene	EPA 8260	09-C18498	< 20	< 20	0	ug/Kg	40.	4927
n-Propylbenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Styrene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,1,1,2-Tetrachloroethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,1,2,2-Tetrachloroethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Tetrachloroethene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Toluene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,2,3-Trichlorobenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,2,4-Trichlorobenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,1,1-Trichloroethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,1,2-Trichloroethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Trichloroethene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927

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Order No.: Q6701

Sample Duplicate

Analyte	Method	Sample ID	Sample Value	Sample Duplicate	RPD	Units	RPD Limit	Batch
Trichlorofluoromethane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	50.	4927
1,2,3-Trichloropropane	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	40.	4927
1,2,4-Trimethylbenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
1,3,5-Trimethylbenzene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
Vinyl Chloride	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	50.	4927
m,p-Xylene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927
o-Xylene	EPA 8260	09-C18498	< 5	< 5	0	ug/Kg	30.	4927

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Surrogate Report

Sample Number	Batch	Method	Surrogate	% Recovery	QC Limits
09-C18495	4881	EPA 8270	Pyrene-d10 (Aromatic)	60.	16-127
09-C18495	4916	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	69.	50-150
09-C18496	4916	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	69.	50-150
09-C18497	4927	EPA 8260	Dibromofluoromethane	107.	80-130
09-C18497	4927	EPA 8260	Toluene-d8	123.	70-126
09-C18497	4927	EPA 8260	4-BFB	98.	57-124
09-C18497	4927	EPA 8260	1,2-Dichloroethane-d4	112.	60-143
09-C18497	4916	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	86.	50-150
09-C18498	4927	EPA 8260	Dibromofluoromethane	101.	80-130
09-C18498	4927	EPA 8260	Toluene-d8	108.	70-126
09-C18498	4927	EPA 8260	4-BFB	97.	57-124
09-C18498	4927	EPA 8260	1,2-Dichloroethane-d4	96.	60-143
09-C18498	4916	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	84.	50-150
09-C18499	4916	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	69.	50-150
09-C18500	4881	EPA 8270	Pyrene-d10 (Aromatic)	56.	16-127
09-C18500	4916	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	76.	50-150
09-C18501	4881	EPA 8270	Pyrene-d10 (Aromatic)	62.	16-127
blank	4927	EPA 8260	Dibromofluoromethane	110.	80-130
LCS	4927	EPA 8260	Dibromofluoromethane	102.	80-130
09-C18498 dup.	4927	EPA 8260	Dibromofluoromethane	106.	80-130
blank	4927	EPA 8260	Toluene-d8	119.	70-126
LCS	4927	EPA 8260	Toluene-d8	104.	70-126
09-C18498 dup.	4927	EPA 8260	Toluene-d8	120.	70-126
blank	4927	EPA 8260	4-BFB	92.	57-124
LCS	4927	EPA 8260	4-BFB	101.	57-124
09-C18498 dup.	4927	EPA 8260	4-BFB	94.	57-124
blank	4881	EPA 8270	Pyrene-d10 (Aromatic)	70.	16-127
LCS	4881	EPA 8270	Pyrene-d10 (Aromatic)	69.	16-127
blank	4927	EPA 8260	1,2-Dichloroethane-d4	87.	60-143
LCS	4927	EPA 8260	1,2-Dichloroethane-d4	104.	60-143
09-C18498 dup.	4927	EPA 8260	1,2-Dichloroethane-d4	90.	60-143
blank	4916	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	75.	50-150
LCS	4916	EPA 8015M/LUFT DRO	Hexacosane (SL/SGT)	82.	50-150

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Environmental Testing Services
2520 N. San Fernando Rd., Los Angeles, CA 90065 Tel: (323) 223-9700 Fax: (323) 223-9500

ANALYTICAL RESULTS

Ordered By

Creek Environmental Labs, Inc.
141 Suburban Rd Suite C-5
San Luis Obispo, CA 93401-

Telephone: (805)545-9838
Attn: Orval Osborne
Page: 2
Project ID: Q6701

ASL Job Number	Submitted	Client
44145	12/17/2009	CREEK

Method: 8082, Polychlorinated Biphenyls(PCBs) by Gas Chromatography

QC Batch No: 121809-1

Our Lab I.D.		246410	246411	246412	246413	246414
Client Sample I.D.		(18495) SB-8-0.5	(18496) SB-8-1.0	(18497) SB-7-1.0	(18498) SB-7-2.0	(18500) SB-11-1.0
Date Sampled		12/15/2009	12/15/2009	12/15/2009	12/15/2009	12/15/2009
Date Prepared		12/18/2009	12/18/2009	12/18/2009	12/18/2009	12/18/2009
Preparation Method						
Date Analyzed		12/18/2009	12/18/2009	12/18/2009	12/18/2009	12/18/2009
Matrix		Soil	Soil	Soil	Soil	Soil
Units		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor		1	1	1	1	1
Analytes	PQL	Results	Results	Results	Results	Results
Aroclor-1016 (PCB-1016)	33.0	ND	ND	ND	ND	ND
Aroclor-1221 (PCB-1221)	67.0	ND	ND	ND	ND	ND
Aroclor-1232 (PCB-1232)	33.0	ND	ND	ND	ND	ND
Aroclor-1242 (PCB-1242)	33.0	ND	ND	ND	ND	ND
Aroclor-1248 (PCB-1248)	33.0	ND	ND	ND	ND	ND
Aroclor-1254 (PCB-1254)	33.0	ND	ND	ND	ND	ND
Aroclor-1260 (PCB-1260)	33.0	ND	ND	ND	ND	ND

Our Lab I.D.		246410	246411	246412	246413	246414
Surrogates	% Rec Limit	% Rec.	% Rec.	% Rec.	% Rec.	% Rec.
Surrogate Percent Recovery						
Decachlorobiphenyl	43-169	94	101	108	86	97

QUALITY CONTROL REPORT

QC Batch No: 121809-1

Analytes	MS % REC	MS DUP % REC	RPD %	MS/MSD % Limit	MS RPD % Limit	LCS % REC	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit
Aroclor-1260 (PCB-1260)	89	99	10.6	39-150	<30	89	92	3.3	39-150	<30

AMERICAN SCIENTIFIC LABORATORIES, LLC
Environmental Testing Services
2520 N. San Fernando Rd., Los Angeles, CA 90065 Tel: (323) 223-9700 Fax: (323) 223-9500

ANALYTICAL RESULTS

Ordered By

Creek Environmental Labs, Inc.
141 Suburban Rd Suite C-5
San Luis Obispo, CA 93401-

Telephone: (805)545-9838
Attn: Orval Osborne

Page: 3

Project ID: Q6701

ASL Job Number	Submitted	Client
44145	12/17/2009	CREEK

Method: SM2540-G, Percent Solids

QC Batch No: 121709-1

Our Lab I.D.		246410	246411	246412	246413	246414
Client Sample I.D.		(18495) SB-8-0.5	(18496) SB-8-1.0	(18497) SB-7-1.0	(18498) SB-7-2.0	(18500) SB-11-1.0
Date Sampled		12/15/2009	12/15/2009	12/15/2009	12/15/2009	12/15/2009
Date Prepared		12/17/2009	12/17/2009	12/17/2009	12/17/2009	12/17/2009
Preparation Method						
Date Analyzed		12/17/2009	12/17/2009	12/17/2009	12/17/2009	12/17/2009
Matrix		Soil	Soil	Soil	Soil	Soil
Units		percent(%)	percent(%)	percent(%)	percent(%)	percent(%)
Dilution Factor		1	1	1	1	1
Analytes	PQL	Results	Results	Results	Results	Results
Conventionals						
% Solids	1.00	93.9	90.0	91.2	88.4	86.4

QUALITY CONTROL REPORT

QC Batch No: 121709-1

Analytes	SM Result	SM DUP Result	RPD %	SM RPD % Limit						
Conventionals										
% Solids	93.9	93.6	<1	20						

CHAIN-OF-CUSTODY RECORD

Q6697 OAK 16147

PROJECT NAME: MARSH LANDING

PROJECT NUMBER: 15317.000

RESULTS TO: jonathan.skaggs@amec.com

TURNAROUND TIME: 7 day

SAMPLE SHIPMENT METHOD: Fed Ex

LABORATORY NAME: Creek Environmental

LABORATORY ADDRESS: San Luis Obispo

LABORATORY CONTACT: Judy

LABORATORY PHONE NUMBER:

CLIENT INFORMATION:

DATE: 12/15/09 PAGE 1 OF 1

REPORTING REQUIREMENTS:

GEOTRACKER REQUIRED YES NO

SITE SPECIFIC GLOBAL ID NO.

SAMPLERS (SIGNATURE):

ANALYSES

DATE	TIME	SAMPLE NUMBER	VOCs by 8260B	TPHd by 8015M	TPHmo by 8015M	Silica Gel Cleanup	Title 22 Metals Corr	Mercury 7471A	CONTAINER TYPE AND SIZE	Soil (S), Water (W), Vapor (V), or Other (O)	Filtered	Preservative Type	Cooled	MS/MSD	No. of Containers	ADDITIONAL COMMENTS
12/15/09	0941	TB-121509	X						40mL VOA	W	N	HCl	Y	N	2	A,B 18477
↓	1420	SB-3-GW	X	X	X	X	X	X	40mL VOA, Amber, Poly	↓	→	See Notes	Y	↓	5	Metals field filtered * 18478
	1445	SB-2-GW	X	X	X	X	X	X	40mL VOA, Amber, Poly		→	See Notes	Y		5	metals field filtered 18479
	1500	SB-20-GW	X	X	X	X	X	X	40mL VOA, Amber, Poly		→	See Notes	Y		5	metals field filtered 18480
															*	3 VOA's A,B,C
																AG/UNP/1L D
																P/HNO3/250mL E
																For 18478, 18479 + 18480

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
SIGNATURE:	12/15/09	1850	SIGNATURE: Cathy Wenzloff	12/16/09	11:03
PRINTED NAME: Tiffany Klikke			PRINTED NAME: Cathy Wenzloff		
COMPANY: AMEC Geomatrix			COMPANY: Creek Env. Lab		
SIGNATURE:			SIGNATURE:		
PRINTED NAME:			PRINTED NAME:		
COMPANY:			COMPANY:		
SIGNATURE:			SIGNATURE:		
PRINTED NAME:			PRINTED NAME:		
COMPANY:			COMPANY:		

TOTAL NUMBER OF CONTAINERS: 17

SAMPLING COMMENTS: For SB-3-GW, SB-2-GW, SB-20-GW each sample consists of 3 40mL VOA vials preserved with HCl, 1 L unpreserved amber, 1 250 mL Poly preserved with HNO3.
* Metals were field filtered *
Send results to jonathan.skaggs@amec.com + heidi.dietrich@amec.com

2101 Webster Street, 12th Floor
Oakland, California 94612-3066
Tel 510.663.4100 Fax 510.663.4141

amec

Temp. 4.5°C

Custody Seal opened 12/16/09 11:03 REW

CREEK ENVIRONMENTAL LABORATORIES, INC.
A Minority-owned Business Enterprise
141 SUBURBAN ROAD, SUITE C • SAN LUIS OBISPO, CA 93401 • (805) 545-9838 • FAX (805) 545-0107

Date: December 22, 2009

CASE NARRATIVE Q6697

Client: **Amec Geomatrix**
Project: **PG&E Marsh Landing**
Sample(s): **09-C18477 to 09-C18480**
Sampled: **12/15/09**

Received: 12/16/09

Samples 09-C18477 to 09-C18480 were received at the laboratory at 4.5 °C with no anomaly.

Diesel range (C10-C25) and motor oil range (C25-C40) petroleum hydrocarbons (TPH) were extracted by separatory funnel method (EPA 3510C) and the extracts were treated with silica gel cleanup (EPA 3630C) prior to analysis by GC/FID (EPA 8015M).

Volatile organic compounds were extracted by purge-and-trap method (EPA 5030B) and analyzed by GC/MS (EPA 8260B).

CAM metals were digested by EPA 3010A method and analyzed by ICP-MS (EPA 6020), except for mercury, which was analyzed by CVAAS method (EPA 7470A).

All samples were extracted and analyzed within holding time. All analytical quality control parameters were within acceptable limits and there was no analytical anomaly.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18477
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
TB-121509	Tiffany Klitzke	12/15/09@09:41	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Toluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Ethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
m,p-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
o-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Methyl t-Butyl Ether (MTBE)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Chlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,3-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,4-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dichloroethane (EDC)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dibromoethane (EDB)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromochloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromodichloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromoform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
n-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
sec-Butyl Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
t-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Carbon Tetrachloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Chloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
2-Chloroethylvinyl ether	Not Detected	20	1	ug/L	EPA 8260	12/21/09		4905
Chloroform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Chloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
2-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
4-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dibromo-3-Chloropropane	Not Detected	1	1	ug/L	EPA 8260	12/21/09		4905
Dibromochloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18477
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
TB-121509	Tiffany Klitzke	12/15/09@09:41	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Dibromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Dichlorodifluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1-Dichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
cis-1,2-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
trans-1,2-Dichloethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,3-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
2,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
cis-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
trans-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Hexachlorobutadiene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Isopropylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
4-Isopropyltoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Methylene Chloride	Not Detected	5	1	ug/L	EPA 8260	12/21/09		4905
Naphthalene	Not Detected	5	1	ug/L	EPA 8260	12/21/09		4905
n-Propylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Styrene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,1,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,2,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Tetrachloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,3-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,4-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,1-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,2-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Trichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Trichlorofluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,3-Trichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18477
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
TB-121509	Tiffany Klitzke	12/15/09@09:41	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
1,2,4-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,3,5-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Vinyl Chloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18478
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-3-GW	Tiffany Klitzke	12/15/09@14:20	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.0005	1	mg/L	EPA 7470	12/18/09	12/18/09	4864
TPH as Diesel, SGT	0.46	0.05	1	mg/L	EPA 8015/LUFT	12/21/09	12/18/09	4913
TPH as Motor Oil, SGT	1.2	0.1	1	mg/L	EPA 8015/LUFT	12/21/09	12/18/09	4913
Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Toluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Ethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
m,p-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
o-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Methyl t-Butyl Ether (MTBE)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Chlorobenzene monochlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,3-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,4-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dichloroethane (EDC)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dibromoethane (EDB)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromochloromethane chlorobromomethane?	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromodichloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromoform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
n-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
sec-Butyl Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
t-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Carbon Tetrachloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Chloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
2-Chloroethylvinyl ether	Not Detected	20	1	ug/L	EPA 8260	12/21/09		4905
Chloroform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Chloromethane – methyl chloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
2-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18478
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-3-GW	Tiffany Klitzke	12/15/09@14:20	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
4-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dibromo-3-Chloropropane (dibromochloropropane)	Not Detected	1	1	ug/L	EPA 8260	12/21/09		4905
Dibromochloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Dibromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Dichlorodifluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1-Dichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
cis-1,2-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
trans-1,2-Dichloethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,3-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
2,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
cis-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
trans-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Hexachlorobutadiene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Isopropylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
4-Isopropyltoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Methylene Chloride	Not Detected	5	1	ug/L	EPA 8260	12/21/09		4905
Naphthalene	Not Detected	5	1	ug/L	EPA 8260	12/21/09		4905
n-Propylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Styrene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,1,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,2,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Tetrachloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,3-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,4-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,1-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,2-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905

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A Minority-owned Business Enterprise
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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18478
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-3-GW	Tiffany Klitzke	12/15/09@14:20	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Trichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Trichlorofluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,3-Trichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,4-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,3,5-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Vinyl Chloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Antimony	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Arsenic	0.065	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Barium	0.055	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Beryllium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Cadmium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Chromium	0.046	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Cobalt	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Copper	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Lead	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Molybdenum	0.014	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Nickel	0.016	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Selenium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Silver	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Thallium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Vanadium	0.18	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Zinc	Not Detected	0.08	1	mg/L	EPA 6020	12/21/09	12/18/09	4899

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Log Number: 09-C18478
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-3-GW	Tiffany Klitzke	12/15/09@14:20	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Log Number: 09-C18479
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-2-GW	Tiffany Klitzke	12/15/09@14:45	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.0005	1	mg/L	EPA 7470	12/18/09	12/18/09	4864
TPH as Diesel, SGT	Not Detected	0.05	1	mg/L	EPA 8015/LUFT	12/21/09	12/18/09	4913
TPH as Motor Oil, SGT	Not Detected	0.1	1	mg/L	EPA 8015/LUFT	12/21/09	12/18/09	4913
Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Toluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Ethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
m,p-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
o-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Methyl t-Butyl Ether (MTBE)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Chlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,3-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,4-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dichloroethane (EDC)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dibromoethane (EDB)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromochloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromodichloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromoform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
n-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
sec-Butyl Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
t-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Carbon Tetrachloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Chloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
2-Chloroethylvinyl ether	Not Detected	20	1	ug/L	EPA 8260	12/21/09		4905
Chloroform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Chloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
2-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905

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Log Number: 09-C18479
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-2-GW	Tiffany Klitzke	12/15/09@14:45	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
4-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dibromo-3-Chloropropane	Not Detected	1	1	ug/L	EPA 8260	12/21/09		4905
Dibromochloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Dibromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Dichlorodifluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1-Dichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
cis-1,2-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
trans-1,2-Dichloethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,3-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
2,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
cis-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
trans-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Hexachlorobutadiene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Isopropylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
4-Isopropyltoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Methylene Chloride	Not Detected	5	1	ug/L	EPA 8260	12/21/09		4905
Naphthalene	Not Detected	5	1	ug/L	EPA 8260	12/21/09		4905
n-Propylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Styrene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,1,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,2,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Tetrachloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,3-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,4-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,1-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,2-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905

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AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18479
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-2-GW	Tiffany Klitzke	12/15/09@14:45	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Trichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Trichlorofluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,3-Trichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,4-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,3,5-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Vinyl Chloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Antimony	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Arsenic	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Barium	0.086	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Beryllium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Cadmium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Chromium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Cobalt	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Copper	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Lead	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Molybdenum	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Nickel	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Selenium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Silver	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Thallium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Vanadium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Zinc	Not Detected	0.08	1	mg/L	EPA 6020	12/21/09	12/18/09	4899

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-2-GW	Tiffany Klitzke	12/15/09@14:45	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
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Log Number: 09-C18480
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-20-GW	Tiffany Klitzke	12/15/09@15:00	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.0005	1	mg/L	EPA 7470	12/18/09	12/18/09	4864
TPH as Diesel, SGT	Not Detected	0.05	1	mg/L	EPA 8015/LUFT	12/21/09	12/18/09	4913
TPH as Motor Oil, SGT	Not Detected	0.1	1	mg/L	EPA 8015/LUFT	12/21/09	12/18/09	4913
Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Toluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Ethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
m,p-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
o-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Methyl t-Butyl Ether (MTBE)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Chlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,3-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,4-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dichloroethane (EDC)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dibromoethane (EDB)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromochloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromodichloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromoform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Bromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
n-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
sec-Butyl Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
t-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Carbon Tetrachloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Chloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
2-Chloroethylvinyl ether	Not Detected	20	1	ug/L	EPA 8260	12/21/09		4905
Chloroform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Chloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
2-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905

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Jonathan Skaggs
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Log Number: 09-C18480
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-20-GW	Tiffany Klitzke	12/15/09@15:00	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
4-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dibromo-3-Chloropropane	Not Detected	1	1	ug/L	EPA 8260	12/21/09		4905
Dibromochloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Dibromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Dichlorodifluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1-Dichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
cis-1,2-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
trans-1,2-Dichloethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,3-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
2,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
cis-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
trans-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Hexachlorobutadiene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Isopropylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
4-Isopropyltoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Methylene Chloride	Not Detected	5	1	ug/L	EPA 8260	12/21/09		4905
Naphthalene	Not Detected	5	1	ug/L	EPA 8260	12/21/09		4905
n-Propylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Styrene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,1,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,2,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Tetrachloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,3-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,4-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,1-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,1,2-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18480
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-20-GW	Tiffany Klitzke	12/15/09@15:00	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Trichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Trichlorofluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,3-Trichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,2,4-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
1,3,5-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Vinyl Chloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4905
Antimony	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Arsenic	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Barium	0.074	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Beryllium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Cadmium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Chromium	0.008	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Cobalt	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Copper	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Lead	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Molybdenum	0.016	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Nickel	0.009	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Selenium	Not Detected	0.01	2	mg/L	EPA 6020	12/21/09	12/18/09	4899
Silver	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Thallium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Vanadium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Zinc	Not Detected	0.08	1	mg/L	EPA 6020	12/21/09	12/18/09	4899

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18480
Order: Q6697
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-20-GW	Tiffany Klitzke	12/15/09@15:00	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Quality Control Results

Order No.: Q6697
Laboratory Reagent Blank

Analyte	Method	Results	Units	Batch
Mercury	EPA 7470	< 0.0005	mg/L	4864
TPH as Diesel, SGT	EPA 8015/LUFT	< 0.05	mg/L	4913
TPH as Motor Oil, SGT	EPA 8015/LUFT	< 0.1	mg/L	4913
Benzene	EPA 8260	< 0.5	ug/L	4905
Toluene	EPA 8260	< 0.5	ug/L	4905
Ethylbenzene	EPA 8260	< 0.5	ug/L	4905
m,p-Xylene	EPA 8260	< 0.5	ug/L	4905
o-Xylene	EPA 8260	< 0.5	ug/L	4905
Methyl t-Butyl Ether (MTBE)	EPA 8260	< 0.5	ug/L	4905
Chlorobenzene	EPA 8260	< 0.5	ug/L	4905
1,2-Dichlorobenzene	EPA 8260	< 0.5	ug/L	4905
1,3-Dichlorobenzene	EPA 8260	< 0.5	ug/L	4905
1,4-Dichlorobenzene	EPA 8260	< 0.5	ug/L	4905
1,2-Dichloroethane (EDC)	EPA 8260	< 0.5	ug/L	4905
1,2-Dibromoethane (EDB)	EPA 8260	< 0.5	ug/L	4905
Bromobenzene	EPA 8260	< 0.5	ug/L	4905
Bromochloromethane	EPA 8260	< 0.5	ug/L	4905
Bromodichloromethane	EPA 8260	< 0.5	ug/L	4905
Bromoform	EPA 8260	< 0.5	ug/L	4905
Bromomethane	EPA 8260	< 0.5	ug/L	4905
n-Butylbenzene	EPA 8260	< 0.5	ug/L	4905
sec-Butyl Benzene	EPA 8260	< 0.5	ug/L	4905
t-Butylbenzene	EPA 8260	< 0.5	ug/L	4905
Carbon Tetrachloride	EPA 8260	< 0.5	ug/L	4905
Chloroethane	EPA 8260	< 0.5	ug/L	4905
2-Chloroethylvinyl ether	EPA 8260	< 20	ug/L	4905
Chloroform	EPA 8260	< 0.5	ug/L	4905
Chloromethane	EPA 8260	< 0.5	ug/L	4905
2-Chlorotoluene	EPA 8260	< 0.5	ug/L	4905
4-Chlorotoluene	EPA 8260	< 0.5	ug/L	4905
1,2-Dibromo-3-Chloropropane	EPA 8260	< 1	ug/L	4905
Dibromochloromethane	EPA 8260	< 0.5	ug/L	4905
Dibromomethane	EPA 8260	< 0.5	ug/L	4905
Dichlorodifluoromethane	EPA 8260	< 0.5	ug/L	4905
1,1-Dichloroethane	EPA 8260	< 0.5	ug/L	4905
1,1-Dichloroethene	EPA 8260	< 0.5	ug/L	4905
cis-1,2-Dichloroethene	EPA 8260	< 0.5	ug/L	4905
trans-1,2-Dichloethene	EPA 8260	< 0.5	ug/L	4905
1,2-Dichloropropane	EPA 8260	< 0.5	ug/L	4905
1,3-Dichloropropane	EPA 8260	< 0.5	ug/L	4905
2,2-Dichloropropane	EPA 8260	< 0.5	ug/L	4905
1,1-Dichloropropene	EPA 8260	< 0.5	ug/L	4905
cis-1,3-Dichloropropene	EPA 8260	< 0.5	ug/L	4905
trans-1,3-Dichloropropene	EPA 8260	< 0.5	ug/L	4905
Hexachlorobutadiene	EPA 8260	< 0.5	ug/L	4905

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Order No.: Q6697

Laboratory Reagent Blank (continued)

Analyte	Method	Result	Units	Batch
Isopropylbenzene	EPA 8260	< 0.5	ug/L	4905
4-Isopropyltoluene	EPA 8260	< 0.5	ug/L	4905
Methylene Chloride	EPA 8260	< 5	ug/L	4905
Naphthalene	EPA 8260	< 5	ug/L	4905
n-Propylbenzene	EPA 8260	< 0.5	ug/L	4905
Styrene	EPA 8260	< 0.5	ug/L	4905
1,1,1,2-Tetrachloroethane	EPA 8260	< 0.5	ug/L	4905
1,1,2,2-Tetrachloroethane	EPA 8260	< 0.5	ug/L	4905
Tetrachloroethene	EPA 8260	< 0.5	ug/L	4905
1,2,3-Trichlorobenzene	EPA 8260	< 0.5	ug/L	4905
1,2,4-Trichlorobenzene	EPA 8260	< 0.5	ug/L	4905
1,1,1-Trichloroethane	EPA 8260	< 0.5	ug/L	4905
1,1,2-Trichloroethane	EPA 8260	< 0.5	ug/L	4905
Trichloroethene	EPA 8260	< 0.5	ug/L	4905
Trichlorofluoromethane	EPA 8260	< 0.5	ug/L	4905
1,2,3-Trichloropropane	EPA 8260	< 0.5	ug/L	4905
1,2,4-Trimethylbenzene	EPA 8260	< 0.5	ug/L	4905
1,3,5-Trimethylbenzene	EPA 8260	< 0.5	ug/L	4905
Vinyl Chloride	EPA 8260	< 0.5	ug/L	4905
Antimony	EPA 6020	< 0.008	mg/L	4899
Arsenic	EPA 6020	< 0.008	mg/L	4899
Barium	EPA 6020	< 0.008	mg/L	4899
Beryllium	EPA 6020	< 0.008	mg/L	4899
Cadmium	EPA 6020	< 0.008	mg/L	4899
Chromium	EPA 6020	< 0.008	mg/L	4899
Cobalt	EPA 6020	< 0.008	mg/L	4899
Copper	EPA 6020	< 0.008	mg/L	4899
Lead	EPA 6020	< 0.008	mg/L	4899
Molybdenum	EPA 6020	< 0.008	mg/L	4899
Nickel	EPA 6020	< 0.008	mg/L	4899
Selenium	EPA 6020	< 0.008	mg/L	4899
Silver	EPA 6020	< 0.008	mg/L	4899
Thallium	EPA 6020	< 0.008	mg/L	4899
Vanadium	EPA 6020	< 0.008	mg/L	4899
Zinc	EPA 6020	< 0.08	mg/L	4899

Laboratory Known Analysis (LCS)

Analyte	Method	Recovery	Spike Amount	Units	Recovery Limits	Batch
Mercury	EPA 7470	104%	0.0050	mg/L	70 - 130	4864
TPH as Diesel, SGT	EPA 8015/LUFT	73%	5.0	mg/L	50 - 150	4913
Benzene	EPA 8260	106%	10	ug/L	80 - 120	4905
Toluene	EPA 8260	109%	10	ug/L	80 - 120	4905

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Order No.: Q6697

Laboratory Known Analysis (LCS)

Analyte	Method	Recovery	Spike Amount	Units	Recovery Limits	Batch
Chlorobenzene	EPA 8260	108%	10	ug/L	81 - 115	4905
1,1-Dichloroethene	EPA 8260	103%	10	ug/L	63 - 129	4905
Trichloroethene	EPA 8260	107%	10	ug/L	77 - 117	4905
Antimony	EPA 6020	122%	1.0	mg/L	70 - 130	4899
Arsenic	EPA 6020	96%	1.0	mg/L	70 - 130	4899
Barium	EPA 6020	101%	1.0	mg/L	75 - 125	4899
Beryllium	EPA 6020	101%	1.0	mg/L	75 - 125	4899
Cadmium	EPA 6020	105%	1.0	mg/L	75 - 125	4899
Chromium	EPA 6020	105%	1.0	mg/L	75 - 125	4899
Cobalt	EPA 6020	106%	1.0	mg/L	75 - 125	4899
Copper	EPA 6020	107%	1.0	mg/L	75 - 125	4899
Lead	EPA 6020	105%	1.0	mg/L	75 - 125	4899
Molybdenum	EPA 6020	97%	1.0	mg/L	75 - 125	4899
Nickel	EPA 6020	101%	1.0	mg/L	75 - 125	4899
Selenium	EPA 6020	106%	4.0	mg/L	70 - 130	4899
Silver	EPA 6020	102%	1.0	mg/L	70 - 130	4899
Thallium	EPA 6020	103%	1.0	mg/L	70 - 130	4899
Vanadium	EPA 6020	103%	1.0	mg/L	75 - 125	4899
Zinc	EPA 6020	108%	1.0	mg/L	75 - 125	4899

Matrix Spike/Matrix Spike Duplicates

Analyte	Method	MS Rec.	MSD Rec.	RPD	Matrix Sample	Spike Amount	Units	Recovery Limits	RPD Limit	Batch
Mercury	EPA 7470	100%	98%	2	09-C18480	0.0050	mg/L	70 - 130	20	4864
Benzene	EPA 8260	104%	97%	7	09-C18478	10	ug/L	80 - 120	20	4905
Toluene	EPA 8260	106%	98%	8	09-C18478	10	ug/L	80 - 120	20	4905
Chlorobenzene	EPA 8260	107%	98%	9	09-C18478	10	ug/L	74 - 131	20	4905
1,1-Dichloroethene	EPA 8260	104%	97%	7	09-C18478	10	ug/L	59 - 145	20	4905
Trichloroethene	EPA 8260	107%	97%	10	09-C18478	10	ug/L	69 - 133	20	4905
Antimony	EPA 6020	106%	121%	13	09-C18479	1.0	mg/L	70 - 130	20	4899
Arsenic	EPA 6020	103%	102%	1	09-C18479	1.0	mg/L	70 - 130	20	4899
Barium	EPA 6020	82%	99%	18	09-C18479	1.0	mg/L	75 - 125	20	4899
Beryllium	EPA 6020	85%	97%	13	09-C18479	1.0	mg/L	75 - 125	20	4899
Cadmium	EPA 6020	103%	102%	1	09-C18479	1.0	mg/L	75 - 125	20	4899
Chromium	EPA 6020	86%	100%	15	09-C18479	1.0	mg/L	75 - 125	20	4899
Cobalt	EPA 6020	91%	102%	11	09-C18479	1.0	mg/L	75 - 125	20	4899
Copper	EPA 6020	96%	100%	4	09-C18479	1.0	mg/L	75 - 125	20	4899
Lead	EPA 6020	89%	103%	15	09-C18479	1.0	mg/L	75 - 125	20	4899
Molybdenum	EPA 6020	92%	99%	7	09-C18479	1.0	mg/L	75 - 125	20	4899
Nickel	EPA 6020	91%	101%	11	09-C18479	1.0	mg/L	75 - 125	20	4899
Selenium	EPA 6020	100%	109%	8	09-C18479	4.0	mg/L	70 - 130	20	4899
Silver	EPA 6020	91%	99%	9	09-C18479	1.0	mg/L	70 - 130	20	4899
Thallium	EPA 6020	90%	101%	11	09-C18479	1.0	mg/L	70 - 130	20	4899

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Quality Control Results

Order No.: Q6697

Matrix Spike/Matrix Spike Duplicates

Analyte	Method	MS Rec.	MSD Rec.	RPD	Matrix Sample	Spike Amount	Units	Recovery Limits	RPD Limit	Batch
Vanadium	EPA 6020	95%	99%	4	09-C18479	1.0	mg/L	75 - 125	20	4899
Zinc	EPA 6020	94%	106%	12	09-C18479	1.0	mg/L	75 - 125	20	4899

Sample Duplicate

Analyte	Method	Sample ID	Sample Value	Sample Duplicate	RPD	Units	RPD Limit	Batch
TPH as Diesel, SGT	EPA 8015/LUFT	LCS	3.6	3.5	4	mg/L	30.	4913

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Surrogate Report

Sample Number	Batch	Method	Surrogate	% Recovery	QC Limits
09-C18477	4905	EPA 8260	Dibromofluoromethane	96.	81-123
09-C18477	4905	EPA 8260	Toluene-d8	98.	78-116
09-C18477	4905	EPA 8260	4-BFB	94.	60-116
09-C18477	4905	EPA 8260	1,2-Dichloroethane-d4	95.	79-124
09-C18478	4905	EPA 8260	Dibromofluoromethane	102.	81-123
09-C18478	4905	EPA 8260	Toluene-d8	96.	78-116
09-C18478	4905	EPA 8260	4-BFB	95.	60-116
09-C18478	4905	EPA 8260	1,2-Dichloroethane-d4	106.	79-124
09-C18478	4913	EPA 8015M/LUFT DRO	Hexacosane (AQ/SGT)	103.	50-150
09-C18479	4905	EPA 8260	Dibromofluoromethane	101.	81-123
09-C18479	4905	EPA 8260	Toluene-d8	95.	78-116
09-C18479	4905	EPA 8260	4-BFB	93.	60-116
09-C18479	4905	EPA 8260	1,2-Dichloroethane-d4	106.	79-124
09-C18479	4913	EPA 8015M/LUFT DRO	Hexacosane (AQ/SGT)	82.	50-150
09-C18480	4905	EPA 8260	Dibromofluoromethane	102.	81-123
09-C18480	4905	EPA 8260	Toluene-d8	97.	78-116
09-C18480	4905	EPA 8260	4-BFB	97.	60-116
09-C18480	4905	EPA 8260	1,2-Dichloroethane-d4	109.	79-124
09-C18480	4913	EPA 8015M/LUFT DRO	Hexacosane (AQ/SGT)	78.	50-150
blank	4905	EPA 8260	Dibromofluoromethane	95.	81-123
LCS	4905	EPA 8260	Dibromofluoromethane	95.	81-123
09-C18478 MS	4905	EPA 8260	Dibromofluoromethane	100.	81-123
09C18478 MSD	4905	EPA 8260	Dibromofluoromethane	101.	81-123
blank	4905	EPA 8260	Toluene-d8	98.	78-116
LCS	4905	EPA 8260	Toluene-d8	100.	78-116
09-C18478 MS	4905	EPA 8260	Toluene-d8	100.	78-116
09C18478 MSD	4905	EPA 8260	Toluene-d8	100.	78-116
blank	4905	EPA 8260	4-BFB	95.	60-116
LCS	4905	EPA 8260	4-BFB	100.	60-116
09-C18478 MS	4905	EPA 8260	4-BFB	96.	60-116
09C18478 MSD	4905	EPA 8260	4-BFB	98.	60-116
blank	4905	EPA 8260	1,2-Dichloroethane-d4	90.	79-124
LCS	4905	EPA 8260	1,2-Dichloroethane-d4	87.	79-124
09-C18478 MS	4905	EPA 8260	1,2-Dichloroethane-d4	98.	79-124
09C18478 MSD	4905	EPA 8260	1,2-Dichloroethane-d4	97.	79-124
blank	4913	EPA 8015M/LUFT DRO	Hexacosane (AQ/SGT)	84.	50-150
LCS	4913	EPA 8015M/LUFT DRO	Hexacosane (AQ/SGT)	96.	50-150
LCS dup.	4913	EPA 8015M/LUFT DRO	Hexacosane (AQ/SGT)	88.	50-150

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CHAIN-OF-CUSTODY RECORD

Q6700 OAK 16148

PROJECT NAME: MARSH LANDING

PROJECT NUMBER: 15317.000

RESULTS TO: jonathan.skaggs@amec.com

TURNAROUND TIME: 4 Day

SAMPLE SHIPMENT METHOD: FedEx

LABORATORY NAME: Green Environmental

LABORATORY ADDRESS: San Luis Obispo

LABORATORY CONTACT: Judy

LABORATORY PHONE NUMBER:

CLIENT INFORMATION:

DATE: 12/15/09 PAGE 1 OF 1

REPORTING REQUIREMENTS:

GEOTRACKER REQUIRED YES NO

SITE SPECIFIC GLOBAL ID NO.

SAMPLERS (SIGNATURE):

ANALYSES

DATE	TIME	SAMPLE NUMBER	VOCs by 8260B	Total Lead 8015M	TPHmo by 8015M	Silica Gel Cleanup	Title 22 Metals	Mercury 7471A	PCBs by 8082	CONTAINER TYPE AND SIZE	Soil (S), Water (W), Vapor (V), or Other (O)	Filtered	Preservative Type	Cooled	MS/MSD	No. of Containers	ADDITIONAL COMMENTS
12/15/09	1705	SB-1-GW	X	X	X	X	X	X		40mL VOA, Amber, Poly	W	→	See Comment	Y	N	5	metals field filtered 18493
12/15/09	1755	SB-7-GW	X	X	X	X	X	X	X	40mL VOA, Amber, Poly	W	→	See Comment	Y	N	6	metals field filtered 18494

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
SIGNATURE:	12/15/09	1800	SIGNATURE: Kathy Wenstroff	12/16/09	11:05
PRINTED NAME: Tiffany Klitzke			PRINTED NAME: Kathy Wenstroff		
COMPANY: AMEC Geomatrix			COMPANY: Green Env. Lab		
SIGNATURE:			SIGNATURE:		
PRINTED NAME:			PRINTED NAME:		
COMPANY:			COMPANY:		
SIGNATURE:			SIGNATURE:		
PRINTED NAME:			PRINTED NAME:		
COMPANY:			COMPANY:		

TOTAL NUMBER OF CONTAINERS: 11

SAMPLING COMMENTS: Please send results to jonathan.skaggs@amec.com, and Heidi.Dietrich@amec.com. Preservation for the bottles is 40mL VOAs with HCl, 1L AMBERS with NO preservative, 250mL Polys with HNO3.

2101 Webster Street, 12th Floor
Oakland, California 94612-3066
Tel 510.663.4100 Fax 510.663.4141

amec

Custody Seal opened 12/16/09 11:05 KEW 3.8 Temp

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Date: December 22, 2009

CASE NARRATIVE Q6700

Client: **Amec Geomatrix**
Project: **PG&E Marsh Landing**
Sample(s): **09-C18493 to 09-C18494**
Sampled: **12/15/09** **Received: 12/16/09**

Samples 09-C18493 to 09-C18494 were received at the laboratory at 3.8 °C with no anomaly except for the following remarks:

- PCBs analysis was subcontracted to American Scientific Laboratories.

Diesel range (C10-C25) and motor oil range (C25-C40) petroleum hydrocarbons (TPH) were extracted by separatory funnel method (EPA 3510C) and the extracts were treated with silica gel cleanup (EPA 3630C) prior to analysis by GC/FID (EPA 8015M).

Volatile organic compounds were extracted by purge-and-trap method (EPA 5030B) and analyzed by GC/MS (EPA 8260B).

CAM metals were digested by EPA 3010A method and analyzed by ICP-MS (EPA 6020), except for mercury, which was analyzed by CVAAS method (EPA 7470A).

All samples were extracted and analyzed within holding time. All analytical quality control parameters were within acceptable limits and there was no analytical anomaly except for the following remarks:

- TPH surrogate recovery for sample 09-C18494 was below QC limit due to matrix effects. TPH-diesel and TPH-motor oil were not detected in the sample.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18493
Order: Q6700
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-1-GW	Tiffany Klitzke	12/15/09@17:05	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.0005	1	mg/L	EPA 7470	12/18/09	12/18/09	4864
TPH as Diesel, SGT	Not Detected	0.05	1	mg/L	EPA 8015/LUFT	12/21/09	12/16/09	4908
TPH as Motor Oil, SGT	Not Detected	0.1	1	mg/L	EPA 8015/LUFT	12/21/09	12/16/09	4908
Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Toluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Ethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
m,p-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
o-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Methyl t-Butyl Ether (MTBE)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Chlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,3-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,4-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2-Dichloroethane (EDC)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2-Dibromoethane (EDB)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Bromobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Bromochloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Bromodichloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Bromoform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Bromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
n-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
sec-Butyl Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
t-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Carbon Tetrachloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Chloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
2-Chloroethylvinyl ether	Not Detected	20	1	ug/L	EPA 8260	12/21/09		4909
Chloroform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Chloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
2-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909

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REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-1-GW	Tiffany Klitzke	12/15/09@17:05	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
4-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2-Dibromo-3-Chloropropane	Not Detected	1	1	ug/L	EPA 8260	12/21/09		4909
Dibromochloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Dibromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Dichlorodifluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1-Dichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
cis-1,2-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
trans-1,2-Dichloethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,3-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
2,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
cis-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
trans-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Hexachlorobutadiene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Isopropylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
4-Isopropyltoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Methylene Chloride	Not Detected	5	1	ug/L	EPA 8260	12/21/09		4909
Naphthalene	Not Detected	5	1	ug/L	EPA 8260	12/21/09		4909
n-Propylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Styrene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1,1,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1,2,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Tetrachloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2,3-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2,4-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1,1-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1,2-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909

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Jonathan Skaggs
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2101 Webster St.
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Log Number: 09-C18493
Order: Q6700
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-1-GW	Tiffany Klitzke	12/15/09@17:05	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Trichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Trichlorofluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2,3-Trichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2,4-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,3,5-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Vinyl Chloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Antimony	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Arsenic	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Barium	0.074	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Beryllium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Cadmium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Chromium	0.013	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Cobalt	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Copper	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Lead	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Molybdenum	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Nickel	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Selenium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Silver	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Thallium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Vanadium	Not Detected	0.01	2	mg/L	EPA 6020	12/21/09	12/18/09	4899
Zinc	Not Detected	0.08	1	mg/L	EPA 6020	12/21/09	12/18/09	4899

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch

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Lab Director, Michael Ng

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REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-7-GW	Tiffany Klitzke	12/15/09@17:55	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.0005	1	mg/L	EPA 7470	12/18/09	12/18/09	4864
TPH as Diesel, SGT <0.05 UJ	Not Detected	0.05	1	mg/L	EPA 8015/LUFT	12/21/09	12/16/09	4908
TPH as Motor Oil, SGT <0.1 UJ	Not Detected	0.1	1	mg/L	EPA 8015/LUFT	12/21/09	12/16/09	4908
Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Toluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Ethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
m,p-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
o-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Methyl t-Butyl Ether (MTBE)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Chlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,3-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,4-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2-Dichloroethane (EDC)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2-Dibromoethane (EDB)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Bromobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Bromochloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Bromodichloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Bromoform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Bromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
n-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
sec-Butyl Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
t-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Carbon Tetrachloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Chloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
2-Chloroethylvinyl ether	Not Detected	20	1	ug/L	EPA 8260	12/21/09		4909
Chloroform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Chloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
2-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909

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REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-7-GW	Tiffany Klitzke	12/15/09@17:55	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
4-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2-Dibromo-3-Chloropropane	Not Detected	1	1	ug/L	EPA 8260	12/21/09		4909
Dibromochloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Dibromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Dichlorodifluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1-Dichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
cis-1,2-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
trans-1,2-Dichloethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,3-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
2,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
cis-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
trans-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Hexachlorobutadiene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Isopropylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
4-Isopropyltoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Methylene Chloride	Not Detected	5	1	ug/L	EPA 8260	12/21/09		4909
Naphthalene	Not Detected	5	1	ug/L	EPA 8260	12/21/09		4909
n-Propylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Styrene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1,1,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1,2,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Tetrachloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2,3-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2,4-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1,1-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,1,2-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909

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SB-7-GW	Tiffany Klitzke	12/15/09@17:55	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Trichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Trichlorofluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2,3-Trichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,2,4-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
1,3,5-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Vinyl Chloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		4909
Antimony	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Arsenic	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Barium	0.051	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Beryllium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Cadmium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Chromium	0.021	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Cobalt	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Copper	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Lead	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Molybdenum	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Nickel	0.008	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Selenium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Silver	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Thallium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Vanadium	0.019	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	4899
Zinc	Not Detected	0.08	1	mg/L	EPA 6020	12/21/09	12/18/09	4899

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18494
Order: Q6700
Project: Marsh Landing
Received: 12/16/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-7-GW	Tiffany Klitzke	12/15/09@17:55	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Order No.: Q6700
Laboratory Reagent Blank

Analyte	Method	Results	Units	Batch
Mercury	EPA 7470	< 0.0005	mg/L	4864
TPH as Diesel, SGT	EPA 8015/LUFT	< 0.05	mg/L	4908
TPH as Motor Oil, SGT	EPA 8015/LUFT	< 0.1	mg/L	4908
Benzene	EPA 8260	< 0.5	ug/L	4909
Toluene	EPA 8260	< 0.5	ug/L	4909
Ethylbenzene	EPA 8260	< 0.5	ug/L	4909
m,p-Xylene	EPA 8260	< 0.5	ug/L	4909
o-Xylene	EPA 8260	< 0.5	ug/L	4909
Methyl t-Butyl Ether (MTBE)	EPA 8260	< 0.5	ug/L	4909
Chlorobenzene	EPA 8260	< 0.5	ug/L	4909
1,2-Dichlorobenzene	EPA 8260	< 0.5	ug/L	4909
1,3-Dichlorobenzene	EPA 8260	< 0.5	ug/L	4909
1,4-Dichlorobenzene	EPA 8260	< 0.5	ug/L	4909
1,2-Dichloroethane (EDC)	EPA 8260	< 0.5	ug/L	4909
1,2-Dibromoethane (EDB)	EPA 8260	< 0.5	ug/L	4909
Bromobenzene	EPA 8260	< 0.5	ug/L	4909
Bromochloromethane	EPA 8260	< 0.5	ug/L	4909
Bromodichloromethane	EPA 8260	< 0.5	ug/L	4909
Bromoform	EPA 8260	< 0.5	ug/L	4909
Bromomethane	EPA 8260	< 0.5	ug/L	4909
n-Butylbenzene	EPA 8260	< 0.5	ug/L	4909
sec-Butyl Benzene	EPA 8260	< 0.5	ug/L	4909
t-Butylbenzene	EPA 8260	< 0.5	ug/L	4909
Carbon Tetrachloride	EPA 8260	< 0.5	ug/L	4909
Chloroethane	EPA 8260	< 0.5	ug/L	4909
2-Chloroethylvinyl ether	EPA 8260	< 20	ug/L	4909
Chloroform	EPA 8260	< 0.5	ug/L	4909
Chloromethane	EPA 8260	< 0.5	ug/L	4909
2-Chlorotoluene	EPA 8260	< 0.5	ug/L	4909
4-Chlorotoluene	EPA 8260	< 0.5	ug/L	4909
1,2-Dibromo-3-Chloropropane	EPA 8260	< 1	ug/L	4909
Dibromochloromethane	EPA 8260	< 0.5	ug/L	4909
Dibromomethane	EPA 8260	< 0.5	ug/L	4909
Dichlorodifluoromethane	EPA 8260	< 0.5	ug/L	4909
1,1-Dichloroethane	EPA 8260	< 0.5	ug/L	4909
1,1-Dichloroethene	EPA 8260	< 0.5	ug/L	4909
cis-1,2-Dichloroethene	EPA 8260	< 0.5	ug/L	4909
trans-1,2-Dichloethene	EPA 8260	< 0.5	ug/L	4909
1,2-Dichloropropane	EPA 8260	< 0.5	ug/L	4909
1,3-Dichloropropane	EPA 8260	< 0.5	ug/L	4909
2,2-Dichloropropane	EPA 8260	< 0.5	ug/L	4909
1,1-Dichloropropene	EPA 8260	< 0.5	ug/L	4909
cis-1,3-Dichloropropene	EPA 8260	< 0.5	ug/L	4909
trans-1,3-Dichloropropene	EPA 8260	< 0.5	ug/L	4909
Hexachlorobutadiene	EPA 8260	< 0.5	ug/L	4909

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Quality Control Results

Order No.: Q6700

Laboratory Reagent Blank (continued)

Analyte	Method	Result	Units	Batch
Isopropylbenzene	EPA 8260	< 0.5	ug/L	4909
4-Isopropyltoluene	EPA 8260	< 0.5	ug/L	4909
Methylene Chloride	EPA 8260	< 5	ug/L	4909
Naphthalene	EPA 8260	< 5	ug/L	4909
n-Propylbenzene	EPA 8260	< 0.5	ug/L	4909
Styrene	EPA 8260	< 0.5	ug/L	4909
1,1,1,2-Tetrachloroethane	EPA 8260	< 0.5	ug/L	4909
1,1,2,2-Tetrachloroethane	EPA 8260	< 0.5	ug/L	4909
Tetrachloroethene	EPA 8260	< 0.5	ug/L	4909
1,2,3-Trichlorobenzene	EPA 8260	< 0.5	ug/L	4909
1,2,4-Trichlorobenzene	EPA 8260	< 0.5	ug/L	4909
1,1,1-Trichloroethane	EPA 8260	< 0.5	ug/L	4909
1,1,2-Trichloroethane	EPA 8260	< 0.5	ug/L	4909
Trichloroethene	EPA 8260	< 0.5	ug/L	4909
Trichlorofluoromethane	EPA 8260	< 0.5	ug/L	4909
1,2,3-Trichloropropane	EPA 8260	< 0.5	ug/L	4909
1,2,4-Trimethylbenzene	EPA 8260	< 0.5	ug/L	4909
1,3,5-Trimethylbenzene	EPA 8260	< 0.5	ug/L	4909
Vinyl Chloride	EPA 8260	< 0.5	ug/L	4909
Antimony	EPA 6020	< 0.008	mg/L	4899
Arsenic	EPA 6020	< 0.008	mg/L	4899
Barium	EPA 6020	< 0.008	mg/L	4899
Beryllium	EPA 6020	< 0.008	mg/L	4899
Cadmium	EPA 6020	< 0.008	mg/L	4899
Chromium	EPA 6020	< 0.008	mg/L	4899
Cobalt	EPA 6020	< 0.008	mg/L	4899
Copper	EPA 6020	< 0.008	mg/L	4899
Lead	EPA 6020	< 0.008	mg/L	4899
Molybdenum	EPA 6020	< 0.008	mg/L	4899
Nickel	EPA 6020	< 0.008	mg/L	4899
Selenium	EPA 6020	< 0.008	mg/L	4899
Silver	EPA 6020	< 0.008	mg/L	4899
Thallium	EPA 6020	< 0.008	mg/L	4899
Vanadium	EPA 6020	< 0.008	mg/L	4899
Zinc	EPA 6020	< 0.08	mg/L	4899

Laboratory Known Analysis (LCS)

Analyte	Method	Recovery	Spike Amount	Units	Recovery Limits	Batch
Mercury	EPA 7470	104%	0.0050	mg/L	70 - 130	4864
TPH as Diesel, SGT	EPA 8015/LUFT	71%	5.0	mg/L	50 - 150	4908
Benzene	EPA 8260	107%	10	ug/L	80 - 120	4909
Toluene	EPA 8260	109%	10	ug/L	80 - 120	4909

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Quality Control Results

Order No.: Q6700

Laboratory Known Analysis (LCS)

Analyte	Method	Recovery	Spike Amount	Units	Recovery Limits	Batch
Chlorobenzene	EPA 8260	109%	10	ug/L	81 - 115	4909
1,1-Dichloroethene	EPA 8260	106%	10	ug/L	63 - 129	4909
Trichloroethene	EPA 8260	109%	10	ug/L	77 - 117	4909
Antimony	EPA 6020	122%	1.0	mg/L	70 - 130	4899
Arsenic	EPA 6020	96%	1.0	mg/L	70 - 130	4899
Barium	EPA 6020	101%	1.0	mg/L	75 - 125	4899
Beryllium	EPA 6020	101%	1.0	mg/L	75 - 125	4899
Cadmium	EPA 6020	105%	1.0	mg/L	75 - 125	4899
Chromium	EPA 6020	105%	1.0	mg/L	75 - 125	4899
Cobalt	EPA 6020	106%	1.0	mg/L	75 - 125	4899
Copper	EPA 6020	107%	1.0	mg/L	75 - 125	4899
Lead	EPA 6020	105%	1.0	mg/L	75 - 125	4899
Molybdenum	EPA 6020	97%	1.0	mg/L	75 - 125	4899
Nickel	EPA 6020	101%	1.0	mg/L	75 - 125	4899
Selenium	EPA 6020	106%	4.0	mg/L	70 - 130	4899
Silver	EPA 6020	102%	1.0	mg/L	70 - 130	4899
Thallium	EPA 6020	103%	1.0	mg/L	70 - 130	4899
Vanadium	EPA 6020	103%	1.0	mg/L	75 - 125	4899
Zinc	EPA 6020	108%	1.0	mg/L	75 - 125	4899

Matrix Spike/Matrix Spike Duplicates

Analyte	Method	MS Rec.	MSD Rec.	RPD	Matrix Sample	Spike Amount	Units	Recovery Limits	RPD Limit	Batch
Mercury	EPA 7470	100%	98%	2	09-C18480	0.0050	mg/L	70 - 130	20	4864
Antimony	EPA 6020	106%	121%	13	09-C18479	1.0	mg/L	70 - 130	20	4899
Arsenic	EPA 6020	103%	102%	1	09-C18479	1.0	mg/L	70 - 130	20	4899
Barium	EPA 6020	82%	99%	18	09-C18479	1.0	mg/L	75 - 125	20	4899
Beryllium	EPA 6020	85%	97%	13	09-C18479	1.0	mg/L	75 - 125	20	4899
Cadmium	EPA 6020	103%	102%	1	09-C18479	1.0	mg/L	75 - 125	20	4899
Chromium	EPA 6020	86%	100%	15	09-C18479	1.0	mg/L	75 - 125	20	4899
Cobalt	EPA 6020	91%	102%	11	09-C18479	1.0	mg/L	75 - 125	20	4899
Copper	EPA 6020	96%	100%	4	09-C18479	1.0	mg/L	75 - 125	20	4899
Lead	EPA 6020	89%	103%	15	09-C18479	1.0	mg/L	75 - 125	20	4899
Molybdenum	EPA 6020	92%	99%	7	09-C18479	1.0	mg/L	75 - 125	20	4899
Nickel	EPA 6020	91%	101%	11	09-C18479	1.0	mg/L	75 - 125	20	4899
Selenium	EPA 6020	100%	109%	8	09-C18479	4.0	mg/L	70 - 130	20	4899
Silver	EPA 6020	91%	99%	9	09-C18479	1.0	mg/L	70 - 130	20	4899
Thallium	EPA 6020	90%	101%	11	09-C18479	1.0	mg/L	70 - 130	20	4899
Vanadium	EPA 6020	95%	99%	4	09-C18479	1.0	mg/L	75 - 125	20	4899
Zinc	EPA 6020	94%	106%	12	09-C18479	1.0	mg/L	75 - 125	20	4899

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Quality Control Results

Order No.: Q6700

Sample Duplicate

Analyte	Method	Sample ID	Sample Value	Sample Duplicate	RPD	Units	RPD Limit	Batch
TPH as Diesel, SGT	EPA 8015/LUFT	LCS	3.5	3.5	1	mg/L	30.	4908
Benzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Toluene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Ethylbenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
m,p-Xylene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
o-Xylene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Methyl t-Butyl Ether (MTBE)	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	30.	4909
Chlorobenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,2-Dichlorobenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,3-Dichlorobenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,4-Dichlorobenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,2-Dichloroethane (EDC)	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,2-Dibromoethane (EDB)	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Bromobenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Bromochloromethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Bromodichloromethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Bromoform	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Bromomethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	30.	4909
n-Butylbenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
sec-Butyl Benzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
t-Butylbenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Carbon Tetrachloride	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Chloroethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	30.	4909
2-Chloroethylvinyl ether	EPA 8260	09-C18493	< 20	< 20	0	ug/L	40.	4909
Chloroform	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Chloromethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	30.	4909
2-Chlorotoluene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
4-Chlorotoluene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,2-Dibromo-3-Chloropropane	EPA 8260	09-C18493	< 1	< 1	0	ug/L	30.	4909
Dibromochloromethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Dibromomethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Dichlorodifluoromethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	30.	4909
1,1-Dichloroethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,1-Dichloroethene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
cis-1,2-Dichloroethene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
trans-1,2-Dichloethene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,2-Dichloropropane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,3-Dichloropropane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
2,2-Dichloropropane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,1-Dichloropropene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
cis-1,3-Dichloropropene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
trans-1,3-Dichloropropene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Hexachlorobutadiene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	30.	4909
Isopropylbenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909

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Quality Control Results

Order No.: Q6700

Sample Duplicate

Analyte	Method	Sample ID	Sample Value	Sample Duplicate	RPD	Units	RPD Limit	Batch
4-Isopropyltoluene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Methylene Chloride	EPA 8260	09-C18493	< 5	< 5	0	ug/L	30.	4909
Naphthalene	EPA 8260	09-C18493	< 5	< 5	0	ug/L	30.	4909
n-Propylbenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Styrene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,1,1,2-Tetrachloroethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,1,2,2-Tetrachloroethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Tetrachloroethene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,2,3-Trichlorobenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	30.	4909
1,2,4-Trichlorobenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	30.	4909
1,1,1-Trichloroethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,1,2-Trichloroethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Trichloroethene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Trichlorofluoromethane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	30.	4909
1,2,3-Trichloropropane	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	30.	4909
1,2,4-Trimethylbenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
1,3,5-Trimethylbenzene	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	20.	4909
Vinyl Chloride	EPA 8260	09-C18493	< 0.5	< 0.5	0	ug/L	30.	4909

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Surrogate Report

Sample Number	Batch	Method	Surrogate	% Recovery	QC Limits
09-C18493	4909	EPA 8260	Dibromofluoromethane	103.	81-123
09-C18493	4909	EPA 8260	Toluene-d8	96.	78-116
09-C18493	4909	EPA 8260	4-BFB	94.	60-116
09-C18493	4909	EPA 8260	1,2-Dichloroethane-d4	108.	79-124
09-C18493	4908	EPA 8015M/LUFT DRO	Hexacosane (AQ/SGT)	76.	50-150
09-C18494	4909	EPA 8260	Dibromofluoromethane	104.	81-123
09-C18494	4909	EPA 8260	Toluene-d8	96.	78-116
09-C18494	4909	EPA 8260	4-BFB	95.	60-116
09-C18494	4909	EPA 8260	1,2-Dichloroethane-d4	110.	79-124
09-C18494	4908	EPA 8015M/LUFT DRO	Hexacosane (AQ/SGT)	36.	50-150
blank	4909	EPA 8260	Dibromofluoromethane	104.	81-123
LCS	4909	EPA 8260	Dibromofluoromethane	99.	81-123
09-C18493 dup.	4909	EPA 8260	Dibromofluoromethane	107.	81-123
blank	4909	EPA 8260	Toluene-d8	96.	78-116
LCS	4909	EPA 8260	Toluene-d8	100.	78-116
09-C18493 dup.	4909	EPA 8260	Toluene-d8	95.	78-116
blank	4909	EPA 8260	4-BFB	96.	60-116
LCS	4909	EPA 8260	4-BFB	97.	60-116
09-C18493 dup.	4909	EPA 8260	4-BFB	92.	60-116
blank	4909	EPA 8260	1,2-Dichloroethane-d4	109.	79-124
LCS	4909	EPA 8260	1,2-Dichloroethane-d4	96.	79-124
09-C18493 dup.	4909	EPA 8260	1,2-Dichloroethane-d4	115.	79-124
blank	4908	EPA 8015M/LUFT DRO	Hexacosane (AQ/SGT)	83.	50-150
LCS	4908	EPA 8015M/LUFT DRO	Hexacosane (AQ/SGT)	88.	50-150
LCS dup.	4908	EPA 8015M/LUFT DRO	Hexacosane (AQ/SGT)	93.	50-150

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ANALYTICAL RESULTS

Ordered By

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Attn: Orval Osborne

Page: 2
Project ID: Q6700

ASL Job Number	Submitted	Client
44144	12/17/2009	CREEK

Method: 8082, Polychlorinated Biphenyls(PCBs) by Gas Chromatography

QC Batch No: 122109-1

Our Lab I.D.		246409				
Client Sample I.D.		(18494) SB-7-GW				
Date Sampled		12/15/2009				
Date Prepared		12/21/2009				
Preparation Method						
Date Analyzed		12/21/2009				
Matrix		Groundwater				
Units		ug/L				
Dilution Factor		1				
Analytes	PQL	Results				
Aroclor-1016 (PCB-1016)	0.650	ND				
Aroclor-1221 (PCB-1221)	1.00	ND				
Aroclor-1232 (PCB-1232)	0.650	ND				
Aroclor-1242 (PCB-1242)	0.650	ND				
Aroclor-1248 (PCB-1248)	0.650	ND				
Aroclor-1254 (PCB-1254)	0.650	ND				
Aroclor-1260 (PCB-1260)	0.650	ND				

Our Lab I.D.		246409				
Surrogates	% Rec Limit	% Rec.				
Surrogate Percent Recovery						
Decachlorobiphenyl	43-169	71				

QUALITY CONTROL REPORT

QC Batch No: 122109-1

Analytes	LCS % REC	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit					
Aroclor-1260 (PCB-1260)	108	105	2.8	39-150	<30					

Creek Environmental Laboratories, Inc.

Chain-of-Custody

141 Suburban Road, Suite C-5, San Luis Obispo, CA 93401 phone (805) 545-9838 fax (805) 545-0107 www.creeklabs.com sales@creeklabs.com

Order # Q6808

- Please Print in Pen

☐ DW EDT ☐ LUFT EDF ☐ Custom EDD

Client Name AMEC / GEOMATRIX	**Contact** JONATHAN SKAGGS	**Phone** 510-663-4104	**Due Date:** 12-29-9 FIRM 24Hr 48Hr Other Normal TAT
Address City State Zip		Fax	Cell Beeper
Project Name/Number MARSH LANDING		PO# 15317.000	Copies To:
Bill to: (if different from above) AMEC - SKAGGS	Address	City	State Zip
Sampler Name (Print) TIFFANY KLITZKE	Comments:		**Matrix Key:** DW = Drinking Water AQ = Aqueous SL = Soil/Solid

Sample Description	Date/Time Sampled	Analysis	Matrix	# of Bottles	Preservative / Type Bottles	Creek Lab Sample #
SB-1-GW (18493)	12-15-09 1705	Be, Cd, Co, Cu, Pb, Se, Ag, Tl by 200.8	Ag	1	250 P HNO_3	18811
SB-7-GW (18494)	12-15-09 1755	"	"	1	"	18812
SB-3-GW (18478)	12-15-09 1420	"	"	1	"	18813
SB-2-GW (18479)	12-15-09 1445	"	"	1	"	18814
SB-20-GW (18480)	12-15-09 1500	"	"	1	"	18815

RELINQUISHED BY (Sign)	(Print)	(Organization)	DATE/TIME	RECEIVED BY (Sign)	(Print)	(Organization)
			12-23-9 1000	[signature]	J. WENSLOFF	Creek Environmental Laboratories, Inc.

FOR LAB USE ONLY: Shipping Method: Client/ Lab/ Courier: IN HOUSE — Sample Conditions: **Temp:** _____ Intact: Y/ N Custody Sealed: Y/ N

REMARKS per e-mail from Jonathan 12/22/9 (attached)

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Date: December 29, 2009

CASE NARRATIVE Q6808

Client: **Amec Geomatrix**
Project: **PG&E Marsh Landing**
Sample(s): **09-C18811 to 09-C18815**
Sampled: **12/15/09** **Received: 12/16/09**

Samples 09-C18811 to 09-C18815 were received at the laboratory at 3.8 °C with no anomaly except for the following remarks:

- Metals analysis was requested as additional analysis per an e-mail received from Jonathan Skaggs on 12-22-09.

The samples were digested and analyzed following method EPA 200.8 (ICP-MS), except for the mercury which was analyzed by method EPA 7471A (CVAAS).

All samples were extracted and analyzed within holding time. All analytical quality control parameters were within acceptable limits. There was no analytical anomaly except for the above comments and the following remarks:

- Beryllium was reported with a Detection Limit for Reporting (DLR) of 0.0005 mg/L. This is below our Limit of Quantitation (LOQ) of 0.001 mg/L, but above the Limit of Detection (LOD) which is 0.0001 mg/L.
- Cadmium was reported with a DLR of 0.0002 mg/L. This is below the LOQ of 0.001 mg/L, and right at the LOD of 0.0002 mg/L.
- Silver was reported with a DLR of 0.0001 mg/L. This is below the LOQ of 0.001 mg/L, and right at the LOD which is 0.0001 mg/L.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18813
Order: Q6808
Project: Marsh Landing
Received: 12/23/09
Printed: 12/29/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-3-GW (18478)	Tiffany Klitzke	12/15/09@14:20	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batc
Mercury	Not Detected	0.0002	1	mg/L	EPA 7470	12/18/09		509
Beryllium	Not Detected	0.0005 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Cadmium	Not Detected	0.0002 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Cobalt	0.003	0.002	2	mg/L	EPA 200.8	12/28/09	12/28/09	504
Copper	0.006	0.002	2	mg/L	EPA 200.8	12/28/09	12/28/09	504
Lead	0.002	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Selenium	Not Detected	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Silver	Not Detected	0.0001 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Thallium	Not Detected	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18814
Order: Q6808
Project: Marsh Landing
Received: 12/23/09
Printed: 12/29/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-2-GW (18479)	Tiffany Klitzke	12/15/09@14:45	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.0002	1	mg/L	EPA 7470	12/18/09		509
Beryllium	Not Detected	0.0005 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Cadmium	Not Detected	0.0002 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Cobalt	0.001	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Copper	Not Detected	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Lead	Not Detected	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Selenium	Not Detected	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Silver	Not Detected	0.0001 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Thallium	Not Detected	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18811
Order: Q6808
Project: Marsh Landing
Received: 12/23/09
Printed: 12/29/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-1-GW (18493)	Tiffany Klitzke	12/15/09@17:05	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batc
Mercury	Not Detected	0.0002	1	mg/L	EPA 7470	12/18/09		509
Beryllium	Not Detected	0.0005 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Cadmium	Not Detected	0.0002 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Cobalt	Not Detected	0.002	2	mg/L	EPA 200.8	12/28/09	12/28/09	504
Copper	0.005	0.002	2	mg/L	EPA 200.8	12/28/09	12/28/09	504
Lead	0.003	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Selenium	Not Detected	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Silver	Not Detected	0.0001 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Thallium	Not Detected	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18812
Order: Q6808
Project: Marsh Landing
Received: 12/23/09
Printed: 12/29/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-7-GW (18494)	Tiffany Klitzke	12/15/09@17:55	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected	0.0002	1	mg/L	EPA 7470	12/18/09		509
Beryllium	Not Detected	0.0005 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Cadmium	Not Detected	0.0002 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Cobalt	Not Detected	0.002	2	mg/L	EPA 200.8	12/28/09	12/28/09	504
Copper	0.002	0.002	2	mg/L	EPA 200.8	12/28/09	12/28/09	504
Lead	0.001	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Selenium	0.003	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Silver	Not Detected	0.0001 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Thallium	Not Detected	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18815
Order: Q6808
Project: Marsh Landing
Received: 12/23/09
Printed: 12/29/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-20-GW (18480)	Tiffany Klitzke	12/15/09@15:00	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batc
Mercury	Not Detected	0.0002	1	mg/L	EPA 7470	12/18/09		509
Beryllium	Not Detected	0.0005 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Cadmium	Not Detected	0.0002 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Cobalt	0.001	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Copper	Not Detected	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Lead	Not Detected	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Selenium	Not Detected	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Silver	Not Detected	0.0001 <0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504
Thallium	Not Detected	0.001	1	mg/L	EPA 200.8	12/28/09	12/28/09	504

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Lab Director, Michael Ng

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Quality Control Results

Order No.: Q6808
Laboratory Reagent Blank

Analyte	Method	Results	Units	Batch
Mercury	EPA 7470	< 0.0002	mg/L	5092
Beryllium	EPA 200.8	< 0.0005	mg/L	5041
Cadmium	EPA 200.8	< 0.0002	mg/L	5041
Cobalt	EPA 200.8	< 0.001	mg/L	5041
Copper	EPA 200.8	< 0.001	mg/L	5041
Lead	EPA 200.8	< 0.001	mg/L	5041
Selenium	EPA 200.8	< 0.001	mg/L	5041
Silver	EPA 200.8	< 0.0001	mg/L	5041
Thallium	EPA 200.8	< 0.001	mg/L	5041

Laboratory Known Analysis (LCS)

Analyte	Method	Recovery	Spike Amount	Units	Recovery Limits	Batch
Mercury	EPA 7470	104%	0.0050	mg/L	70 - 130	5092
Beryllium	EPA 200.8	97%	0.1	mg/L	85 - 115	5041
Cadmium	EPA 200.8	102%	0.1	mg/L	85 - 115	5041
Cobalt	EPA 200.8	96%	0.1	mg/L	85 - 115	5041
Copper	EPA 200.8	98%	0.1	mg/L	85 - 115	5041
Lead	EPA 200.8	100%	0.1	mg/L	85 - 115	5041
Selenium	EPA 200.8	104%	0.5	mg/L	85 - 115	5041
Silver	EPA 200.8	101%	0.1	mg/L	85 - 115	5041
Thallium	EPA 200.8	94%	0.1	mg/L	85 - 115	5041

Matrix Spike/Matrix Spike Duplicates

Analyte	Method	MS Rec.	MSD Rec.	RPD	Matrix Sample	Spike Amount	Units	Recovery Limits	RPD Limit	Batch
Mercury	EPA 7470	100%	98%	2	09-C18815	0.0050	mg/L	70 - 130	20	5092
Beryllium	EPA 200.8	95%	93%	3	09-C18812	0.1	mg/L	70 - 130	20	5041
Cadmium	EPA 200.8	102%	102%	0	09-C18812	0.1	mg/L	70 - 130	20	5041
Cobalt	EPA 200.8	87%	87%	0	09-C18812	0.1	mg/L	70 - 130	20	5041
Copper	EPA 200.8	86%	87%	1	09-C18812	0.1	mg/L	70 - 130	20	5041
Lead	EPA 200.8	101%	102%	2	09-C18812	0.1	mg/L	70 - 130	20	5041
Selenium	EPA 200.8	103%	102%	0	09-C18812	0.5	mg/L	70 - 130	20	5041
Silver	EPA 200.8	99%	100%	1	09-C18812	0.1	mg/L	70 - 130	20	5041
Thallium	EPA 200.8	96%	98%	2	09-C18812	0.1	mg/L	70 - 130	20	5041

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CHAIN-OF-CUSTODY RECORD

CQ66665 16705

PROJECT NAME: MARSH LANDING

PROJECT NUMBER: 15317.000

RESULTS TO: jonathan.skaggs@amec.com; heidi.dietrich@amec.com

TURNAROUND TIME: 4 DAY

SAMPLE SHIPMENT METHOD: FED EX

LABORATORY NAME: Creek Environmental

LABORATORY ADDRESS: San Luis Obispo, CA

LABORATORY CONTACT: Judy

LABORATORY PHONE NUMBER:

CLIENT INFORMATION:

DATE: 12/14/09 PAGE 1 OF 1

REPORTING REQUIREMENTS:

GEOTRACKER REQUIRED YES NO

SITE SPECIFIC GLOBAL ID NO.

SAMPLERS (SIGNATURE):

ANALYSES

DATE	TIME	SAMPLE NUMBER	TPHd with silica gel	TPHmo with silica gel	VOCs by 8260B	Title 22 Metals 6010	Mercury 7471A	CONTAINER TYPE AND SIZE	Soil (S), Water (W), Vapor (V), or Other (O)	Filtered	Preservative Type	Cooled	MS/MSD	No. of Containers	ADDITIONAL COMMENTS
12/14/09	1135	SB-4-GW	X	X				1 L Amber	W	N	None	Y	N	1	A 18362
						X	X	250 mL POLY	W	Y	HNO_3	Y	N	1	B
					X			40mL VOA	W	N	HCl	Y	N	3	C, D, E

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
SIGNATURE:	12/14/09	1800	SIGNATURE: Cathy Wensloff	12/15/09	11:30
PRINTED NAME: Tiffany Klitzke			PRINTED NAME: Cathy Wensloff		
COMPANY: Amec Geomatrix			COMPANY: Creek Env Labs		
SIGNATURE:			SIGNATURE:		
PRINTED NAME:			PRINTED NAME:		
COMPANY:			COMPANY:		
SIGNATURE:			SIGNATURE:		
PRINTED NAME:			PRINTED NAME:		
COMPANY:			COMPANY:		

TOTAL NUMBER OF CONTAINERS: 5

SAMPLING COMMENTS: Please email results to jonathan.skaggs@amec.com and Heidi.dietrich@amec.com.

Custody Seal opened 12/15/09 10:36 KEW Temp. 1.0

amec

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18362
Order: Q6665
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-4-GW	Tiffany Klitzke	12/14/09@11:35	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batcl
Mercury	Not Detected	0.0005	1	mg/L	EPA 7470	12/18/09	12/18/09	486
TPH as Diesel, SGT	Not Detected	0.05	1	mg/L	EPA 8015/LUFT	12/21/09	12/16/09	490
TPH as Motor Oil, SGT	Not Detected	0.1	1	mg/L	EPA 8015/LUFT	12/21/09	12/16/09	490
Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Toluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Ethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
m,p-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
o-Xylene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Methyl t-Butyl Ether (MTBE)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Chlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
1,2-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
1,3-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
1,4-Dichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
1,2-Dichloroethane (EDC)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
1,2-Dibromoethane (EDB)	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Bromobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Bromochloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Bromodichloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Bromoform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Bromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
n-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
sec-Butyl Benzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
t-Butylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Carbon Tetrachloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Chloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
2-Chloroethylvinyl ether	Not Detected	20	1	ug/L	EPA 8260	12/21/09		490
Chloroform	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Chloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
2-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18362
Order: Q6665
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-4-GW	Tiffany Klitzke	12/14/09@11:35	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batcl
4-Chlorotoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
1,2-Dibromo-3-Chloropropane	Not Detected	1	1	ug/L	EPA 8260	12/21/09		490!
Dibromochloromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
Dibromomethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
Dichlorodifluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
1,1-Dichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
1,1-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
cis-1,2-Dichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
trans-1,2-Dichloethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
1,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
1,3-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
2,2-Dichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
1,1-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
cis-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
trans-1,3-Dichloropropene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
Hexachlorobutadiene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
Isopropylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
4-Isopropyltoluene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
Methylene Chloride	Not Detected	5	1	ug/L	EPA 8260	12/21/09		490!
Naphthalene	Not Detected	5	1	ug/L	EPA 8260	12/21/09		490!
n-Propylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
Styrene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
1,1,1,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
1,1,2,2-Tetrachloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
Tetrachloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
1,2,3-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
1,2,4-Trichlorobenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
1,1,1-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!
1,1,2-Trichloroethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490!

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18362
Order: Q6665
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-4-GW	Tiffany Klitzke	12/14/09@11:35	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batcl
Trichloroethene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Trichlorofluoromethane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
1,2,3-Trichloropropane	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
1,2,4-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
1,3,5-Trimethylbenzene	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Vinyl Chloride	Not Detected	0.5	1	ug/L	EPA 8260	12/21/09		490
Antimony	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Arsenic	0.021	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Barium	0.015	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Beryllium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Cadmium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Chromium	0.026	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Cobalt	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Copper	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Lead	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Molybdenum	0.017	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Nickel	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Selenium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Silver	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Thallium	Not Detected	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Vanadium	0.068	0.008	1	mg/L	EPA 6020	12/21/09	12/18/09	489
Zinc	Not Detected	0.08	1	mg/L	EPA 6020	12/21/09	12/18/09	489

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18362
Order: Q6665
Project: Marsh Landing
Received: 12/15/09
Printed: 12/22/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-4-GW	Tiffany Klitzke	12/14/09@11:35	Aqueous

Analyte	Result	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Quality Control Results

Order No.: Q6665
Laboratory Reagent Blank

Analyte	Method	Results	Units	Batch
Mercury	EPA 7470	< 0.0005	mg/L	4864
TPH as Diesel, SGT	EPA 8015/LUFT	< 0.05	mg/L	4908
TPH as Motor Oil, SGT	EPA 8015/LUFT	< 0.1	mg/L	4908
Benzene	EPA 8260	< 0.5	ug/L	4905
Toluene	EPA 8260	< 0.5	ug/L	4905
Ethylbenzene	EPA 8260	< 0.5	ug/L	4905
m,p-Xylene	EPA 8260	< 0.5	ug/L	4905
o-Xylene	EPA 8260	< 0.5	ug/L	4905
Methyl t-Butyl Ether (MTBE)	EPA 8260	< 0.5	ug/L	4905
Chlorobenzene	EPA 8260	< 0.5	ug/L	4905
1,2-Dichlorobenzene	EPA 8260	< 0.5	ug/L	4905
1,3-Dichlorobenzene	EPA 8260	< 0.5	ug/L	4905
1,4-Dichlorobenzene	EPA 8260	< 0.5	ug/L	4905
1,2-Dichloroethane (EDC)	EPA 8260	< 0.5	ug/L	4905
1,2-Dibromoethane (EDB)	EPA 8260	< 0.5	ug/L	4905
Bromobenzene	EPA 8260	< 0.5	ug/L	4905
Bromochloromethane	EPA 8260	< 0.5	ug/L	4905
Bromodichloromethane	EPA 8260	< 0.5	ug/L	4905
Bromoform	EPA 8260	< 0.5	ug/L	4905
Bromomethane	EPA 8260	< 0.5	ug/L	4905
n-Butylbenzene	EPA 8260	< 0.5	ug/L	4905
sec-Butyl Benzene	EPA 8260	< 0.5	ug/L	4905
t-Butylbenzene	EPA 8260	< 0.5	ug/L	4905
Carbon Tetrachloride	EPA 8260	< 0.5	ug/L	4905
Chloroethane	EPA 8260	< 0.5	ug/L	4905
2-Chloroethylvinyl ether	EPA 8260	< 20	ug/L	4905
Chloroform	EPA 8260	< 0.5	ug/L	4905
Chloromethane	EPA 8260	< 0.5	ug/L	4905
2-Chlorotoluene	EPA 8260	< 0.5	ug/L	4905
4-Chlorotoluene	EPA 8260	< 0.5	ug/L	4905
1,2-Dibromo-3-Chloropropane	EPA 8260	< 1	ug/L	4905
Dibromochloromethane	EPA 8260	< 0.5	ug/L	4905
Dibromomethane	EPA 8260	< 0.5	ug/L	4905
Dichlorodifluoromethane	EPA 8260	< 0.5	ug/L	4905
1,1-Dichloroethane	EPA 8260	< 0.5	ug/L	4905
1,1-Dichloroethene	EPA 8260	< 0.5	ug/L	4905
cis-1,2-Dichloroethene	EPA 8260	< 0.5	ug/L	4905
trans-1,2-Dichloethene	EPA 8260	< 0.5	ug/L	4905
1,2-Dichloropropane	EPA 8260	< 0.5	ug/L	4905
1,3-Dichloropropane	EPA 8260	< 0.5	ug/L	4905
2,2-Dichloropropane	EPA 8260	< 0.5	ug/L	4905
1,1-Dichloropropene	EPA 8260	< 0.5	ug/L	4905
cis-1,3-Dichloropropene	EPA 8260	< 0.5	ug/L	4905
trans-1,3-Dichloropropene	EPA 8260	< 0.5	ug/L	4905
Hexachlorobutadiene	EPA 8260	< 0.5	ug/L	4905

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Order No.: Q6665

Laboratory Reagent Blank (continued)

Analyte	Method	Result	Units	Batch
Isopropylbenzene	EPA 8260	< 0.5	ug/L	4905
4-Isopropyltoluene	EPA 8260	< 0.5	ug/L	4905
Methylene Chloride	EPA 8260	< 5	ug/L	4905
Naphthalene	EPA 8260	< 5	ug/L	4905
n-Propylbenzene	EPA 8260	< 0.5	ug/L	4905
Styrene	EPA 8260	< 0.5	ug/L	4905
1,1,1,2-Tetrachloroethane	EPA 8260	< 0.5	ug/L	4905
1,1,2,2-Tetrachloroethane	EPA 8260	< 0.5	ug/L	4905
Tetrachloroethene	EPA 8260	< 0.5	ug/L	4905
1,2,3-Trichlorobenzene	EPA 8260	< 0.5	ug/L	4905
1,2,4-Trichlorobenzene	EPA 8260	< 0.5	ug/L	4905
1,1,1-Trichloroethane	EPA 8260	< 0.5	ug/L	4905
1,1,2-Trichloroethane	EPA 8260	< 0.5	ug/L	4905
Trichloroethene	EPA 8260	< 0.5	ug/L	4905
Trichlorofluoromethane	EPA 8260	< 0.5	ug/L	4905
1,2,3-Trichloropropane	EPA 8260	< 0.5	ug/L	4905
1,2,4-Trimethylbenzene	EPA 8260	< 0.5	ug/L	4905
1,3,5-Trimethylbenzene	EPA 8260	< 0.5	ug/L	4905
Vinyl Chloride	EPA 8260	< 0.5	ug/L	4905
Antimony	EPA 6020	< 0.008	mg/L	4899
Arsenic	EPA 6020	< 0.008	mg/L	4899
Barium	EPA 6020	< 0.008	mg/L	4899
Beryllium	EPA 6020	< 0.008	mg/L	4899
Cadmium	EPA 6020	< 0.008	mg/L	4899
Chromium	EPA 6020	< 0.008	mg/L	4899
Cobalt	EPA 6020	< 0.008	mg/L	4899
Copper	EPA 6020	< 0.008	mg/L	4899
Lead	EPA 6020	< 0.008	mg/L	4899
Molybdenum	EPA 6020	< 0.008	mg/L	4899
Nickel	EPA 6020	< 0.008	mg/L	4899
Selenium	EPA 6020	< 0.008	mg/L	4899
Silver	EPA 6020	< 0.008	mg/L	4899
Thallium	EPA 6020	< 0.008	mg/L	4899
Vanadium	EPA 6020	< 0.008	mg/L	4899
Zinc	EPA 6020	< 0.08	mg/L	4899

Laboratory Known Analysis (LCS)

Analyte	Method	Recovery	Spike Amount	Units	Recovery Limits	Batch
Mercury	EPA 7470	104%	0.0050	mg/L	70 - 130	4864
TPH as Diesel, SGT	EPA 8015/LUFT	71%	5.0	mg/L	50 - 150	4908
Benzene	EPA 8260	106%	10	ug/L	80 - 120	4905
Toluene	EPA 8260	109%	10	ug/L	80 - 120	4905

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Quality Control Results

Order No.: Q6665

Laboratory Known Analysis (LCS)

Analyte	Method	Recovery	Spike Amount	Units	Recovery Limits	Batch
Chlorobenzene	EPA 8260	108%	10	ug/L	81 - 115	4905
1,1-Dichloroethene	EPA 8260	103%	10	ug/L	63 - 129	4905
Trichloroethene	EPA 8260	107%	10	ug/L	77 - 117	4905
Antimony	EPA 6020	122%	1.0	mg/L	70 - 130	4899
Arsenic	EPA 6020	96%	1.0	mg/L	70 - 130	4899
Barium	EPA 6020	101%	1.0	mg/L	75 - 125	4899
Beryllium	EPA 6020	101%	1.0	mg/L	75 - 125	4899
Cadmium	EPA 6020	105%	1.0	mg/L	75 - 125	4899
Chromium	EPA 6020	105%	1.0	mg/L	75 - 125	4899
Cobalt	EPA 6020	106%	1.0	mg/L	75 - 125	4899
Copper	EPA 6020	107%	1.0	mg/L	75 - 125	4899
Lead	EPA 6020	105%	1.0	mg/L	75 - 125	4899
Molybdenum	EPA 6020	97%	1.0	mg/L	75 - 125	4899
Nickel	EPA 6020	101%	1.0	mg/L	75 - 125	4899
Selenium	EPA 6020	106%	4.0	mg/L	70 - 130	4899
Silver	EPA 6020	102%	1.0	mg/L	70 - 130	4899
Thallium	EPA 6020	103%	1.0	mg/L	70 - 130	4899
Vanadium	EPA 6020	103%	1.0	mg/L	75 - 125	4899
Zinc	EPA 6020	108%	1.0	mg/L	75 - 125	4899

Matrix Spike/Matrix Spike Duplicates

Analyte	Method	MS Rec.	MSD Rec.	RPD	Matrix Sample	Spike Amount	Units	Recovery Limits	RPD Limit	Batch
Mercury	EPA 7470	100%	98%	2	09-C18480	0.0050	mg/L	70 - 130	20	4864
Benzene	EPA 8260	104%	97%	7	09-C18478	10	ug/L	80 - 120	20	4905
Toluene	EPA 8260	106%	98%	8	09-C18478	10	ug/L	80 - 120	20	4905
Chlorobenzene	EPA 8260	107%	98%	9	09-C18478	10	ug/L	74 - 131	20	4905
1,1-Dichloroethene	EPA 8260	104%	97%	7	09-C18478	10	ug/L	59 - 145	20	4905
Trichloroethene	EPA 8260	107%	97%	10	09-C18478	10	ug/L	69 - 133	20	4905
Antimony	EPA 6020	106%	121%	13	09-C18479	1.0	mg/L	70 - 130	20	4899
Arsenic	EPA 6020	103%	102%	1	09-C18479	1.0	mg/L	70 - 130	20	4899
Barium	EPA 6020	82%	99%	18	09-C18479	1.0	mg/L	75 - 125	20	4899
Beryllium	EPA 6020	85%	97%	13	09-C18479	1.0	mg/L	75 - 125	20	4899
Cadmium	EPA 6020	103%	102%	1	09-C18479	1.0	mg/L	75 - 125	20	4899
Chromium	EPA 6020	86%	100%	15	09-C18479	1.0	mg/L	75 - 125	20	4899
Cobalt	EPA 6020	91%	102%	11	09-C18479	1.0	mg/L	75 - 125	20	4899
Copper	EPA 6020	96%	100%	4	09-C18479	1.0	mg/L	75 - 125	20	4899
Lead	EPA 6020	89%	103%	15	09-C18479	1.0	mg/L	75 - 125	20	4899
Molybdenum	EPA 6020	92%	99%	7	09-C18479	1.0	mg/L	75 - 125	20	4899
Nickel	EPA 6020	91%	101%	11	09-C18479	1.0	mg/L	75 - 125	20	4899
Selenium	EPA 6020	100%	109%	8	09-C18479	4.0	mg/L	70 - 130	20	4899
Silver	EPA 6020	91%	99%	9	09-C18479	1.0	mg/L	70 - 130	20	4899
Thallium	EPA 6020	90%	101%	11	09-C18479	1.0	mg/L	70 - 130	20	4899

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Quality Control Results

Order No.: Q6665

Matrix Spike/Matrix Spike Duplicates

Analyte	Method	MS Rec.	MSD Rec.	RPD	Matrix Sample	Spike Amount	Units	Recovery Limits	RPD Limit	Batch
Vanadium	EPA 6020	95%	99%	4	09-C18479	1.0	mg/L	75 - 125	20	4899
Zinc	EPA 6020	94%	106%	12	09-C18479	1.0	mg/L	75 - 125	20	4899

Sample Duplicate

Analyte	Method	Sample ID	Sample Value	Sample Duplicate	RPD	Units	RPD Limit	Batch
TPH as Diesel, SGT	EPA 8015/LUFT	kv:LCS	3.5	3.5	1	mg/L	30.	4908

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Date: December 30, 2009

CASE NARRATIVE Q6880

Client: **Amec Geomatrix**
Project: **PG&E Marsh Landing**
Sample(s): **09-C18976**
Sampled: **12/14/09** **Received: 12/15/09**

Samples 09-C18976 was received at the laboratory at 3.8 °C with no anomaly except for the following remarks:

- Metals analysis was requested as additional analysis per an e-mail received from Jonathan Skaggs on 12-29-09.

The sample was digested and analyzed following method EPA 200.8 (ICP-MS), except for the mercury which was analyzed by method EPA 7471A (CVAAS).

The sample was extracted and analyzed within holding time. All analytical quality control parameters were within acceptable limits. There was no analytical anomaly except for the above comments and the following remarks:

- Beryllium was reported with a Detection Limit for Reporting (DLR) of 0.0005 mg/L. This is below our Limit of Quantitation (LOQ) of 0.001 mg/L, but above the Limit of Detection (LOD) which is 0.0001 mg/L.

- Cadmium was reported with a DLR of 0.0002 mg/L. This is below the LOQ of 0.001 mg/L, and right at the LOD of 0.0002 mg/L.

- Silver was reported with a DLR of 0.0001 mg/L. This is below the LOQ of 0.001 mg/L, and right at the LOD which is 0.0001 mg/L.

- Silver was found in the Reagent Blank at 0.0001 mg/L. Silver was found in the sample at 0.0001 mg/L as well. The silver results received a B flag.

CREEK ENVIRONMENTAL LABORATORIES

Lab Director, Michael Ng

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Jonathan Skaggs
AMEC Geomatrix
2101 Webster St.
Oakland, CA 94612

Log Number: 09-C18976
Order: Q6880
Project: Marsh Landing (Q6665)
Received: 12/30/09
Printed: 12/30/09

REPORT OF ANALYTICAL RESULTS

Sample Description	Sampled By	Sampled Date @ Time	Matrix
SB-4-GW (18362)	Tiffany Klitzke	12/14/09@11:35	Aqueous

Analyte	Result	Flag	DLR	Dilution Factor	Units	Method	Date Analyzed	Date Prepared	Batch
Mercury	Not Detected		0.0002	1	mg/L	EPA 7470	12/18/09		5145
Beryllium	Not Detected		0.0005 <0.001	1	mg/L	EPA 200.8	12/30/09	12/29/09	5147
Cadmium	Not Detected		0.0002 <0.001	1	mg/L	EPA 200.8	12/30/09	12/29/09	5147
Cobalt	Not Detected		0.002	2	mg/L	EPA 200.8	12/30/09	12/29/09	5147
Copper	0.002		0.002	2	mg/L	EPA 200.8	12/30/09	12/29/09	5147
Lead	Not Detected		0.001	1	mg/L	EPA 200.8	12/30/09	12/29/09	5147
Selenium	Not Detected		0.001	1	mg/L	EPA 200.8	12/30/09	12/29/09	5147
Silver	0.0001	B	0.0001	1 U	mg/L	EPA 200.8	12/30/09	12/29/09	5147
Thallium	Not Detected		0.001	1	mg/L	EPA 200.8	12/30/09	12/29/09	5147

DLR = Detection Limit for Reporting. Results of "Not Detected" are below DLR.

<0.001U

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Quality Control Results

Order No.: Q6880

Laboratory Reagent Blank

Analyte	Method	Results	Units	Batch
Mercury	EPA 7470	< 0.0002	mg/L	5145
Beryllium	EPA 200.8	< 0.0005	mg/L	5147
Cadmium	EPA 200.8	< 0.0002	mg/L	5147
Cobalt	EPA 200.8	< 0.002	mg/L	5147
Copper	EPA 200.8	< 0.002	mg/L	5147
Lead	EPA 200.8	< 0.001	mg/L	5147
Selenium	EPA 200.8	< 0.001	mg/L	5147
Silver	EPA 200.8	0.0001	mg/L	5147
Thallium	EPA 200.8	< 0.001	mg/L	5147

Laboratory Known Analysis (LCS)

Analyte	Method	Recovery	Spike Amount	Units	Recovery Limits	Batch
Mercury	EPA 7470	104%	0.0050	mg/L	70 - 130	5145
Beryllium	EPA 200.8	90%	0.1	mg/L	85 - 115	5147
Cadmium	EPA 200.8	101%	0.1	mg/L	85 - 115	5147
Cobalt	EPA 200.8	95%	0.1	mg/L	85 - 115	5147
Copper	EPA 200.8	98%	0.1	mg/L	85 - 115	5147
Lead	EPA 200.8	104%	0.1	mg/L	85 - 115	5147
Selenium	EPA 200.8	100%	0.5	mg/L	85 - 115	5147
Silver	EPA 200.8	100%	0.1	mg/L	85 - 115	5147
Thallium	EPA 200.8	95%	0.1	mg/L	85 - 115	5147

Matrix Spike/Matrix Spike Duplicates

Analyte	Method	MS Rec.	MSD Rec.	RPD	Matrix Sample	Spike Amount	Units	Recovery Limits	RPD Limit	Batch
Beryllium	EPA 200.8	89%	87%	2	09-C18800	0.1	mg/L	70 - 130	20	5147
Cadmium	EPA 200.8	101%	98%	3	09-C18800	0.1	mg/L	70 - 130	20	5147
Cobalt	EPA 200.8	86%	85%	1	09-C18800	0.1	mg/L	70 - 130	20	5147
Copper	EPA 200.8	86%	84%	2	09-C18800	0.1	mg/L	70 - 130	20	5147
Lead	EPA 200.8	103%	101%	2	09-C18800	0.1	mg/L	70 - 130	20	5147
Selenium	EPA 200.8	102%	99%	3	09-C18800	0.5	mg/L	70 - 130	20	5147
Silver	EPA 200.8	99%	96%	3	09-C18800	0.1	mg/L	70 - 130	20	5147
Thallium	EPA 200.8	95%	94%	2	09-C18800	0.1	mg/L	70 - 130	20	5147

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Client Name: AMEC	Contact: JONATHAN SKAGGS	Phone: 510-663-4104	Due Date: 24Hr 48Hr Other Normal TAT
Address	City	State	Zip (Q6665) ~~(Q6698)~~ ~~(Q6688)~~
Fax	Cell	Beeper	
Project Name/Number: MARSH LANDING	PO#: 15317.000.	Copies To:	
Bill to: (if different from above)	Address	City	State Zip
Sampler Name (Print): Tiffany KLITZKE	Comments: Per e-mail from J. Skaggs	Matrix Key: DW = Drinking Water, AQ = Aqueous, SL = Soil/Solid	

Sample Description	Date/Time Sampled	Analysis	Matrix	# of Bottles	Preservative / Type Bottles	Creek Lab Sample #
SB-4-GN ~~(18481)~~ (18362)	12-14-09 11:35	Hg, Be, Cd, Co, Cu, Pb, Se, Ag, Tl	Ag	1	250 ml HNO3	18976
		LL				

RELINQUISHED BY (Sign)	(Print)	(Organization)	DATE/TIME	RECEIVED BY (Sign)	(Print)	(Organization)
			12-30-09 1400	[signature]	J. WENSLOFF	Creek Environmental Laboratories, Inc.

FOR LAB USE ONLY: Shipping Method: Client/ Lab/ Courier: In House. Sample Conditions: Temp:_____ Intact: Y/ N Custody Sealed: Y/ N

REMARKS

APPENDIX F

Background Metals Analysis

APPENDIX F-1

ProUCL 4.00.04 STATISTICAL OUTPUT - ARSENIC[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Wilcox-Mann-Whitney Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	29	25
Minimum	0.5	0.59
Maximum	6.9	5.1
Mean	2	2
Median	1.5	1.7
SD	1.084	1.07
SE of Mean	0.131	0.126

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4212
WMW Test U-Stat	-2.429
WMW Critical Value (0.050)	1.645
P-Value	0.00758

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site <= Background
P-Value < alpha (0.05)

APPENDIX F-1

ProUCL 4.00.04 STATISTICAL OUTPUT - ARSENIC[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Quantile Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	29	25
Minimum	0.5	0.59
Maximum	6.9	5.1
Mean	2	2
Median	1.5	1.7
SD	1.084	1.07
SE of Mean	0.131	0.126

Quantile Test

H0: Site Concentration <= Background Concentration (Form 1)

Approximate R Value (0.06)	4
Approximate K Value (0.06)	4
R Value Adjusted for Ties in Data	5
K Value Adjusted for Ties in Data	5
Number of Site Observations in 'R' Largest	2
Calculated Alpha	0.0531

Conclusion with Alpha = 0.06
Do Not Reject H0, Perform Wilcoxon-Mann-Whitney Ranked Sum Test

Notes:
1. Statistical output generated using ProUCL 4.00.04 (U.S. EPA, 2009)

APPENDIX F-2

ProUCL 4.00.04 STATISTICAL OUTPUT - BARIUM[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Wilcox-Mann-Whitney Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	40	43
Minimum	15	24
Maximum	394	170
Mean	64	50
Median	43	44
SD	56.54	24.47
SE of Mean	6.856	2.883

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4852
WMW Test U-Stat	0.24
WMW Critical Value (0.050)	1.645
P-Value	0.405

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site <= Background
P-Value >= alpha (0.05)

APPENDIX F-2

ProUCL 4.00.04 STATISTICAL OUTPUT - BARIUM[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Quantile Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	40	43
Minimum	15	24
Maximum	394	170
Mean	64	50
Median	43	44
SD	56.54	24.47
SE of Mean	6.856	2.883

Quantile Test

H0: Site Concentration <= Background Concentration (Form 1)

Approximate R Value (0.06)	4
Approximate K Value (0.06)	4
R Value Adjusted for Ties in Data	5
K Value Adjusted for Ties in Data	5
Number of Site Observations in 'R' Largest	4
Calculated Alpha	0.0531

Conclusion with Alpha = 0.06
Do Not Reject H0, Perform Wilcoxon-Mann-Whitney Ranked Sum Test

Notes:
1. Statistical output generated using ProUCL 4.00.04 (U.S. EPA, 2009)

APPENDIX F-3

ProUCL 4.00.04 STATISTICAL OUTPUT - CHROMIUM (TOTAL)[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Wilcox-Mann-Whitney Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	30	29
Minimum	7.7	8.2
Maximum	630	62
Mean	27	19
Median	14	16
SD	74.85	10.21
SE of Mean	9.077	1.204

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4601
WMW Test U-Stat	-0.809
WMW Critical Value (0.050)	1.645
P-Value	0.209

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site <= Background
P-Value >= alpha (0.05)

APPENDIX F-3

ProUCL 4.00.04 STATISTICAL OUTPUT - CHROMIUM (TOTAL)[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Quantile Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	30	29
Minimum	7.7	8.2
Maximum	630	62
Mean	27	19
Median	14	16
SD	74.85	10.21
SE of Mean	9.077	1.204

Quantile Test

H0: Site Concentration <= Background Concentration (Form 1)

Approximate R Value (0.06)	4
Approximate K Value (0.06)	4
Number of Site Observations in 'R' Largest	2
Calculated Alpha	0.0531

Conclusion with Alpha = 0.06
Do Not Reject H0, Perform Wilcoxon-Mann-Whitney Ranked Sum Test

Notes:
1. Statistical output generated using ProUCL 4.00.04 (U.S. EPA, 2009)

APPENDIX F-4

ProUCL 4.00.04 STATISTICAL OUTPUT - COBALT[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Wilcox-Mann-Whitney Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	39	30
Minimum	2.5	2.5
Maximum	17	17
Mean	6	5
Median	4.6	5.2
SD	3.015	3.336
SE of Mean	0.366	0.393

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	5266
WMW Test U-Stat	1.966
WMW Critical Value (0.050)	1.645
P-Value	0.0247

Conclusion with Alpha = 0.05
Reject H0, Conclude Site > Background
P-Value < alpha (0.05)

APPENDIX F-4

ProUCL 4.00.04 STATISTICAL OUTPUT - COBALT[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Quantile Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	39	30
Minimum	2.5	2.5
Maximum	17	17
Mean	6	5
Median	4.6	5.2
SD	3.015	3.336
SE of Mean	0.366	0.393

Quantile Test

H0: Site Concentration <= Background Concentration (Form 1)

Approximate R Value (0.06)	4
Approximate K Value (0.06)	4
Number of Site Observations in 'R' Largest	2
Calculated Alpha	0.0531

Conclusion with Alpha = 0.06
Do Not Reject H0, Perform Wilcoxon-Mann-Whitney Ranked Sum Test

Notes:
1. Statistical output generated using ProUCL 4.00.04 (U.S. EPA, 2009)

APPENDIX F-5

ProUCL 4.00.04 STATISTICAL OUTPUT - COPPER[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Wilcox-Mann-Whitney Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	46	46
Minimum	3.8	4.2
Maximum	80	38
Mean	12	8
Median	6.1	6.45
SD	13.55	6.09
SE of Mean	1.643	0.718

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4781
WMW Test U-Stat	-0.0584
WMW Critical Value (0.050)	1.645
P-Value	0.477

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site <= Background
P-Value >= alpha (0.05)

APPENDIX F-5

ProUCL 4.00.04 STATISTICAL OUTPUT - COPPER[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Quantile Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	46	46
Minimum	3.8	4.2
Maximum	80	38
Mean	11.67	8.196
Median	6.1	6.45
SD	13.55	6.09
SE of Mean	1.643	0.718

Quantile Test

H0: Site Concentration <= Background Concentration (Form 1)

Approximate R Value (0.06)	4
Approximate K Value (0.06)	4
R Value Adjusted for Ties in Data	5
K Value Adjusted for Ties in Data	5
Number of Site Observations in 'R' Largest	3
Calculated Alpha	0.0531

Conclusion with Alpha = 0.06
Do Not Reject H0, Perform Wilcoxon-Mann-Whitney Ranked Sum Test

Notes:
1. Statistical output generated using ProUCL 4.00.04 (U.S. EPA, 2009)

APPENDIX F-6

ProUCL 4.00.04 STATISTICAL OUTPUT - LEAD[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Wilcox-Mann-Whitney Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	41	36
Minimum	1	0.84
Maximum	30	86
Mean	3.922	4.158
Median	2.45	2.5
SD	4.552	10.05
SE of Mean	0.552	1.185

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4780
WMW Test U-Stat	-0.0605
WMW Critical Value (0.050)	1.645
P-Value	0.476

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site <= Background
P-Value >= alpha (0.05)

APPENDIX F-6

ProUCL 4.00.04 STATISTICAL OUTPUT - LEAD[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Quantile Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	41	36
Minimum	1	0.84
Maximum	30	86
Mean	3.922	4.158
Median	2.45	2.5
SD	4.552	10.05
SE of Mean	0.552	1.185

Quantile Test

H0: Site Concentration <= Background Concentration (Form 1)

Approximate R Value (0.06)	4
Approximate K Value (0.06)	4
Number of Site Observations in 'R' Largest	2
Calculated Alpha	0.0531

Conclusion with Alpha = 0.06
Do Not Reject H0, Perform Wilcoxon-Mann-Whitney Ranked Sum Test

Notes:
1. Statistical output generated using ProUCL 4.00.04 (U.S. EPA, 2009)

APPENDIX F-7

ProUCL 4.00.04 STATISTICAL OUTPUT - MERCURY[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Gehan Test

Raw Statistics

	Site	Background
Number of Valid Data	68	72
Number of Non-Detect Data	48	64
Number of Detect Data	20	8
Minimum Non-Detect	0.04	0.025
Maximum Non-Detect	0.05	0.025
Percent Non detects	71%	89%
Minimum Detected	0.011	0.025
Maximum Detected	0.41	0.37
Mean of Detected Data	0.0983	0.111
Median of Detected Data	0.045	0.025
SD of Detected Data	0.115	0.132

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test Value	3.404
Critical z (0.95)	1.645
P-Value	0.0003326

Conclusion with Alpha = 0.05
Reject H0, Conclude Site > Background
P-Value < alpha (0.05)

APPENDIX F-7

ProUCL 4.00.04 STATISTICAL OUTPUT - MERCURY[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Quantile Test

Raw Statistics

	Site	Background
Number of Valid Data	68	72
Number of Non-Detect Data	48	64
Number of Detect Data	20	8
Minimum Non-Detect	0.04	0.025
Maximum Non-Detect	0.050	0.025
Percent Non detects	71%	89%
Minimum Detected	0.011	0.025
Maximum Detected	0.41	0.37
Mean of Detected Data	0.0983	0.111
Median of Detected Data	0.045	0.025
SD of Detected Data	0.115	0.132

Quantile Test

H0: Site Concentration <= Background Concentration (Form 1)

Approximate R Value (0.06)	4
Approximate K Value (0.06)	4
Number of Site Observations in 'R' Largest	3
Calculated Alpha	0.0531

Conclusion with Alpha = 0.06
Do Not Reject H0, Perform Wilcoxon-Mann-Whitney or Gehan Test

1. Statistical output generated using ProUCL 4.00.04 (U.S. EPA, 2009)

APPENDIX F-8

ProUCL 4.00.04 STATISTICAL OUTPUT - NICKEL [1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Wilcox-Mann-Whitney Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	30	29
Minimum	5.6	12
Maximum	400	110
Mean	26	26
Median	17	20
SD	48.1	17.59
SE of Mean	5.833	2.073

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4137
WMW Test U-Stat	-2.743
WMW Critical Value (0.050)	1.645
P-Value	0.00304

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site <= Background
P-Value < alpha (0.05)

APPENDIX F-8

ProUCL 4.00.04 STATISTICAL OUTPUT - NICKEL [1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Quantile Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	30	29
Minimum	5.6	12
Maximum	400	110
Mean	26	26
Median	17	20
SD	48.1	17.59
SE of Mean	5.833	2.073

Quantile Test

H0: Site Concentration <= Background Concentration (Form 1)

Approximate R Value (0.06)	4
Approximate K Value (0.06)	4
Number of Site Observations in 'R' Largest	2
Calculated Alpha	0.0531

Conclusion with Alpha = 0.06
Do Not Reject H0, Perform Wilcoxon-Mann-Whitney Ranked Sum Test

Notes:
1. Statistical output generated using ProUCL 4.00.04 (U.S. EPA, 2009)

APPENDIX F-9

ProUCL 4.00.04 STATISTICAL OUTPUT - VANADIUM[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Wilcox-Mann-Whitney Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	28	29
Minimum	12	12
Maximum	95	110
Mean	25	26
Median	21	22
SD	12.88	16.23
SE of Mean	1.562	1.913

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4877
WMW Test U-Stat	0.344
WMW Critical Value (0.050)	1.645
P-Value	0.365

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site <= Background
P-Value >= alpha (0.05)

APPENDIX F-9

ProUCL 4.00.04 STATISTICAL OUTPUT - VANADIUM[1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Quantile Test

Raw Statistics

	Site	Background
Number of Valid Observations	68	72
Number of Distinct Observations	28	29
Minimum	12	12
Maximum	95	110
Mean	25	26
Median	21	22
SD	12.88	16.23
SE of Mean	1.562	1.913

Quantile Test

H0: Site Concentration <= Background Concentration (Form 1)

Approximate R Value (0.06)	4
Approximate K Value (0.06)	4
Number of Site Observations in 'R' Largest	1
Calculated Alpha	0.0531

Conclusion with Alpha = 0.06
Do Not Reject H0, Perform Wilcoxon-Mann-Whitney Ranked Sum Test

Notes:
1. Statistical output generated using ProUCL 4.00.04 (U.S. EPA, 2009)

APPENDIX F-10

ProUCL 4.00.04 STATISTICAL OUTPUT - ZINC [1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Gehan Test

Raw Statistics

	Site	Background
Number of Valid Data	68	72
Number of Non-Detect Data	8	6
Number of Detect Data	60	66
Minimum Non-Detect	13	8.5
Maximum Non-Detect	21	10
Percent Non detects	12%	8%
Minimum Detected	14	14
Maximum Detected	79	70
Mean of Detected Data	25.18	26.23
Median of Detected Data	20	23
SD of Detected Data	12.28	10.53

Site vs Background Gehan Test

H0: Mean/Median of Site or AOC <= Mean/Median of background

Gehan z Test Value	-2.248
Critical z (0.95)	1.645
P-Value	0.988

Conclusion with Alpha = 0.05
Do Not Reject H0, Conclude Site <= Background
P-Value >= alpha (0.05)

APPENDIX F-10

ProUCL 4.00.04 STATISTICAL OUTPUT - ZINC [1]

Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Quantile Test

Raw Statistics

	Site	Background
Number of Valid Data	68	72
Number of Non-Detect Data	48	64
Number of Detect Data	20	8
Minimum Non-Detect	0.04	0.025
Maximum Non-Detect	0.05	0.03
Percent Non detects	71%	89%
Minimum Detected	0.011	0.025
Maximum Detected	0.41	0.37
Mean of Detected Data	0.0983	0.111
Median of Detected Data	0.045	0.025
SD of Detected Data	0.115	0.132

Quantile Test

H0: Site Concentration <= Background Concentration (Form 1)

Approximate R Value (0.06)	4
Approximate K Value (0.06)	4
Number of Site Observations in 'R' Largest	3
Calculated Alpha	0.0531

Conclusion with Alpha = 0.06
Do Not Reject H0, Perform Wilcoxon-Mann-Whitney or Gehan Test

1. Statistical output generated using ProUCL 4.00.04 (U.S. EPA, 2009)

APPENDIX G

Calculation of Representative Concentrations – ProUCL Output

APPENDIX G-1.1

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Cobalt

General Statistics			
Number of Valid Observations	67	Number of Distinct Observations	38
Raw Statistics		Log-transformed Statistics	
Minimum	2.5	Minimum of Log Data	0.916
Maximum	17	Maximum of Log Data	2.833
Mean	5.836	Mean of log Data	1.664
Median	4.6	SD of log Data	0.425
SD	3.027		
Coefficient of Variation	0.519		
Skewness	1.82		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.242	Lilliefors Test Statistic	0.181
Lilliefors Critical Value	0.108	Lilliefors Critical Value	0.108
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	6.453	95% H-UCL	6.356
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	7.126
95% Adjusted-CLT UCL	6.532	97.5% Chebyshev (MVUE) UCL	7.713
95% Modified-t UCL	6.466	99% Chebyshev (MVUE) UCL	8.867
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	4.921	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.186		
MLE of Mean	5.836		
MLE of Standard Deviation	2.631		
nu star	659.4		
Approximate Chi Square Value (.05)	600.9	Nonparametric Statistics	
Adjusted Level of Significance	0.0464	95% CLT UCL	6.444
Adjusted Chi Square Value	599.6	95% Jackknife UCL	6.453
		95% Standard Bootstrap UCL	6.45
Anderson-Darling Test Statistic	3.445	95% Bootstrap-t UCL	6.552
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	6.522
Kolmogorov-Smirnov Test Statistic	0.205	95% Percentile Bootstrap UCL	6.475
Kolmogorov-Smirnov 5% Critical Value	0.109	95% BCA Bootstrap UCL	6.539
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	7.448
		97.5% Chebyshev(Mean, Sd) UCL	8.145
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	9.515
95% Approximate Gamma UCL	6.405		
95% Adjusted Gamma UCL	6.418		
Potential UCL to Use		Use 95% Student's-t UCL	6.453
		or 95% Modified-t UCL	6.466

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.2

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Mercury

General Statistics			
Number of Valid Data	67	Number of Detected Data	20
Number of Distinct Detected Data	18	Number of Non-Detect Data	47
		Percent Non-Detects	70.15%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.011	Minimum Detected	-4.51
Maximum Detected	0.41	Maximum Detected	-0.892
Mean of Detected	0.0983	Mean of Detected	-2.902
SD of Detected	0.115	SD of Detected	1.09
Minimum Non-Detect	0.04	Minimum Non-Detect	-3.219
Maximum Non-Detect	0.05	Maximum Non-Detect	-2.996
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	59
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	8
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	88.06%
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.734	Shapiro Wilk Test Statistic	0.931
5% Shapiro Wilk Critical Value	0.905	5% Shapiro Wilk Critical Value	0.905
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0463	Mean	-3.481
SD	0.0706	SD	0.701
95% DL/2 (t) UCL	0.0607	95% H-Stat (DL/2) UCL	0.0492
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-3.482
		SD in Log Scale	0.927
		Mean in Original Scale	0.0507
		SD in Original Scale	0.0713
		95% Percentile Bootstrap UCL	0.0659
		95% BCA Bootstrap UCL	0.0692
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.877	Data appear Lognormal at 5% Significance Level	
Theta Star	0.112		
nu star	35.1		
A-D Test Statistic	1.064	Nonparametric Statistics	
5% A-D Critical Value	0.768	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.768	Mean	0.0481
5% K-S Critical Value	0.199	SD	0.0701
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0091
		95% KM (t) UCL	0.0632
Assuming Gamma Distribution		95% KM (z) UCL	0.063
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.0631
Minimum	1.00E-09	95% KM (bootstrap t) UCL	0.0704
Maximum	0.41	95% KM (BCA) UCL	0.0639
Mean	0.0987	95% KM (Percentile Bootstrap) UCL	0.0639
Median	0.0702	95% KM (Chebyshev) UCL	0.0877
SD	0.0931	97.5% KM (Chebyshev) UCL	0.105
k star	0.258	99% KM (Chebyshev) UCL	0.139
Theta star	0.383		
Nu star	34.52	Potential UCLs to Use	
AppChi2	22.08	95% KM (BCA) UCL	0.0639
95% Gamma Approximate UCL	0.154		
95% Adjusted Gamma UCL	0.156		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.3

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Molybdenum

General Statistics			
Number of Valid Data	67	Number of Detected Data	5
Number of Distinct Detected Data	3	Number of Non-Detect Data	62
		Percent Non-Detects	92.54%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.4	Minimum Detected	-0.916
Maximum Detected	0.7	Maximum Detected	-0.357
Mean of Detected	0.48	Mean of Detected	-0.76
SD of Detected	0.13	SD of Detected	0.245
Minimum Non-Detect	0.4	Minimum Non-Detect	-0.916
Maximum Non-Detect	10	Maximum Non-Detect	2.303
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	67
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.735	Shapiro Wilk Test Statistic	0.754
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	4.233	Mean	1.144
SD	1.745	SD	1.073
95% DL/2 (t) UCL	4.589	95% H-Stat (DL/2) UCL	9.079
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.174
		SD in Log Scale	0.479
		Mean in Original Scale	0.346
		SD in Original Scale	0.17
		95% Percentile Bootstrap UCL	0.383
		95% BCA Bootstrap UCL	0.383
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	7.96	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0603		
nu star	79.6		
A-D Test Statistic	0.733	Nonparametric Statistics	
5% A-D Critical Value	0.679	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.679	Mean	0.436
5% K-S Critical Value	0.357	SD	0.0881
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0297
		95% KM (t) UCL	0.486
Assuming Gamma Distribution		95% KM (z) UCL	0.485
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.485
Minimum	0.17	95% KM (bootstrap t) UCL	N/A
Maximum	0.778	95% KM (BCA) UCL	0.525
Mean	0.58	95% KM (Percentile Bootstrap) UCL	0.507
Median	0.608	95% KM (Chebyshev) UCL	0.566
SD	0.147	97.5% KM (Chebyshev) UCL	0.622
k star	12.13	99% KM (Chebyshev) UCL	0.732
Theta star	0.0478		
Nu star	1625	Potential UCLs to Use	
AppChi2	1533	95% KM (t) UCL	0.486
95% Gamma Approximate UCL	0.615	95% KM (% Bootstrap) UCL	0.507
95% Adjusted Gamma UCL	0.616		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.4

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Methylene
Chloride

General Statistics			
Number of Valid Data	53	Number of Detected Data	21
Number of Distinct Detected Data	17	Number of Non-Detect Data	32
		Percent Non-Detects	60.38%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0033	Minimum Detected	-5.714
Maximum Detected	0.019	Maximum Detected	-3.963
Mean of Detected	0.0104	Mean of Detected	-4.66
SD of Detected	0.00429	SD of Detected	0.459
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	0.01	Maximum Non-Detect	-4.605
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.97	Shapiro Wilk Test Statistic	0.96
5% Shapiro Wilk Critical Value	0.908	5% Shapiro Wilk Critical Value	0.908
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00713	Mean	-5.045
SD	0.00376	SD	0.425
95% DL/2 (t) UCL	0.008	95% H-Stat (DL/2) UCL	0.00843
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0148	Mean in Log Scale	-4.857
SD	0.00267	SD in Log Scale	0.41
95% MLE (t) UCL	0.0154	Mean in Original Scale	0.00844
95% MLE (Tiku) UCL	0.0163	SD in Original Scale	0.00352
		95% Percentile Bootstrap UCL	0.00921
		95% BCA Bootstrap UCL	0.00929
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	4.841	Data appear Normal at 5% Significance Level	
Theta Star	0.00214		
nu star	203.3		
A-D Test Statistic	0.226	Nonparametric Statistics	
5% A-D Critical Value	0.745	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.745	Mean	0.00859
5% K-S Critical Value	0.19	SD	0.00346
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	6.71E-04
		95% KM (t) UCL	0.00971
Assuming Gamma Distribution		95% KM (z) UCL	0.00969
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.00975
Minimum	0.0033	95% KM (bootstrap t) UCL	0.00969
Maximum	0.019	95% KM (BCA) UCL	0.0097
Mean	0.0102	95% KM (Percentile Bootstrap) UCL	0.00968
Median	0.00989	95% KM (Chebyshev) UCL	0.0115
SD	0.0027	97.5% KM (Chebyshev) UCL	0.0128
k star	12.82	99% KM (Chebyshev) UCL	0.0153
Theta star	7.96E-04		
Nu star	1359	Potential UCLs to Use	
AppChi2	1274	95% KM (t) UCL	0.00971
95% Gamma Approximate UCL	0.0109	95% KM (Percentile Bootstrap) UCL	0.00968
95% Adjusted Gamma UCL	0.0109		

Note: DL/2 is not a recommended method.

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.5

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Benzo(ghi)perylene

General Statistics			
Number of Valid Data	133	Number of Detected Data	7
Number of Distinct Detected Data	7	Number of Non-Detect Data	126
Number of Missing Values	17	Percent Non-Detects	94.74%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.018	Minimum Detected	-4.017
Maximum Detected	2.5	Maximum Detected	0.916
Mean of Detected	0.821	Mean of Detected	-1.381
SD of Detected	1.096	SD of Detected	1.875
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	10	Maximum Non-Detect	2.303
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	133
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.73	Shapiro Wilk Test Statistic	0.94
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.215	Mean	-2.594
SD	0.569	SD	1.241
95% DL/2 (t) UCL	0.296	95% H-Stat (DL/2) UCL	0.211
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-7.101
		SD in Log Scale	2.916
		Mean in Original Scale	0.0501
		SD in Original Scale	0.297
		95% Percentile Bootstrap UCL	0.0967
		95% BCA Bootstrap UCL	0.124
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.399	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	2.058		
nu star	5.586		
A-D Test Statistic	0.408	Nonparametric Statistics	
5% A-D Critical Value	0.75	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.75	Mean	0.065
5% K-S Critical Value	0.327	SD	0.296
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.0282
		95% KM (t) UCL	0.112
Assuming Gamma Distribution		95% KM (z) UCL	0.111
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.101
Minimum	1.00E-09	95% KM (bootstrap t) UCL	0.186
Maximum	6.81	95% KM (BCA) UCL	0.604
Mean	1.734	95% KM (Percentile Bootstrap) UCL	0.195
Median	0.999	95% KM (Chebyshev) UCL	0.188
SD	1.94	97.5% KM (Chebyshev) UCL	0.241
k star	0.16	99% KM (Chebyshev) UCL	0.346
Theta star	10.83		
Nu star	42.58	Potential UCLs to Use	
AppChi2	28.62	95% KM (t) UCL	0.112
95% Gamma Approximate UCL	2.58		
95% Adjusted Gamma UCL	2.592		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.6

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Benzo(a)anthracene

General Statistics			
Number of Valid Data	133	Number of Detected Data	7
Number of Distinct Detected Data	7	Number of Non-Detect Data	126
Number of Missing Values	17	Percent Non-Detects	94.74%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.017	Minimum Detected	-4.075
Maximum Detected	27	Maximum Detected	3.296
Mean of Detected	4.425	Mean of Detected	-1.27
SD of Detected	10	SD of Detected	2.773
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	10	Maximum Non-Detect	2.303
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	132
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	99.25%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data se
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.526	Shapiro Wilk Test Statistic	0.9
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Leve	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.405	Mean	-2.583
SD	2.388	SD	1.321
95% DL/2 (t) UCL	0.748	95% H-Stat (DL/2) UCL	0.242
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-6.269
		SD in Log Scale	3.035
		Mean in Original Scale	0.259
		SD in Original Scale	2.351
		95% Percentile Bootstrap UCL	0.655
		95% BCA Bootstrap UCL	1.085
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.242	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	18.3		
nu star	3.386		
A-D Test Statistic	0.647	Nonparametric Statistics	
5% A-D Critical Value	0.8	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.8	Mean	0.257
5% K-S Critical Value	0.338	SD	2.341
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.219
		95% KM (t) UCL	0.621
Assuming Gamma Distribution		95% KM (z) UCL	0.618
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.591
Minimum	1.00E-09	95% KM (bootstrap t) UCL	4.585
Maximum	241.1	95% KM (BCA) UCL	0.852
Mean	40.24	95% KM (Percentile Bootstrap) UCL	0.676
Median	9.233	95% KM (Chebyshev) UCL	1.213
SD	60.67	97.5% KM (Chebyshev) UCL	1.627
k star	0.107	99% KM (Chebyshev) UCL	2.44
Theta star	376.9		
Nu star	28.4	Potential UCLs to Use	
AppChi2	17.24	95% KM (t) UCL	0.621
95% Gamma Approximate UCL	66.29		
95% Adjusted Gamma UCL	66.65		

Note: DL/2 is not a recommended method.

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.7

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Benzo(a)pyrene

General Statistics			
Number of Valid Data	133	Number of Detected Data	10
Number of Distinct Detected Data	10	Number of Non-Detect Data	123
Number of Missing Values	17	Percent Non-Detects	92.48%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.012	Minimum Detected	-4.423
Maximum Detected	8.6	Maximum Detected	2.152
Mean of Detected	1.648	Mean of Detected	-1.539
SD of Detected	2.8	SD of Detected	2.449
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	2.5	Maximum Non-Detect	0.916
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	130
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	3
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	97.74%
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.67	Shapiro Wilk Test Statistic	0.903
5% Shapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.188	Mean	-3.209
SD	0.852	SD	1.226
95% DL/2 (t) UCL	0.31	95% H-Stat (DL/2) UCL	0.112
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-6.021
		SD in Log Scale	2.77
		Mean in Original Scale	0.138
		SD in Original Scale	0.85
		95% Percentile Bootstrap UCL	0.27
		95% BCA Bootstrap UCL	0.337
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.299	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	5.503		
nu star	5.99		
A-D Test Statistic	0.619	Nonparametric Statistics	
5% A-D Critical Value	0.808	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.808	Mean	0.139
5% K-S Critical Value	0.287	SD	0.846
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.0774
		95% KM (t) UCL	0.267
Assuming Gamma Distribution		95% KM (z) UCL	0.266
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.258
Minimum	1.00E-09	95% KM (bootstrap t) UCL	0.435
Maximum	8.6	95% KM (BCA) UCL	0.325
Mean	1.677	95% KM (Percentile Bootstrap) UCL	0.28
Median	0.55	95% KM (Chebyshev) UCL	0.476
SD	2.23	97.5% KM (Chebyshev) UCL	0.622
k star	0.126	99% KM (Chebyshev) UCL	0.909
Theta star	13.35		
Nu star	33.4	Potential UCLs to Use	
AppChi2	21.19	95% KM (t) UCL	0.267
95% Gamma Approximate UCL	2.643		
95% Adjusted Gamma UCL	2.657		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.8

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Benzo(b)fluoranthene

General Statistics			
Number of Valid Data	133	Number of Detected Data	10
Number of Distinct Detected Data	10	Number of Non-Detect Data	123
Number of Missing Values	17	Percent Non-Detects	92.48%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.011	Minimum Detected	-4.51
Maximum Detected	2.5	Maximum Detected	0.916
Mean of Detected	0.747	Mean of Detected	-1.888
SD of Detected	1.02	SD of Detected	2.179
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	10	Maximum Non-Detect	2.303
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	133
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.734	Shapiro Wilk Test Statistic	0.87
5% Shapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.299	Mean	-2.504
SD	0.824	SD	1.335
95% DL/2 (t) UCL	0.417	95% H-Stat (DL/2) UCL	0.289
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-5.238
		SD in Log Scale	2.247
		Mean in Original Scale	0.0752
		SD in Original Scale	0.331
		95% Percentile Bootstrap UCL	0.126
		95% BCA Bootstrap UCL	0.146
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.354	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	2.109		
nu star	7.082		
A-D Test Statistic	0.719	Nonparametric Statistics	
5% A-D Critical Value	0.793	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.793	Mean	0.0784
5% K-S Critical Value	0.284	SD	0.334
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.0318
		95% KM (t) UCL	0.131
Assuming Gamma Distribution		95% KM (z) UCL	0.131
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.127
Minimum	0.011	95% KM (bootstrap t) UCL	0.159
Maximum	3.38	95% KM (BCA) UCL	0.141
Mean	0.933	95% KM (Percentile Bootstrap) UCL	0.136
Median	0.561	95% KM (Chebyshev) UCL	0.217
SD	0.916	97.5% KM (Chebyshev) UCL	0.277
k star	0.963	99% KM (Chebyshev) UCL	0.395
Theta star	0.97		
Nu star	256.1	Potential UCLs to Use	
AppChi2	220.1	95% KM (t) UCL	0.131
95% Gamma Approximate UCL	1.086		
95% Adjusted Gamma UCL	1.088		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.9

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Benzo(k)fluoranthene

General Statistics			
Number of Valid Data	133	Number of Detected Data	6
Number of Distinct Detected Data	6	Number of Non-Detect Data	127
Number of Missing Values	17	Percent Non-Detects	95.49%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.016	Minimum Detected	-4.135
Maximum Detected	2.3	Maximum Detected	0.833
Mean of Detected	0.554	Mean of Detected	-2.185
SD of Detected	0.915	SD of Detected	2.089
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	10	Maximum Non-Detect	2.303
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	133
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.698	Shapiro Wilk Test Statistic	0.876
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.244	Mean	-2.561
SD	0.683	SD	1.27
95% DL/2 (t) UCL	0.342	95% H-Stat (DL/2) UCL	0.241
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-6.156
		SD in Log Scale	2.239
		Mean in Original Scale	0.0347
		SD in Original Scale	0.212
		95% Percentile Bootstrap UCL	0.0671
		95% BCA Bootstrap UCL	0.0895
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.317	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.751		
nu star	3.798		
A-D Test Statistic	0.542	Nonparametric Statistics	
5% A-D Critical Value	0.75	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.75	Mean	0.0439
5% K-S Critical Value	0.352	SD	0.214
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.0209
		95% KM (t) UCL	0.0786
Assuming Gamma Distribution		95% KM (z) UCL	0.0783
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.0738
Minimum	1.00E-09	95% KM (bootstrap t) UCL	0.312
Maximum	12.23	95% KM (BCA) UCL	0.168
Mean	2.592	95% KM (Percentile Bootstrap) UCL	0.11
Median	1.082	95% KM (Chebyshev) UCL	0.135
SD	3.315	97.5% KM (Chebyshev) UCL	0.175
k star	0.14	99% KM (Chebyshev) UCL	0.252
Theta star	18.52		
Nu star	37.21	Potential UCLs to Use	
AppChi2	24.25	95% KM (t) UCL	0.0786
95% Gamma Approximate UCL	3.977		
95% Adjusted Gamma UCL	3.996		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.10

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Chrysene

General Statistics			
Number of Valid Data	133	Number of Detected Data	9
Number of Distinct Detected Data	9	Number of Non-Detect Data	124
Number of Missing Values	17	Percent Non-Detects	93.23%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.017	Minimum Detected	-4.075
Maximum Detected	32	Maximum Detected	3.466
Mean of Detected	4.185	Mean of Detected	-1.61
SD of Detected	10.49	SD of Detected	2.72
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	10	Maximum Non-Detect	2.303
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	132
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	99.25%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.466	Shapiro Wilk Test Statistic	0.829
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.455	Mean	-2.546
SD	2.818	SD	1.305
95% DL/2 (t) UCL	0.86	95% H-Stat (DL/2) UCL	0.26
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-4.944
		SD in Log Scale	2.565
		Mean in Original Scale	0.333
		SD in Original Scale	2.789
		95% Percentile Bootstrap UCL	0.808
		95% BCA Bootstrap UCL	1.086
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.231	Data appear Lognormal at 5% Significance Level	
Theta Star	18.1		
nu star	4.163		
A-D Test Statistic	1.096	Nonparametric Statistics	
5% A-D Critical Value	0.832	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.832	Mean	0.312
5% K-S Critical Value	0.305	SD	2.778
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.256
		95% KM (t) UCL	0.735
Assuming Gamma Distribution		95% KM (z) UCL	0.732
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.709
Minimum	1.00E-09	95% KM (bootstrap t) UCL	3.661
Maximum	75.64	95% KM (BCA) UCL	0.801
Mean	11.66	95% KM (Percentile Bootstrap) UCL	0.79
Median	0.93	95% KM (Chebyshev) UCL	1.426
SD	18.86	97.5% KM (Chebyshev) UCL	1.908
k star	0.0857	99% KM (Chebyshev) UCL	2.855
Theta star	136		
Nu star	22.79	Potential UCLs to Use	
AppChi2	12.94	97.5% KM (Chebyshev) UCL	1.908
95% Gamma Approximate UCL	20.54		
95% Adjusted Gamma UCL	20.67		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.11

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Dibenz(a,h)anthracene

General Statistics			
Number of Valid Data	133	Number of Detected Data	7
Number of Distinct Detected Data	7	Number of Non-Detect Data	126
Number of Missing Values	17	Percent Non-Detects	94.74%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.051	Minimum Detected	-2.976
Maximum Detected	2.9	Maximum Detected	1.065
Mean of Detected	0.736	Mean of Detected	-1.063
SD of Detected	1.016	SD of Detected	1.356
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	5	Maximum Non-Detect	1.609
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	133
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.714	Shapiro Wilk Test Statistic	0.983
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.123	Mean	-3.257
SD	0.363	SD	1.22
95% DL/2 (t) UCL	0.175	95% H-Stat (DL/2) UCL	0.0982
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-8.152
		SD in Log Scale	3.306
		Mean in Original Scale	0.0418
		SD in Original Scale	0.272
		95% Percentile Bootstrap UCL	0.0847
		95% BCA Bootstrap UCL	0.113
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.545	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.351		
nu star	7.625		
A-D Test Statistic	0.329	Nonparametric Statistics	
5% A-D Critical Value	0.735	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.735	Mean	0.0884
5% K-S Critical Value	0.322	SD	0.266
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.0251
		95% KM (t) UCL	0.13
Assuming Gamma Distribution		95% KM (z) UCL	0.13
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.133
Minimum	1.00E-09	95% KM (bootstrap t) UCL	0.206
Maximum	4.437	95% KM (BCA) UCL	0.335
Mean	1.369	95% KM (Percentile Bootstrap) UCL	0.306
Median	1.047	95% KM (Chebyshev) UCL	0.198
SD	1.339	97.5% KM (Chebyshev) UCL	0.245
k star	0.167	99% KM (Chebyshev) UCL	0.338
Theta star	8.212		
Nu star	44.33	Potential UCLs to Use	
AppChi2	30.06	95% KM (t) UCL	0.13
95% Gamma Approximate UCL	2.018		
95% Adjusted Gamma UCL	2.027		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.12

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Fluoranthene

General Statistics			
Number of Valid Data	133	Number of Detected Data	9
Number of Distinct Detected Data	9	Number of Non-Detect Data	124
Number of Missing Values	17	Percent Non-Detects	93.23%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.012	Minimum Detected	-4.423
Maximum Detected	29	Maximum Detected	3.367
Mean of Detected	5.651	Mean of Detected	-1.21
SD of Detected	10.04	SD of Detected	3.026
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	5	Maximum Non-Detect	1.609
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	130
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	3
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	97.74%
Warning: There are only 9 Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data se			
the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.661	Shapiro Wilk Test Statistic	0.846
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Leve	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.52	Mean	-2.553
SD	2.846	SD	1.35
95% DL/2 (t) UCL	0.929	95% H-Stat (DL/2) UCL	0.268
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-5.931
		SD in Log Scale	3.145
		Mean in Original Scale	0.417
		SD in Original Scale	2.85
		95% Percentile Bootstrap UCL	0.86
		95% BCA Bootstrap UCL	1.129
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.236	Data appear Lognormal at 5% Significance Leve	
Theta Star	23.97		
nu star	4.244		
A-D Test Statistic	0.913	Nonparametric Statistics	
5% A-D Critical Value	0.829	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.829	Mean	0.405
5% K-S Critical Value	0.305	SD	2.839
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.261
		95% KM (t) UCL	0.838
Assuming Gamma Distribution		95% KM (z) UCL	0.835
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.809
Minimum	0.012	95% KM (bootstrap t) UCL	6.019
Maximum	46.3	95% KM (BCA) UCL	0.896
Mean	10.81	95% KM (Percentile Bootstrap) UCL	0.847
Median	5.448	95% KM (Chebyshev) UCL	1.543
SD	11	97.5% KM (Chebyshev) UCL	2.036
k star	1	99% KM (Chebyshev) UCL	3.004
Theta star	10.8		
Nu star	266.1	Potential UCLs to Use	
AppChi2	229.3	97.5% KM (Chebyshev) UCL	2.036
95% Gamma Approximate UCL	12.54		
95% Adjusted Gamma UCL	12.56		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.13

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Indeno(1,2,3-cd)pyrene

General Statistics			
Number of Valid Data	133	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	128
Number of Missing Values	17	Percent Non-Detects	96.24%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.014	Minimum Detected	-4.269
Maximum Detected	2.1	Maximum Detected	0.742
Mean of Detected	0.587	Mean of Detected	-2.044
SD of Detected	0.9	SD of Detected	2.146
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	6	Maximum Non-Detect	1.792
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	133
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.748	Shapiro Wilk Test Statistic	0.889
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.125	Mean	-3.101
SD	0.349	SD	1.157
95% DL/2 (t) UCL	0.176	95% H-Stat (DL/2) UCL	0.112
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-6.26
		SD in Log Scale	2.384
		Mean in Original Scale	0.0348
		SD in Original Scale	0.194
		95% Percentile Bootstrap UCL	0.0652
		95% BCA Bootstrap UCL	0.0875
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.305	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.923		
nu star	3.054		
A-D Test Statistic	0.479	Nonparametric Statistics	
5% A-D Critical Value	0.721	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.721	Mean	0.0403
5% K-S Critical Value	0.375	SD	0.192
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.019
		95% KM (t) UCL	0.0718
Assuming Gamma Distribution		95% KM (z) UCL	0.0716
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.0645
Minimum	1.00E-09	95% KM (bootstrap t) UCL	0.115
Maximum	28.78	95% KM (BCA) UCL	N/A
Mean	6.014	95% KM (Percentile Bootstrap) UCL	0.108
Median	2.628	95% KM (Chebyshev) UCL	0.123
SD	7.671	97.5% KM (Chebyshev) UCL	0.159
k star	0.164	99% KM (Chebyshev) UCL	0.23
Theta star	36.71		
Nu star	43.57	Potential UCLs to Use	
AppChi2	29.43	95% KM (t) UCL	0.0718
95% Gamma Approximate UCL	8.902		
95% Adjusted Gamma UCL	8.941		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.14

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Naphthalene

General Statistics			
Number of Valid Data	133	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	131
Number of Missing Values	17	Percent Non-Detects	98.50%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.65	Minimum Detected	-0.431
Maximum Detected	7	Maximum Detected	1.946
Mean of Detected	3.825	Mean of Detected	0.758
SD of Detected	4.49	SD of Detected	1.681
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	5	Maximum Non-Detect	1.609

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	132
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	1
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	99.25%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.206	Mean	-2.645
SD	0.66	SD	1.248
95% DL/2 (t) UCL	0.301	95% H-Stat (DL/2) UCL	0.196
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	0.698
5% K-S Critical Value	N/A	SD	0.549
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0673
		95% KM (t) UCL	0.809
Assuming Gamma Distribution		95% KM (z) UCL	0.808
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	4.805
Minimum	N/A	95% KM (bootstrap t) UCL	0.698
Maximum	N/A	95% KM (BCA) UCL	7
Mean	N/A	95% KM (Percentile Bootstrap) UCL	7
Median	N/A	95% KM (Chebyshev) UCL	0.991
SD	N/A	97.5% KM (Chebyshev) UCL	1.118
k star	N/A	99% KM (Chebyshev) UCL	1.367
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (Chebyshev) UCL	0.991
95% Gamma Approximate UCL	N/A		
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.15

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Phenanthrene

General Statistics			
Number of Valid Data	133	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	129
Number of Missing Values	17	Percent Non-Detects	96.99%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.014	Minimum Detected	-4.269
Maximum Detected	13	Maximum Detected	2.565
Mean of Detected	6.829	Mean of Detected	0.54
SD of Detected	5.525	SD of Detected	3.227
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	5	Maximum Non-Detect	1.609
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	130
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	3
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	97.74%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data se
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.995	Shapiro Wilk Test Statistic	0.733
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.344	Mean	-2.602
SD	1.442	SD	1.337
95% DL/2 (t) UCL	0.551	95% H-Stat (DL/2) UCL	0.232
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-13.18
		SD in Log Scale	6.105
		Mean in Original Scale	0.21
		SD in Original Scale	1.436
		95% Percentile Bootstrap UCL	0.433
		95% BCA Bootstrap UCL	0.54
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.283	Data appear Normal at 5% Significance Level	
Theta Star	24.13		
nu star	2.264		
A-D Test Statistic	0.618	Nonparametric Statistics	
5% A-D Critical Value	0.685	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.685	Mean	0.219
5% K-S Critical Value	0.412	SD	1.429
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.143
		95% KM (t) UCL	0.456
Assuming Gamma Distribution		95% KM (z) UCL	0.454
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	3.59
Minimum	0.014	95% KM (bootstrap t) UCL	0.374
Maximum	288	95% KM (BCA) UCL	13
Mean	61.51	95% KM (Percentile Bootstrap) UCL	9.09
Median	27.4	95% KM (Chebyshev) UCL	0.843
SD	75.13	97.5% KM (Chebyshev) UCL	1.113
k star	0.614	99% KM (Chebyshev) UCL	1.643
Theta star	100.1		
Nu star	163.4	Potential UCLs to Use	
AppChi2	134.9	95% KM (t) UCL	0.456
95% Gamma Approximate UCL	74.53	95% KM (Percentile Bootstrap) UCL	9.09
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-1.16

ProUCL OUTPUT -- SOIL [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in millagrams per kilogram (mg/kg)

Pyrene

General Statistics			
Number of Valid Data	133	Number of Detected Data	10
Number of Distinct Detected Data	10	Number of Non-Detect Data	123
Number of Missing Values	17	Percent Non-Detects	92.48%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.01	Minimum Detected	-4.605
Maximum Detected	62	Maximum Detected	4.127
Mean of Detected	7.957	Mean of Detected	-1.371
SD of Detected	19.32	SD of Detected	3.063
Minimum Non-Detect	0.01	Minimum Non-Detect	-4.605
Maximum Non-Detect	5	Maximum Non-Detect	1.609
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	130
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	3
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	97.74%
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.484	Shapiro Wilk Test Statistic	0.868
5% Shapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.736	Mean	-2.526
SD	5.458	SD	1.346
95% DL/2 (t) UCL	1.52	95% H-Stat (DL/2) UCL	0.291
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	43.64	Mean in Log Scale	-5.799
SD	25.21	SD in Log Scale	3.044
95% MLE (t) UCL	47.26	Mean in Original Scale	0.627
95% MLE (Tiku) UCL	67.1	SD in Original Scale	5.464
		95% Percentile Bootstrap UCL	1.541
		95% BCA Bootstrap UCL	2.09
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.215	Data appear Lognormal at 5% Significance Level	
Theta Star	37.04		
nu star	4.297		
A-D Test Statistic	1.063	Nonparametric Statistics	
5% A-D Critical Value	0.849	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.849	Mean	0.617
5% K-S Critical Value	0.293	SD	5.444
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.498
		95% KM (t) UCL	1.442
Assuming Gamma Distribution		95% KM (z) UCL	1.436
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.4
Minimum	1.00E-09	95% KM (bootstrap t) UCL	5.057
Maximum	66.51	95% KM (BCA) UCL	1.642
Mean	9.651	95% KM (Percentile Bootstrap) UCL	1.555
Median	1.00E-09	95% KM (Chebyshev) UCL	2.786
SD	16.92	97.5% KM (Chebyshev) UCL	3.725
k star	0.0734	99% KM (Chebyshev) UCL	5.568
Theta star	131.5		
Nu star	19.53	Potential UCLs to Use	
AppChi2	10.5	97.5% KM (Chebyshev) UCL	3.725
95% Gamma Approximate UCL	17.94		
95% Adjusted Gamma UCL	18.07		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-2.1

ProUCL OUTPUT -- GROUNDWATER [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Arsenic

General Statistics			
Number of Valid Data	12	Number of Detected Data	7
Number of Distinct Detected Data	7	Number of Non-Detect Data	5
Number of Missing Values	1	Percent Non-Detects	41.67%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	21	Minimum Detected	3.045
Maximum Detected	65	Maximum Detected	4.174
Mean of Detected	44.43	Mean of Detected	3.707
SD of Detected	18.38	SD of Detected	0.468
Minimum Non-Detect	8	Minimum Non-Detect	2.079
Maximum Non-Detect	10	Maximum Non-Detect	2.303
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	5
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	7
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	41.67%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data se
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.897	Shapiro Wilk Test Statistic	0.878
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Leve	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	27.75	Mean	2.777
SD	24.68	SD	1.202
95% DL/2 (t) UCL	40.55	95% H-Stat (DL/2) UCL	51.93
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	20.41	Mean in Log Scale	3.199
SD	33.41	SD in Log Scale	0.736
95% MLE (t) UCL	37.73	Mean in Original Scale	31.07
95% MLE (Tiku) UCL	40.3	SD in Original Scale	21.46
		95% Percentile Bootstrap UCL	41.17
		95% BCA Bootstrap UCL	41.44
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	3.489	Data appear Normal at 5% Significance Level	
Theta Star	12.73		
nu star	48.85		
A-D Test Statistic	0.407	Nonparametric Statistics	
5% A-D Critical Value	0.71	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.71	Mean	34.67
5% K-S Critical Value	0.313	SD	17.39
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	5.422
		95% KM (t) UCL	44.4
Assuming Gamma Distribution		95% KM (z) UCL	43.59
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	43.71
Minimum	21	95% KM (bootstrap t) UCL	45.46
Maximum	65	95% KM (BCA) UCL	50.17
Mean	41.39	95% KM (Percentile Bootstrap) UCL	47.5
Median	41.08	95% KM (Chebyshev) UCL	58.3
SD	15.23	97.5% KM (Chebyshev) UCL	68.53
k star	5.837	99% KM (Chebyshev) UCL	88.62
Theta star	7.091		
Nu star	140.1	Potential UCLs to Use	
AppChi2	113.7	95% KM (t) UCL	44.4
95% Gamma Approximate UCL	50.98	95% KM (Percentile Bootstrap) UCL	47.5
95% Adjusted Gamma UCL	52.65		

Note: DL/2 is not a recommended method.

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-2.2

ProUCL OUTPUT -- GROUNDWATER [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Barium

General Statistics			
Number of Valid Data	11	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	7
Number of Missing Values	2	Percent Non-Detects	63.64%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	15	Minimum Detected	2.708
Maximum Detected	86	Maximum Detected	4.454
Mean of Detected	57.5	Mean of Detected	3.868
SD of Detected	31.08	SD of Detected	0.796
Minimum Non-Detect	8	Minimum Non-Detect	2.079
Maximum Non-Detect	200	Maximum Non-Detect	5.298
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	11
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data se
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.933	Shapiro Wilk Test Statistic	0.823
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Leve	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	75.82	Mean	4.045
SD	35.92	SD	1.048
95% DL/2 (t) UCL	95.45	95% H-Stat (DL/2) UCL	7.54E+02
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	3.508
		SD in Log Scale	0.952
		Mean in Original Scale	47.45
		SD in Original Scale	36.98
		95% Percentile Bootstrap UCL	65.17
		95% BCA Bootstrap UCL	67.81
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.887	Data appear Normal at 5% Significance Level	
Theta Star	64.79		
nu star	7.1		
A-D Test Statistic	0.447	Nonparametric Statistics	
5% A-D Critical Value	0.66	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.66	Mean	49
5% K-S Critical Value	0.397	SD	29.47
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	15.22
		95% KM (t) UCL	76.58
Assuming Gamma Distribution		95% KM (z) UCL	74.03
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	79.78
Minimum	15	95% KM (bootstrap t) UCL	71.6
Maximum	116.1	95% KM (BCA) UCL	80
Mean	60.06	95% KM (Percentile Bootstrap) UCL	78.25
Median	58.01	95% KM (Chebyshev) UCL	115.3
SD	33.11	97.5% KM (Chebyshev) UCL	144
k star	2.167	99% KM (Chebyshev) UCL	200.4
Theta star	27.72		
Nu star	47.67	Potential UCLs to Use	
AppChi2	32.82	95% KM (t) UCL	76.58
95% Gamma Approximate UCL	87.22	95% KM (Percentile Bootstrap) UCL	78.25
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-2.3

ProUCL OUTPUT -- GROUNDWATER [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Chromium

General Statistics			
Number of Valid Data	11	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	6
Number of Missing Values	2	Percent Non-Detects	54.55%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	8	Minimum Detected	2.079
Maximum Detected	46	Maximum Detected	3.829
Mean of Detected	22.8	Mean of Detected	2.955
SD of Detected	14.72	SD of Detected	0.667
Minimum Non-Detect	30	Minimum Non-Detect	3.401
Maximum Non-Detect	30	Maximum Non-Detect	3.401

Warning: There are only 5 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data se
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.93	Shapiro Wilk Test Statistic	0.992
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Leve	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	18.55	Mean	2.82
SD	10.16	SD	0.441
95% DL/2 (t) UCL	24.1	95% H-Stat (DL/2) UCL	40.72
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	2.82
		SD in Log Scale	0.548
		Mean in Original Scale	19.27
		SD in Original Scale	11.14
		95% Percentile Bootstrap UCL	25.13
		95% BCA Bootstrap UCL	26.02
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.361	Data appear Normal at 5% Significance Level	
Theta Star	16.75		
nu star	13.61		
A-D Test Statistic	0.184	Nonparametric Statistics	
5% A-D Critical Value	0.683	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.683	Mean	19.64
5% K-S Critical Value	0.359	SD	10.66
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	4.519
		95% KM (t) UCL	27.83
Assuming Gamma Distribution		95% KM (z) UCL	27.07
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	28.3
Minimum	8	95% KM (bootstrap t) UCL	29.36
Maximum	46	95% KM (BCA) UCL	26.3
Mean	22.47	95% KM (Percentile Bootstrap) UCL	27.27
Median	21.51	95% KM (Chebyshev) UCL	39.34
SD	9.448	97.5% KM (Chebyshev) UCL	47.86
k star	4.702	99% KM (Chebyshev) UCL	64.6
Theta star	4.779		
Nu star	103.4	Potential UCLs to Use	
AppChi2	80.97	95% KM (t) UCL	27.83
95% Gamma Approximate UCL	28.7	95% KM (Percentile Bootstrap) UCL	27.27
95% Adjusted Gamma UCL	29.9		

Note: DL/2 is not a recommended method.

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-2.4

ProUCL OUTPUT -- GROUNDWATER [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Cobalt

General Statistics			
Number of Valid Data	11	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	9
Number of Missing Values	2	Percent Non-Detects	81.82%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1	Minimum Detected	0
Maximum Detected	3	Maximum Detected	1.099
Mean of Detected	2	Mean of Detected	0.549
SD of Detected	1.414	SD of Detected	0.777
Minimum Non-Detect	2	Minimum Non-Detect	0.693
Maximum Non-Detect	50	Maximum Non-Detect	3.912

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	11
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	0
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	14.27	Mean	1.856
SD	12.34	SD	1.597
95% DL/2 (t) UCL	21.01	95% H-Stat (DL/2) UCL	637.6
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	1.4
5% K-S Critical Value	N/A	SD	0.8
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.506
		95% KM (t) UCL	2.317
Assuming Gamma Distribution		95% KM (z) UCL	2.232
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	2.793
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	N/A
Mean	N/A	95% KM (Percentile Bootstrap) UCL	3
Median	N/A	95% KM (Chebyshev) UCL	3.605
SD	N/A	97.5% KM (Chebyshev) UCL	4.56
k star	N/A	99% KM (Chebyshev) UCL	6.434
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	2.317
95% Gamma Approximate UCL	N/A	95% KM (% Bootstrap) UCL	3
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-2.5

ProUCL OUTPUT -- GROUNDWATER [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Copper

General Statistics			
Number of Valid Data	11	Number of Detected Data	6
Number of Distinct Detected Data	5	Number of Non-Detect Data	5
Number of Missing Values	2	Percent Non-Detects	45.45%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	2	Minimum Detected	0.693
Maximum Detected	34	Maximum Detected	3.526
Mean of Detected	10.33	Mean of Detected	181.30%
SD of Detected	12.27	SD of Detected	1.1
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	25	Maximum Non-Detect	3.219
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	10
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	90.91%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data se
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.749	Shapiro Wilk Test Statistic	0.923
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	7.88E-01
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Leve	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	10.23	Mean	1.844
SD	9.32	SD	1.198
95% DL/2 (t) UCL	15.32	95% H-Stat (DL/2) UCL	108.9
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	1.36
		SD in Log Scale	1.157
		Mean in Original Scale	7.194
		SD in Original Scale	9.62
		95% Percentile Bootstrap UCL	12.23
		95% BCA Bootstrap UCL	14.92
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.658	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	15.7		
nu star	7.897		
A-D Test Statistic	0.392	Nonparametric Statistics	
5% A-D Critical Value	0.714	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.714	Mean	7.636
5% K-S Critical Value	0.34	SD	9.135
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	3.181
		95% KM (t) UCL	13.4
Assuming Gamma Distribution		95% KM (z) UCL	12.87
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	13.27
Minimum	1.00E-09	95% KM (bootstrap t) UCL	26.25
Maximum	34	95% KM (BCA) UCL	13.64
Mean	9.332	95% KM (Percentile Bootstrap) UCL	13.05
Median	5.074	95% KM (Chebyshev) UCL	21.5
SD	10.68	97.5% KM (Chebyshev) UCL	27.5
k star	0.186	99% KM (Chebyshev) UCL	39.28
Theta star	50.04		
Nu star	4.102	Potential UCLs to Use	
AppChi2	0.763	95% KM (BCA) UCL	13.64
95% Gamma Approximate UCL	50.2		
95% Adjusted Gamma UCL	68.07		

Note: DL/2 is not a recommended method.

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-2.6

ProUCL OUTPUT -- GROUNDWATER [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Lead

General Statistics			
Number of Valid Data	11	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	7
Number of Missing Values	2	Percent Non-Detects	63.64%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	1	Minimum Detected	0
Maximum Detected	3	Maximum Detected	1.099
Mean of Detected	2.175	Mean of Detected	0.696
SD of Detected	0.888	SD of Detected	0.495
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	5	Maximum Non-Detect	1.609
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	11
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data se
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.94	Shapiro Wilk Test Statistic	0.882
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Leve	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.882	Mean	0.483
SD	0.857	SD	0.647
95% DL/2 (t) UCL	2.35	95% H-Stat (DL/2) UCL	5.288
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	0.273
		SD in Log Scale	0.633
		Mean in Original Scale	1.555
		SD in Original Scale	0.887
		95% Percentile Bootstrap UCL	2.005
		95% BCA Bootstrap UCL	1.987
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.755	Data appear Normal at 5% Significance Level	
Theta Star	1.24		
nu star	14.04		
A-D Test Statistic	0.356	Nonparametric Statistics	
5% A-D Critical Value	0.659	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.659	Mean	1.783
5% K-S Critical Value	0.396	SD	0.837
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.395
		95% KM (t) UCL	2.499
Assuming Gamma Distribution		95% KM (z) UCL	2.433
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	2.565
Minimum	1	95% KM (bootstrap t) UCL	2.349
Maximum	3.554	95% KM (BCA) UCL	2.88
Mean	2.302	95% KM (Percentile Bootstrap) UCL	2.8
Median	2.19	95% KM (Chebyshev) UCL	3.504
SD	0.836	97.5% KM (Chebyshev) UCL	4.249
k star	5.402	99% KM (Chebyshev) UCL	5.712
Theta star	0.426		
Nu star	118.8	Potential UCLs to Use	
AppChi2	94.66	95% KM (t) UCL	2.499
95% Gamma Approximate UCL	2.89	95% KM (Percentile Bootstrap) UCL	2.8
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-2.7

ProUCL OUTPUT -- GROUNDWATER [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Molybdenum

General Statistics			
Number of Valid Data	11	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	7
Number of Missing Values	2	Percent Non-Detects	63.64%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	14	Minimum Detected	2.639
Maximum Detected	66	Maximum Detected	4.19
Mean of Detected	28.25	Mean of Detected	3.109
SD of Detected	25.2	SD of Detected	0.725
Minimum Non-Detect	8	Minimum Non-Detect	2.079
Maximum Non-Detect	100	Maximum Non-Detect	4.605
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	11
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data se
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.677	Shapiro Wilk Test Statistic	0.733
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	33.73	Mean	3.161
SD	22.62	SD	1.035
95% DL/2 (t) UCL	46.09	95% H-Stat (DL/2) UCL	293.4
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	2.505
		SD in Log Scale	0.986
		Mean in Original Scale	18.75
		SD in Original Scale	19.07
		95% Percentile Bootstrap UCL	28.64
		95% BCA Bootstrap UCL	32.84
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.743	Data do not follow a Discernable Distribution (0.05)	
Theta Star	38.04		
nu star	5.941		
A-D Test Statistic	0.775	Nonparametric Statistics	
5% A-D Critical Value	0.66	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.66	Mean	23.5
5% K-S Critical Value	0.397	SD	19.04
Data not Gamma Distributed at 5% Significance Level		SE of Mean	8.976
		95% KM (t) UCL	39.77
Assuming Gamma Distribution		95% KM (z) UCL	38.26
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	39.23
Minimum	7.711	95% KM (bootstrap t) UCL	241.2
Maximum	79.93	95% KM (BCA) UCL	46.4
Mean	32.12	95% KM (Percentile Bootstrap) UCL	41
Median	17	95% KM (Chebyshev) UCL	62.63
SD	25.38	97.5% KM (Chebyshev) UCL	79.56
k star	1.456	99% KM (Chebyshev) UCL	112.8
Theta star	22.05		
Nu star	32.04	Potential UCLs to Use	
AppChi2	20.1	95% KM (t) UCL	39.77
95% Gamma Approximate UCL	51.18	95% KM (% Bootstrap) UCL	41
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-2.8

ProUCL OUTPUT -- GROUNDWATER [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Nickel

General Statistics			
Number of Valid Data	11	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	7
Number of Missing Values	2	Percent Non-Detects	63.64%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	8	Minimum Detected	2.079
Maximum Detected	41	Maximum Detected	3.714
Mean of Detected	18.5	Mean of Detected	2.691
SD of Detected	15.42	SD of Detected	0.746
Minimum Non-Detect	8	Minimum Non-Detect	2.079
Maximum Non-Detect	40	Maximum Non-Detect	3.689
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	10
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	1
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	90.91%

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data se
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.798	Shapiro Wilk Test Statistic	0.89
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Leve	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	16.55	Mean	2.592
SD	10.5	SD	0.737
95% DL/2 (t) UCL	22.28	95% H-Stat (DL/2) UCL	54.91
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	2.005
		SD in Log Scale	0.867
		Mean in Original Scale	10.68
		SD in Original Scale	11.05
		95% Percentile Bootstrap UCL	16.54
		95% BCA Bootstrap UCL	19.06
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.755	Data appear Normal at 5% Significance Level	
Theta Star	24.49		
nu star	6.044		
A-D Test Statistic	0.431	Nonparametric Statistics	
5% A-D Critical Value	0.66	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.66	Mean	12.64
5% K-S Critical Value	0.397	SD	9.451
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	3.45
		95% KM (t) UCL	18.89
Assuming Gamma Distribution		95% KM (z) UCL	18.31
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	18.24
Minimum	4.36	95% KM (bootstrap t) UCL	23.7
Maximum	43.42	95% KM (BCA) UCL	41
Mean	18.66	95% KM (Percentile Bootstrap) UCL	20.55
Median	13.22	95% KM (Chebyshev) UCL	27.67
SD	14.16	97.5% KM (Chebyshev) UCL	34.18
k star	1.508	99% KM (Chebyshev) UCL	46.96
Theta star	12.37		
Nu star	33.18	Potential UCLs to Use	
AppChi2	21.01	95% KM (t) UCL	18.89
95% Gamma Approximate UCL	29.46	95% KM (Percentile Bootstrap) UCL	20.55
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-2.9

ProUCL OUTPUT -- GROUNDWATER [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Selenium

General Statistics			
Number of Valid Data	11	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	9
Number of Missing Values	2	Percent Non-Detects	81.82%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	3	Minimum Detected	1.099
Maximum Detected	14	Maximum Detected	2.639
Mean of Detected	8.5	Mean of Detected	1.869
SD of Detected	7.778	SD of Detected	1.089
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	50	Maximum Non-Detect	3.912

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	11
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	0
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	13.09	Mean	1.551
SD	12.02	SD	1.883
95% DL/2 (t) UCL	19.66	95% H-Stat (DL/2) UCL	636.4
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	4.833
5% K-S Critical Value	N/A	SD	4.099
Data not Gamma Distributed at 5% Significance Level		SE of Mean	2.367
		95% KM (t) UCL	9.123
Assuming Gamma Distribution		95% KM (z) UCL	8.726
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	12.38
Minimum	N/A	95% KM (bootstrap t) UCL	6.321
Maximum	N/A	95% KM (BCA) UCL	14
Mean	N/A	95% KM (Percentile Bootstrap) UCL	14
Median	N/A	95% KM (Chebyshev) UCL	15.15
SD	N/A	97.5% KM (Chebyshev) UCL	19.61
k star	N/A	99% KM (Chebyshev) UCL	28.38
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (BCA) UCL	14
95% Gamma Approximate UCL	N/A		
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX G-2.10

ProUCL OUTPUT -- GROUNDWATER [1]
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Results reported in micrograms per liter (µg/L)

Vanadium

General Statistics			
Number of Valid Data	11	Number of Detected Data	7
Number of Distinct Detected Data	7	Number of Non-Detect Data	4
Number of Missing Values	2	Percent Non-Detects	36.36%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	19	Minimum Detected	2.944
Maximum Detected	210	Maximum Detected	5.347
Mean of Detected	95.86	Mean of Detected	4.29
SD of Detected	71.88	SD of Detected	0.841
Minimum Non-Detect	8	Minimum Non-Detect	2.079
Maximum Non-Detect	50	Maximum Non-Detect	3.912
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	6
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	5
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	54.55%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data se
the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.879	Shapiro Wilk Test Statistic	0.954
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Leve	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	66.36	Mean	3.588
SD	69.4	SD	1.293
95% DL/2 (t) UCL	104.3	95% H-Stat (DL/2) UCL	323.3
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	37.43	Mean in Log Scale	3.635
SD	99.18	SD in Log Scale	1.147
95% MLE (t) UCL	91.63	Mean in Original Scale	65.79
95% MLE (Tiku) UCL	108	SD in Original Scale	69.68
		95% Percentile Bootstrap UCL	100.9
		95% BCA Bootstrap UCL	109.1
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.228	Data appear Normal at 5% Significance Level	
Theta Star	78.06		
nu star	17.19		
A-D Test Statistic	0.271	Nonparametric Statistics	
5% A-D Critical Value	0.715	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.715	Mean	68.73
5% K-S Critical Value	0.315	SD	64.18
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	20.94
		95% KM (t) UCL	106.7
Assuming Gamma Distribution		95% KM (z) UCL	103.2
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	103.9
Minimum	19	95% KM (bootstrap t) UCL	137.9
Maximum	210	95% KM (BCA) UCL	120.1
Mean	83.03	95% KM (Percentile Bootstrap) UCL	110.9
Median	68	95% KM (Chebyshev) UCL	160
SD	61.29	97.5% KM (Chebyshev) UCL	199.5
k star	1.737	99% KM (Chebyshev) UCL	277.1
Theta star	47.81		
Nu star	38.21	Potential UCLs to Use	
AppChi2	25.05	95% KM (t) UCL	106.7
95% Gamma Approximate UCL	126.6	95% KM (Percentile Bootstrap) UCL	110.9
95% Adjusted Gamma UCL	136		

Note: DL/2 is not a recommended method.

Notes:
1. Statistical output generated with ProUCL 4.00.04 (U.S. EPA, 2009).

APPENDIX H

Johnson and Ettinger Model Calculations

APPENDIX H-1: DATA ENTRY SHEET

SL-ADV
Version 3.1; 02/04

Reset to Defaults

Geomatrix Consultants, Inc.
modified by CAK; 1/06
Mult. Chemical; version 3.1.2

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
83329	9.00E+03	Acenaphthene
91203	4.90E+03	Acenaphthylene (Naphthalene surrogate)
91203	2.50E+03	Anthracene (Naphthalene surrogate)
91203	9.10E+03	Phenanthrene (Naphthalene surrogate)
91203	5.00E+02	Fluorene (Naphthalene surrogate)
75092	9.71E+00	Methylene chloride
91203	9.90E+02	Naphthalene
108883	2.80E+00	Cymene (Toluene surrogate)
95636	6.40E+00	1,2,4-Trimethylbenzene
108678	5.30E+00	1,3,5-Trimethylbenzene
108383	2.10E+00	m-Xylene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
16.67	9	91.44	0	9	10	72.44	S		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
S	1.66	0.375	0.054	0.002	S	1.66	0.375	0.054	0.002	SIC	1.8	0.3	0.15	0.055

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
9	40	1000	1000	244	0.1	1	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based soil concentration.

END

CHEMICAL PROPERTIES SHEET

	Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
Acenaphthene	4.21E-02	7.69E-06	1.55E-04	25	12,155	550.54	803.15	7.08E+03	3.57E+00	0.0E+00	2.1E-01	S
Acenaphthylene (Naphtha	5.90E-02	7.50E-06	4.82E-04	25	10,373	491.14	748.40	2.00E+03	3.10E+01	0.0E+00	9.0E-03	S
Anthracene (Naphthalene	5.90E-02	7.50E-06	4.82E-04	25	10,373	491.14	748.40	2.00E+03	3.10E+01	0.0E+00	9.0E-03	S
Phenanthrene (Naphthale	5.90E-02	7.50E-06	4.82E-04	25	10,373	491.14	748.40	2.00E+03	3.10E+01	0.0E+00	9.0E-03	S
Fluorene (Naphthalene su	5.90E-02	7.50E-06	4.82E-04	25	10,373	491.14	748.40	2.00E+03	3.10E+01	0.0E+00	9.0E-03	S
Methylene chloride	1.01E-01	1.17E-05	2.18E-03	25	6,706	313.00	510.00	1.17E+01	1.30E+04	1.0E-06	4.0E-01	L
Naphthalene	5.90E-02	7.50E-06	4.82E-04	25	10,373	491.14	748.40	2.00E+03	3.10E+01	3.4E-05	9.0E-03	S
Cymene (Toluene surroga	8.70E-02	8.60E-06	6.62E-03	25	7,930	383.78	591.79	1.82E+02	5.26E+02	0.0E+00	3.0E-01	L
1,2,4-Trimethylbenzene	6.06E-02	7.92E-06	6.14E-03	25	9,369	442.30	649.17	1.35E+03	5.70E+01	0.0E+00	6.0E-03	L
1,3,5-Trimethylbenzene	6.02E-02	8.67E-06	5.87E-03	25	9,321	437.89	637.25	1.35E+03	2.00E+00	0.0E+00	6.0E-03	L
m-Xylene	7.00E-02	7.80E-06	7.32E-03	25	8,523	412.27	617.05	4.07E+02	1.61E+02	0.0E+00	7.0E-01	L

END

APPENDIX H-1 (continued): INTERMEDIATE CALCULATIONS SHEET

	Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
Acenaphthene	7.88E+08	82.44	0.321	0.321	0.150	0.003	1.00E-07	0.998	1.00E-07	4,000	9.00E+03	6.78E+04
Phenanthrene (Naphthale	7.88E+08	82.44	0.321	0.321	0.150	0.003	1.00E-07	0.998	1.00E-07	4,000	9.10E+03	6.78E+04
Methylene chloride	7.88E+08	82.44	0.321	0.321	0.150	0.003	1.00E-07	0.998	1.00E-07	4,000	9.71E+00	6.78E+04
Naphthalene	7.88E+08	82.44	0.321	0.321	0.150	0.003	1.00E-07	0.998	1.00E-07	4,000	9.90E+02	6.78E+04
Cymene (Toluene surroga	7.88E+08	82.44	0.321	0.321	0.150	0.003	1.00E-07	0.998	1.00E-07	4,000	2.80E+00	6.78E+04
1,2,4-Trimethylbenzene	7.88E+08	82.44	0.321	0.321	0.150	0.003	1.00E-07	0.998	1.00E-07	4,000	6.40E+00	6.78E+04
1,3,5-Trimethylbenzene	7.88E+08	82.44	0.321	0.321	0.150	0.003	1.00E-07	0.998	1.00E-07	4,000	5.30E+00	6.78E+04
m-Xylene	7.88E+08	82.44	0.321	0.321	0.150	0.003	1.00E-07	0.998	1.00E-07	4,000	2.10E+00	6.78E+04

	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
Acenaphthene	1.00E+06	5.00E-03	9	16,041	7.10E-05	2.99E-03	1.77E-04	6.81E-03	6.81E-03	8.96E-04	1.00E-03	82.44	9
Acenaphthylene (Naphtha	1.00E+06	5.00E-03	9	12,844	2.58E-04	1.09E-02	1.77E-04	9.54E-03	9.54E-03	1.20E-03	1.34E-03	82.44	9
Anthracene (Naphthalene	1.00E+06	5.00E-03	9	12,844	2.58E-04	1.09E-02	1.77E-04	9.54E-03	9.54E-03	1.20E-03	1.34E-03	82.44	9
Phenanthrene (Naphthale	1.00E+06	4.00E-04	9	12,844	2.58E-04	1.09E-02	1.77E-04	9.54E-03	9.54E-03	1.20E-03	1.34E-03	82.44	9
Fluorene (Naphthalene su	1.00E+06	5.00E-03	9	12,844	2.58E-04	1.09E-02	1.77E-04	9.54E-03	9.54E-03	1.20E-03	1.34E-03	82.44	9
Methylene chloride	1.00E+06	5.00E-03	9	6,963	1.56E-03	6.55E-02	1.77E-04	1.63E-02	1.63E-02	2.03E-03	2.27E-03	82.44	9
Naphthalene	1.00E+06	5.00E-03	9	12,844	2.58E-04	1.09E-02	1.77E-04	9.54E-03	9.54E-03	1.20E-03	1.34E-03	82.44	9
Cymene (Toluene surroga	1.00E+06	5.00E-03	9	9,082	4.26E-03	1.79E-01	1.77E-04	1.41E-02	1.41E-02	1.75E-03	1.95E-03	82.44	9
1,2,4-Trimethylbenzene	1.00E+06	5.00E-03	9	11,609	3.50E-03	1.47E-01	1.77E-04	9.80E-03	9.80E-03	1.22E-03	1.36E-03	82.44	9
1,3,5-Trimethylbenzene	1.00E+06	5.00E-03	9	11,592	3.34E-03	1.41E-01	1.77E-04	9.73E-03	9.73E-03	1.21E-03	1.35E-03	82.44	9
m-Xylene	1.00E+06	5.00E-03	9	10,177	4.47E-03	1.88E-01	1.77E-04	1.13E-02	1.13E-02	1.40E-03	1.57E-03	82.44	9

	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
Acenaphthene	3.89E+02	6.90E+01	1.25	8.33E+01	6.81E-03	5.00E+03	3.72E+09	1.56E-04	1.1E-02	NA	NA	NA	NA
Acenaphthylene (Naphtha	1.10E+02	8.98E+02	1.25	8.33E+01	9.54E-03	5.00E+03	6.76E+06	2.01E-04	1.8E-01	NA	NA	NA	NA
Anthracene (Naphthalene	1.10E+02	9.58E-01	1.25	8.33E+01	9.54E-03	5.00E+03	6.76E+06	2.01E-04	1.9E-04	NA	NA	NA	NA
Phenanthrene (Naphthale	1.10E+02	9.77E+01	0.10	8.33E+01	9.54E-03	4.00E+02	2.36E+85	2.01E-04	2.0E-02	NA	NA	NA	NA
Fluorene (Naphthalene su	1.10E+02	2.76E-01	1.25	8.33E+01	9.54E-03	5.00E+03	6.76E+06	2.01E-04	5.5E-05	NA	NA	NA	NA
Methylene chloride	6.44E-01	5.73E+02	1.25	8.33E+01	1.63E-02	5.00E+03	9.77E+03	3.05E-04	1.7E-01	NA	NA	NA	NA
Naphthalene	1.10E+02	9.77E+01	1.25	8.33E+01	9.54E-03	5.00E+03	6.76E+06	2.01E-04	2.0E-02	NA	NA	NA	NA
Cymene (Toluene surroga	1.00E+01	4.97E+01	1.25	8.33E+01	1.41E-02	5.00E+03	4.28E+04	2.72E-04	1.4E-02	NA	NA	NA	NA
1,2,4-Trimethylbenzene	7.44E+01	1.26E+01	1.25	8.33E+01	9.80E-03	5.00E+03	4.46E+06	2.03E-04	2.6E-03	NA	NA	NA	NA
1,3,5-Trimethylbenzene	7.44E+01	1.00E+01	1.25	8.33E+01	9.73E-03	5.00E+03	4.94E+06	2.02E-04	2.0E-03	NA	NA	NA	NA
m-Xylene	2.24E+01	1.75E+01	1.25	8.33E+01	1.13E-02	5.00E+03	5.71E+05	2.29E-04	4.0E-03	NA	NA	NA	NA

END

DATA ENTRY SHEET

GW-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below

YES X

Geomatrix Consultants, Inc.
modified by CAK; 11/05
Mult. Chemical; version 3.1.2

ENTER
U.S. EPA or Cal-EPA

Cal-EPA

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_w (µg/L)	Chemical
75092	2.60E+00	Methylene chloride

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell G28)							
10	15	182.88	19	30	133.88	C	S	S		
		6 feet								

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
S	1.66	0.375	0.054	SIC	1.8	0.3	0.15	S	1.66	0.375	0.054

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	1000	366	0.1	1	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

APPENDIX H2 (continued):

CHEMICAL PROPERTIES SHEET

	Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
Methylene chloride	1.01E-01	1.17E-05	2.18E-03	25	6,706	313.00	510.00	1.17E+01	1.30E+04	1.0E-06	4.0E-01

END

APPENDIX H2 (continued): INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	167.88	0.321	0.150	0.321	0.003	9.92E-08	0.998	9.91E-08	17.05	0.375	0.122	0.253	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
1.02E+05	1.06E+06	5.00E-03	15	7,034	1.16E-03	5.01E-02	1.75E-04	1.63E-02	2.03E-03	1.63E-02	6.64E-04	3.51E-03	167.88

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	1.30E+02	1.33	8.33E+01	1.63E-02	5.30E+03	1.52E+04	1.72E-04	2.24E-02	1.0E-06	4.0E-01

END

APPENDIX I

Human Health Risk Assessment Calculations

APPENDIX I
HUMAN HEALTH RISK ASSESSMENT CALCULATIONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California
Project #15317.000

RISK EQUATIONS

INCIDENTAL INGESTION OF SOIL/SEDIMENT

$$AADD = \frac{(Cs \times IRs \times ABSos \times EFig \times ED \times CFmg\text{-}kg)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDo}$$

$$LADD = \frac{(Cs \times IRs \times ABSos \times EFig \times ED \times CFmg\text{-}kg)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFo$$

DERMAL CONTACT WITH SOIL/SEDIMENT

$$AADD = \frac{(Cs \times SAs \times SAF \times ABSds \times EFdc \times ED \times CFmg\text{-}kg)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDo}$$

$$LADD = \frac{(Cs \times SAs \times SAF \times ABSds \times EFdc \times ED \times CFmg\text{-}kg)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFo$$

INHALATION OF VOLATILES IN AMBIENT AIR

$$AADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFi$$

INHALATION OF VOLATILES IN INDOOR AIR

$$AADD = \frac{(Cia \times IHRia \times ETia \times ABSiv \times EFia \times ED)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Cia \times IHRia \times ETia \times ABSiv \times EFia \times ED)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFi$$

INHALATION OF RESUSPENDED SOIL PARTICULATES

$$AADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFi$$

DERMAL CONTACT WITH GROUNDWATER

$$AADD = \frac{(DAevent \times SAswr \times EVswr \times EFswr \times ED)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDo}$$

$$LADD = \frac{(DAevent \times SAswr \times EVswr \times EFswr \times ED)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFo$$

APPENDIX I
HUMAN HEALTH RISK ASSESSMENT CALCULATIONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California
Project #15317.000

CONSTANTS

Parameter	Symbol	Value	Units
SITE-SPECIFIC PROPERTIES			
Soil Emission Area - ambient air	A_site	109,300	m^2
Groundwater Emission Area - ambient air	A_gw	109,300	m^2
TRENCH PARAMETERS			
Soil Emission Area - trench	A_trench	5	m^2
Length of Area - trench	LS_tench	3	m
Mixing Height	MH	2	m
Wind Speed	WS	2.5	m/sec
SOIL PROPERTIES			
Fraction Organic Carbon	foc	0.006	unitless
Bulk Density	pb	1.5	g/cm^3
Water Filled Soil Porosity	Pw	0.15	unitless
Air Filled Soil Porosity	Pa	0.28	unitless
Total Porosity	Pt	0.43	unitless
PHYSICAL CONSTANTS			
Universal Gas Constant	R	8314	Pa-L/mole-K
Universal Gas Constant	Rgas	8.2E-05	atm-m^3/mole-K
UNITS CONVERSION FACTORS			
Conversion Factor from cm^2 to m^2	CF_{cm2-m2}	1E-04	m^2/cm^2
Conversion Factor from cm^3 to L	CF_{cm3-L}	1E-03	L/cm^3
Conversion Factor from cm^3 to m^3	CF_{cm3m3}	1E-06	m^3/cm^3
Conversion Factor from g to kg	CF_{g-kg}	1E-03	kg/g
Conversion Factor from g to mg	CF_{g-mg}	1E+03	mg/g
Conversion Factor from kg to mg	CF_{kg-mg}	1E+06	mg/kg
Conversion Factor from m^2 to cm^2	CF_{m2-cm2}	1E+04	cm^2/m^2
Conversion Factor from m^3 to cm^3	CF_{m3cm3}	1E+06	cm^3/m^3
Conversion Factor from mg to kg	CF_{mg-kg}	1E-06	kg/mg

APPENDIX I
HUMAN HEALTH RISK ASSESSMENT CALCULATIONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California
Project #15317.000

AIR DISPERSION FACTOR (X/Q)

Source	Scenario	Area of Source (acre)	Q/C (g/m^2-sec) per (kg/m^3)	X/Q (mg/m^3) per (mg/m^2-sec)
Soil	Commercial/ Residential	27	46.5	21.5
Groundwater	Commercial/ Residential	27	46.5	21.5

$$X/Q = \frac{CF_{kg\text{-}mg}}{Q/C \times CF_{g\text{-}mg}}$$

Source: USEPA, 1996

Parameter	Symbol	Value	Units	Source(s)
Air Dispersion Factor	X/Q	see above	mg/m^3 per mg/m^2-sec	calculated
Inverse of Dispersion Factor	Q/C	see above	g/m^2-sec per kg/m^3	estimated
Area of Source	A	see above	acre	site-specific
Source Location	--	5	--	site-specific
Conversion Factor from kg to mg	$CF_{kg\text{-}mg}$	1.E+06	mg/kg	--
Conversion Factor from g to mg	$CF_{g\text{-}mg}$	1.E+03	mg/g	--

Location				$Q/C = A \times \exp[(\ln A_c - B)^2 \div C]$ (g/m^2-sec) / (kg/m^3)				
Selection	Zone	State	City	A Constant	B Constant	C Constant	Soil	Groundwater
5	**2**	**CA**	**San Francisco**	**13.81**	**20.16**	**234.29**	**46.52**	**46.52**
1	1	WA	Seattle	14.2253	18.84	218.18	43.03	43.03
2	1	OR	Salem	12.3783	18.97	218.21	38.15	38.15
3	2	CA	Fresno	10.2152	19.27	220.06	32.55	32.55
4	2	CA	Los Angeles	11.911	18.44	209.78	35.53	35.53
5	2	CA	San Francisco	13.8139	20.16	234.29	46.52	46.52
6	3	NV	Las Vegas	13.3093	19.84	230.17	43.71	43.71
7	3	AZ	Phoenix	10.2871	18.71	212.71	31.44	31.44
8	3	NM	Albuquerque	14.9421	17.99	205.18	42.78	42.78

PARTICULATE EMISSION FACTOR (PEF)

Source	Scenario	PEF (mg/kg) per (mg/m^3)	Source
Soil	Residential	4.40E+08	USEPA, 2002
	Commercial	1.32E+09	USEPA, 2004
	Construction	1.44E+06	DTSC, 1999; USEPA 2002

Note: NAAQS of 50 mg/m3

$$PEF = \frac{Q/C \times 3600}{0.036 \times (1 - V) \times (Um/Ut)^3 \times F(x)}$$

Source: USEPA, 1996

Parameter	Symbol	Value	Units	Source(s)
Inverse of Dispersion Factor	Q/C	see above	g/m^2-sec per kg/m^3	estimated
Fraction of Vegetative Cover	V	0.5	--	default
Mean Annual Windspeed	Um	4.69	m/sec	USEPA, 1996
Equivalent Threshold Value of Windspeed	Ut	11.32	m/sec	USEPA, 1996
Function of Um/Ut	F(x)	2.E-01	--	USEPA, 1996

APPENDIX I
HUMAN HEALTH RISK ASSESSMENT CALCULATIONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California
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EXPOSURE PARAMETERS

Parameter	Symbol	Units	On-site Outdoor Worker	On-site Indoor Worker	Construction Worker	Off-site Adult Resident	Off-site Child Resident
ALL PATHWAYS							
Exposure Frequency	EF	d/yr	250	250	250	350	350
Exposure Duration	ED	yr	25	25	1	24	6
Body Weight	BW	kg	70	70	70	70	15
Averaging Time-Non-cancer	ATnc	days	9,125	9,125	365	8,760	2,190
Averaging Time-Cancer	ATca	days	25,550	25,550	25,550	25,550	25,550
INCIDENTAL INGESTION OF SOIL/SEDIMENT							
Exposure Frequency	EFig	d/yr	250	NA	250	NA	NA
Ingestion Rate	IRs	mg/d	100	NA	480	NA	NA
DERMAL CONTACT WITH SOIL/SEDIMENT							
Exposure Frequency	EFdc	d/yr	250	NA	250	NA	NA
Surface Area	SAs	cm^2	3,300	NA	5,800	NA	NA
Soil-to-Skin Adherence Factor	SAF	mg/cm^2	0.2	NA	0.51	NA	NA
INHALATION OF VOLATILES IN AMBIENT AIR							
Exposure Frequency	EFaa	d/yr	250	NA	250	350	350
Inhalation Rate	IHRaa	m^3/hr	1.6	NA	2.5	0.83	0.42
Exposure Time	ETaa	hr/d	8	NA	8	24	24
Duration	T	sec	7.9E+08	NA	3.2E+07	7.6E+08	1.9E+08
INHALATION OF VOLATILES IN INDOOR AIR							
Exposure Frequency	EFia	d/yr	250	250	NA	NA	NA
Inhalation Rate	IHRia	m^3/hr	1.6	1.6	NA	NA	NA
Exposure Time	ETia	hr/d	8	8	NA	NA	NA
INHALATION OF RESUSPENDED SOIL PARTICULATES							
Exposure Frequency	EFpe	d/yr	250	NA	250	350	350
Inhalation Rate	IHRpe	m^3/hr	1.6	NA	2.5	0.83	0.42
Exposure Time	ETpe	hr/d	8	NA	8	24	24
INHALATION OF VOLATILES IN TRENCH AMBIENT AIR							
Exposure Time	ETtrench	hr/day	NA	NA	2	NA	NA
Event Frequency	EVtrench	evt/day	NA	NA	1	NA	NA
Exposure Frequency	EFtrench	d/yr	NA	NA	20	NA	NA
Inhalation Rate	IHRtrench	m^3/hr	NA	NA	2.5	NA	NA
DERMAL CONTACT WITH GROUNDWATER							
Event Duration	tevent	hr/day	NA	NA	0.5	NA	NA
Event Frequency	EVswr	evt/day	NA	NA	1	NA	NA
Exposure Frequency	EFswr	d/yr	NA	NA	20	NA	NA
Surface Area	SAswr	cm^2	NA	NA	7,000	NA	NA

Abbreviations:
NA = not applicable

1) Assuming construction/maintenance workers wear short sleeve shirts, long pants, and shoes.
2) Assuming that construction/maintenance workers stand in ~ 2 feet of water; thus, forearms, hands, lower legs, and feet (30.6% total body

REPRESENTATIVE CONCENTRATIONS

Chemical	Surface Soil (mg/kg)	Soil (mg/kg)	Groundwater (mg/L)	Indoor Air (from soil) (mg/m^3)	Indoor Air (from groundwater) (mg/m^3)
Acenaphthene	9.0E+00	9.0E+00	ND	1.1E-05	ND
Acenaphthylene	4.9E+00	4.9E+00	ND	1.8E-04	ND
Anthracene	2.5E+00	2.5E+00	ND	1.9E-07	ND
Arsenic	ND	ND	4.8E-02	ND	ND
Barium	ND	ND	7.8E-02	ND	ND
Benzo(a)anthracene	6.2E-01	6.2E-01	ND	ND	ND
Benzo(a)pyrene	2.7E-01	2.7E-01	ND	ND	ND
Benzo(b)fluoranthene	1.3E-01	1.3E-01	ND	ND	ND
Benzo(g,h,i)perylene	1.1E-01	1.1E-01	ND	ND	ND
Benzo(k)fluoranthene	7.9E-02	7.9E-02	ND	ND	ND
Chromium III	ND	ND	2.8E-02	ND	ND
Chrysene	1.9E+00	1.9E+00	ND	ND	ND
Cobalt	6.5E+00	6.5E+00	3.0E-03	ND	ND
Copper	ND	ND	1.4E-02	ND	ND
Cymene	2.8E-03	2.8E-03	ND	1.4E-05	ND
Dibenz(a,h)anthracene	1.3E-01	1.3E-01	ND	ND	ND
Fluoranthene	2.0E+00	2.0E+00	ND	ND	ND
Fluorene	5.0E-01	5.0E-01	ND	5.5E-08	ND
Indeno(1,2,3-cd)pyrene	7.2E-02	7.2E-02	ND	ND	ND
Lead	ND	ND	2.8E-03	ND	ND
Mercury (elemental)	6.4E-02	6.4E-02	ND	ND	ND
Methylene chloride	9.7E-03	9.7E-03	2.6E-03	1.7E-04	2.2E-05
Molybdenum	5.1E-01	5.1E-01	4.1E-02	ND	ND
Naphthalene	9.9E-01	9.9E-01	ND	2.0E-05	ND
Nickel	ND	ND	2.1E-02	ND	ND
Phenanthrene	9.1E+00	9.1E+00	ND	2.0E-05	ND
Pyrene	3.7E+00	3.7E+00	ND	ND	ND
Selenium	1.6E+00	1.6E+00	1.4E-02	ND	ND
Thallium	1.5E+00	1.5E+00	ND	ND	ND
1,2,4-Trimethylbenzene	6.4E-03	6.4E-03	ND	2.6E-06	ND
1,3,5-Trimethylbenzene	5.3E-03	5.3E-03	ND	2.0E-06	ND
Vanadium	ND	ND	1.1E-01	ND	ND
Xylenes	2.1E-03	2.1E-03	ND	4.0E-06	ND
Zinc	ND	ND	1.5E-01	ND	ND

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Contra Costa County, California
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TOXICITY CRITERIA

Chemical	Slope Factors (SF)			Reference Doses (RfD)			
	Oral SFo $(mg/kg\text{-}d)^{-1}$	Dermal SFd $(mg/kg\text{-}d)^{-1}$	Inhalation SFi $(mg/kg\text{-}d)^{-1}$	Chronic Oral RfDo (mg/kg-d)	Child Oral RfDch (mg/kg-d)	Chronic Dermal RfDd (mg/kg-d)	Chronic Inhalation RfDi (mg/kg-d)
Acenaphthene	NA	NA	NA	0.06	0.06	0.06	6.00E-02
Acenaphthylene	NC	NA	NC	0.06	0.06	0.06	6.00E-02
Anthracene	NC	NA	NC	0.3	0.3	0.3	3.00E-01
Arsenic	9.45	9.45	12	0.0003	0.0003	0.0003	4.29E-06
Barium	NC	NA	NC	0.2	0.2	0.014	1.43E-04
Benzo(a)anthracene	1.2	1.2	0.39	NA	NA	NA	NA
Benzo(a)pyrene	12	12	3.9	NA	NA	NA	NA
Benzo(b)fluoranthene	1.2	1.2	0.39	NA	NA	NA	NA
Benzo(g,h,i)perylene	NC	NA	NC	0.06	0.06	0.06	6.00E-02
Benzo(k)fluoranthene	1.2	1.2	0.39	NA	NA	NA	NA
Chromium III	NC	NA	NC	1.5	1.5	0.0195	1.50E+00
Chrysene	0.12	0.12	0.039	NA	NA	NA	NA
Cobalt	NA	NA	NA	0.02	0.02	0.02	5.70E-06
Copper	NC	NA	NC	0.037	0.037	0.037	3.70E-02
Cymene	NC	NA	NC	0.08	0.08	0.08	1.40E+00
Dibenz(a,h)anthracene	4.1	4.1	4.1	NA	NA	NA	NA
Fluoranthene	NC	NA	NC	0.04	0.04	0.04	4.00E-02
Fluorene	NC	NA	NC	0.04	0.04	0.04	4.00E-02
Indeno(1,2,3-cd)pyrene	1.2	1.2	0.39	NA	NA	NA	NA
Lead	0.0085	0.0085	0.042	NA	NA	NA	NA
Mercury (elemental)	NA	NA	NA	8.57143E-06	8.57143E-06	8.57143E-06	8.57E-06
Methylene chloride	0.014	0.014	0.0035	0.06	0.06	0.06	1.14E-01
Molybdenum	NA	NA	NA	0.005	0.005	0.005	5.00E-03
Naphthalene	0.12	0.12	0.12	0.02	0.02	0.02	2.57E-03
Nickel	NA	NA	0.91	0.02	0.011	0.0008	1.43E-05
Phenanthrene	NC	NA	NC	0.04	0.04	0.04	4.00E-02
Pyrene	NC	NA	NC	0.03	0.03	0.03	3.00E-02
Selenium	NC	NA	NC	0.005	0.005	0.005	5.71E-03
Thallium	NA	NA	NA	0.00008	0.00008	0.00008	8.00E-05
1,2,4-Trimethylbenzene	NA	NA	NA	0.05	0.05	0.05	1.70E-03
1,3,5-Trimethylbenzene	NA	NA	NA	0.05	0.05	0.05	1.70E-03
Vanadium	NA	NA	NA	0.007	0.007	0.000182	7.00E-03
Xylenes	NA	NA	NC	0.2	0.2	0.2	2.00E-01
Zinc	NC	NA	NC	0.3	0.3	0.3	3.00E-01

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PHYSICOCHEMICAL PROPERTIES

Chemical	Log Octanol Water Partition Coefficient (log Kow)	Henry's Law Constant (H)	Henry's Law Constant (H')	Henry's Law Constant (H)	Aqueous Solubility (S)	Diffusivity in Air (Di) given	Diffusivity in Air (Di) calculated	Diffusivity in Water (Dw)	Organic Carbon Partition Coefficient (Koc)	Molecular Weight (MW)	VOC?
	(--)	(atm-m^3/mole)	(unitless)	(Pa-L/mole)	(mg/L)	(cm^2/sec)	(cm^2/sec)	(cm^2/sec)	(L/kg)	(g/mole)	
Acenaphthene	3.92	1.5E-04	6.3E-03	1.6E+04	3.6E+00	4.2E-02	NA	7.7E-06	7.1E+03	154.21	Yes
Acenaphthylene	4.01	1.1E-04	4.6E-03	1.1E+04	1.0E+01	4.4E-02	NA	6.6E-06	4.8E+03	152.20	Yes
Anthracene	4.55	6.5E-05	2.7E-03	6.6E+03	4.3E-02	3.2E-02	NA	7.7E-06	3.0E+04	178.24	Yes
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	75.00	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	137.00	NA
Benzo(a)anthracene	5.70	3.4E-06	1.4E-04	3.4E+02	9.4E-03	5.1E-02	NA	9.0E-06	4.0E+05	228.30	No
Benzo(a)pyrene	6.11	1.1E-06	4.6E-05	1.1E+02	1.6E-03	4.3E-02	NA	9.0E-06	1.0E+06	252.32	No
Benzo(b)fluoranthene	6.20	1.1E-04	4.5E-03	1.1E+04	1.5E-03	2.3E-02	NA	5.6E-06	1.2E+06	252.32	No
Benzo(g,h,i)perylene	7.10	2.7E-07	1.1E-05	2.7E+01	2.6E-04	4.5E-02	NA	4.9E-06	7.8E+06	276.34	No
Benzo(k)fluoranthene	6.20	8.3E-07	3.4E-05	8.4E+01	8.0E-04	2.3E-02	NA	5.6E-06	1.2E+06	252.32	No
Chromium III	NA	NA	NA	NA	NA	NA	NA	NA	NA	52.00	NA
Chrysene	5.70	9.4E-05	3.9E-03	9.6E+03	6.3E-03	2.5E-02	NA	6.2E-06	4.0E+05	228.30	No
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	59.00	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	64.00	NA
Cymene	4.10	1.1E-02	4.5E-01	1.1E+06	2.3E+01	5.6E-02	NA	7.3E-06	4.1E+03	134.22	Yes
Dibenz(a,h)anthracene	6.69	1.5E-08	6.0E-07	1.5E+00	2.5E-03	2.0E-02	NA	5.2E-06	3.8E+06	278.36	No
Fluoranthene	5.12	1.6E-05	6.6E-04	1.6E+03	2.1E-01	3.0E-02	NA	6.4E-06	1.1E+05	202.26	No
Fluorene	4.21	6.3E-05	2.6E-03	6.4E+03	2.0E+00	3.6E-02	NA	7.9E-06	1.4E+04	166.22	Yes
Indeno(1,2,3-cd)pyrene	6.65	1.6E-06	6.6E-05	1.6E+02	2.2E-05	1.9E-02	NA	5.7E-06	3.5E+06	276.34	No
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	207.20	NA
Mercury (elemental)	NA	1.1E-02	4.4E-01	1.1E+06	2.0E+01	3.1E-02	NA	6.3E-06	5.2E+01	200.59	No
Methylene chloride	1.25	2.2E-03	9.0E-02	2.2E+05	1.3E+04	1.0E-01	NA	1.2E-05	1.2E+01	84.93	Yes
Molybdenum	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.94	NA
Naphthalene	3.36	4.8E-04	2.0E-02	4.9E+04	3.1E+01	5.9E-02	NA	7.5E-06	2.0E+03	128.18	Yes
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	59.00	NA
Phenanthrene	4.48	3.9E-05	1.6E-03	4.0E+03	1.2E+00	5.8E-02	NA	5.9E-06	2.7E+04	178.24	Yes
Pyrene	5.11	1.1E-05	4.5E-04	1.1E+03	1.4E+00	2.7E-02	NA	7.2E-06	1.1E+05	202.26	No
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	79.00	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	204.00	NA
1,2,4-Trimethylbenzene	3.72	6.1E-03	2.5E-01	6.2E+05	5.7E+01	6.1E-02	NA	7.9E-06	1.4E+03	120.20	Yes
1,3,5-Trimethylbenzene	3.54	5.9E-03	2.4E-01	5.9E+05	2.0E+00	6.0E-02	NA	8.7E-06	1.4E+03	120.20	Yes
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	51.00	NA
Xylenes	3.17	6.6E-03	2.7E-01	6.7E+05	1.1E+02	8.5E-02	NA	9.9E-06	4.4E+02	106.17	Yes
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	65.00	NA

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CALCULATION OF SOIL SATURATION CONCENTRATIONS (Csat)

Chemical	Organic Carbon Partition Coefficient (Koc) (L/kg)	Aqueous Solubility (S) (mg/L)	Henry's Law Constant (H') (unitless)	Soil-Organic Partition Coefficient (Kd) (L/kg)	Saturation Concentration (Csat) (mg/kg)	Maximum Concentration Soil (Cs) (mg/kg)	Free Phase?
Acenaphthene	7.1E+03	3.6E+00	6.3E-03	4.2E+01	1.5E+02	9.0E+00	No
Acenaphthylene	4.8E+03	1.0E+01	4.6E-03	2.9E+01	2.9E+02	4.9E+00	No
Anthracene	3.0E+04	4.3E-02	2.7E-03	1.8E+02	7.7E+00	2.5E+00	No
Arsenic	NA	NA	NA	NA	NA	0.0E+00	NA
Barium	NA	NA	NA	NA	NA	0.0E+00	NA
Benzo(a)anthracene	4.0E+05	9.4E-03	1.4E-04	2.4E+03	2.2E+01	6.2E-01	NA
Benzo(a)pyrene	1.0E+06	1.6E-03	4.6E-05	6.1E+03	9.9E+00	2.7E-01	NA
Benzo(b)fluoranthene	1.2E+06	1.5E-03	4.5E-03	7.4E+03	1.1E+01	1.3E-01	NA
Benzo(g,h,i)perylene	7.8E+06	2.6E-04	1.1E-05	4.7E+04	1.2E+01	1.1E-01	NA
Benzo(k)fluoranthene	1.2E+06	8.0E-04	3.4E-05	7.4E+03	5.9E+00	7.9E-02	NA
Chromium III	NA	NA	NA	NA	NA	0.0E+00	NA
Chrysene	4.0E+05	6.3E-03	3.9E-03	2.4E+03	1.5E+01	1.9E+00	NA
Cobalt	NA	NA	NA	NA	NA	6.5E+00	NA
Copper	NA	NA	NA	NA	NA	0.0E+00	NA
Cymene	4.1E+03	2.3E+01	4.5E-01	2.4E+01	5.7E+02	2.8E-03	No
Dibenz(a,h)anthracene	3.8E+06	2.5E-03	6.0E-07	2.3E+04	5.7E+01	1.3E-01	NA
Fluoranthene	1.1E+05	2.1E-01	6.6E-04	6.4E+02	1.3E+02	2.0E+00	NA
Fluorene	1.4E+04	2.0E+00	2.6E-03	8.3E+01	1.6E+02	5.0E-01	No
Indeno(1,2,3-cd)pyrene	3.5E+06	2.2E-05	6.6E-05	2.1E+04	4.6E-01	7.2E-02	NA
Lead	NA	NA	NA	NA	NA	0.0E+00	NA
Mercury (elemental)	5.2E+01	2.0E+01	4.4E-01	3.1E-01	9.9E+00	6.4E-02	NA
Methylene chloride	1.2E+01	1.3E+04	9.0E-02	7.0E-02	2.4E+03	9.7E-03	No
Molybdenum	NA	NA	NA	NA	NA	5.1E-01	NA
Naphthalene	2.0E+03	3.1E+01	2.0E-02	1.2E+01	3.8E+02	9.9E-01	No
Nickel	NA	NA	NA	NA	NA	0.0E+00	NA
Phenanthrene	2.7E+04	1.2E+00	1.6E-03	1.6E+02	2.0E+02	9.1E+00	No
Pyrene	1.1E+05	1.4E+00	4.5E-04	6.3E+02	8.5E+02	3.7E+00	NA
Selenium	NA	NA	NA	NA	NA	1.6E+00	NA
Thallium	NA	NA	NA	NA	NA	1.5E+00	NA
1,2,4-Trimethylbenzene	1.4E+03	5.7E+01	2.5E-01	8.1E+00	4.7E+02	6.4E-03	No
1,3,5-Trimethylbenzene	1.4E+03	2.0E+00	2.4E-01	8.1E+00	1.7E+01	5.3E-03	No
Vanadium	NA	NA	NA	NA	NA	0.0E+00	NA
Xylenes	4.4E+02	1.1E+02	2.7E-01	2.7E+00	3.0E+02	2.1E-03	No
Zinc	NA	NA	NA	NA	NA	0.0E+00	NA

Csat = S/pb x (Kd x pb+ Pw + H' x Pa)

Kd = Koc x foc

Source: USEPA, 1996

Parameter	Symbol	Value	Units
Fraction Organic Carbon	foc	0.006	unitless
Bulk Density	pb	1.5	g/cm^3
Water Filled Soil Porosity	Pw	0.15	unitless
Air Filled Soil Porosity	Pa	0.28	unitless

ABSORPTION FACTORS

Chemical	Oral soil ABSos (--)	Oral Water ABSow (--)	Oral Produce ABSop (--)	Inhalation VOC ABSiv (--)	Inhalation Dust ABSip (--)	Dermal Soil ABSds (--)
Acenaphthene	1	1	1	1	1	0.13
Acenaphthylene	1	1	1	1	1	0.13
Anthracene	1	1	1	1	1	0.13
Arsenic	1	1	1	1	1	0.03
Barium	1	1	1	1	1	0.01
Benzo(a)anthracene	1	1	1	1	1	0.13
Benzo(a)pyrene	1	1	1	1	1	0.13
Benzo(b)fluoranthene	1	1	1	1	1	0.13
Benzo(g,h,i)perylene	1	1	1	1	1	0.13
Benzo(k)fluoranthene	1	1	1	1	1	0.13
Chromium III	1	1	1	1	1	0.01
Chrysene	1	1	1	1	1	0.13
Cobalt	1	1	1	1	1	0.01
Copper	1	1	1	1	1	0.01
Cymene	1	1	1	1	1	0.1
Dibenz(a,h)anthracene	1	1	1	1	1	0.13
Fluoranthene	1	1	1	1	1	0.13
Fluorene	1	1	1	1	1	0.13
Indeno(1,2,3-cd)pyrene	1	1	1	1	1	0.13
Lead	1	1	1	1	1	0.01
Mercury (elemental)	1	1	1	1	1	0.01
Methylene chloride	1	1	1	1	1	0.1
Molybdenum	1	1	1	1	1	0.01
Naphthalene	1	1	1	1	1	0.1
Nickel	1	1	1	1	1	0.01
Phenanthrene	1	1	1	1	1	0.13
Pyrene	1	1	1	1	1	0.13
Selenium	1	1	1	1	1	0.01
Thallium	1	1	1	1	1	0.01
1,2,4-Trimethylbenzene	1	1	1	1	1	0.1
1,3,5-Trimethylbenzene	1	1	1	1	1	0.1
Vanadium	1	1	1	1	1	0.01
Xylenes	1	1	1	1	1	0.1
Zinc	1	1	1	1	1	0.01

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EFFECTIVE DIFFUSION COEFFICIENT IN SOIL

Chemical	Diffusivity in Air (Di) (cm^2/sec)	Diffusivity in Water (Dw) (cm^2/sec)	Henry's Law Constant (H') (unitless)	Soil-Organic Partition Coefficient (Kd) (cm^3/g)	Effective Diffusivity (Da) (cm^2/sec)
Acenaphthene	4.2E-02	7.7E-06	6.3E-03	4.2E+01	3.3E-07
Acenaphthylene	4.4E-02	6.6E-06	4.6E-03	2.9E+01	3.7E-07
Anthracene	3.2E-02	7.7E-06	2.7E-03	1.8E+02	2.6E-08
Arsenic	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA
Benzo(a)anthracene	5.1E-02	9.0E-06	1.4E-04	2.4E+03	NA
Benzo(a)pyrene	4.3E-02	9.0E-06	4.6E-05	6.1E+03	NA
Benzo(b)fluoranthene	2.3E-02	5.6E-06	4.5E-03	7.4E+03	NA
Benzo(g,h,i)perylene	4.5E-02	4.9E-06	1.1E-05	4.7E+04	NA
Benzo(k)fluoranthene	2.3E-02	5.6E-06	3.4E-05	7.4E+03	NA
Chromium III	NA	NA	NA	NA	NA
Chrysene	2.5E-02	6.2E-06	3.9E-03	2.4E+03	NA
Cobalt	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA
Cymene	5.6E-02	7.3E-06	4.5E-01	2.4E+01	5.3E-05
Dibenz(a,h)anthracene	2.0E-02	5.2E-06	6.0E-07	2.3E+04	NA
Fluoranthene	3.0E-02	6.4E-06	6.6E-04	6.4E+02	NA
Fluorene	3.6E-02	7.9E-06	2.6E-03	8.3E+01	6.0E-08
Indeno(1,2,3-cd)pyrene	1.9E-02	5.7E-06	6.6E-05	2.1E+04	NA
Lead	NA	NA	NA	NA	NA
Mercury (elemental)	3.1E-02	6.3E-06	4.4E-01	3.1E-01	NA
Methylene chloride	1.0E-01	1.2E-05	9.0E-02	7.0E-02	2.5E-03
Molybdenum	NA	NA	NA	NA	NA
Naphthalene	5.9E-02	7.5E-06	2.0E-02	1.2E+01	5.0E-06
Nickel	NA	NA	NA	NA	NA
Phenanthrene	5.8E-02	5.9E-06	1.6E-03	1.6E+02	3.0E-08
Pyrene	2.7E-02	7.2E-06	4.5E-04	6.3E+02	NA
Selenium	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	6.1E-02	7.9E-06	2.5E-01	8.1E+00	9.6E-05
1,3,5-Trimethylbenzene	6.0E-02	8.7E-06	2.4E-01	8.1E+00	9.1E-05
Vanadium	NA	NA	NA	NA	NA
Xylenes	8.5E-02	9.9E-06	2.7E-01	2.7E+00	4.3E-04
Zinc	NA	NA	NA	NA	NA

$$Da = \frac{[\,(Pa^{10/3} \times Di \times H' + Pw^{10/3} \times Dw) / Pt^2\,]}{pb \times Kd + Pw + Pa \times H'}$$

Kd = Koc x foc

Source: USEPA, 1996

Parameter	Symbol	Value	Units
Fraction Organic Carbon	foc	0.006	unitless
Air Filled Soil Porosity	Pa	0.28	unitless
Water Filled Soil Porosity	Pw	0.15	unitless
Total Porosity	Pt	0.43	unitless
Soil Bulk Density	pb	1.5	g/cm^3

APPENDIX I
HUMAN HEALTH RISK ASSESSMENT CALCULATIONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California
Project #15317.000

EMISSION RATES OF VOLATILE COPC FROM SUBSURFACE SOIL

Chemical	Concentration Soil (Cs) (mg/kg)	Effective Diffusivity (Da) (cm^2/sec)	Emission Rate (Ei)			
			Industrial (mg/m^2-sec)	Construction (mg/m^2-sec)	Residential (cancer) (mg/m^2-sec)	Residential (noncancer) (mg/m^2-sec)
Acenaphthene	9.0E+00	3.3E-07	3.1E-06	1.5E-05	3.2E-06	6.3E-06
Acenaphthylene	4.9E+00	3.7E-07	1.8E-06	9.0E-06	1.8E-06	3.7E-06
Anthracene	2.5E+00	2.6E-08	2.4E-07	1.2E-06	2.5E-07	4.9E-07
Antimony	ND	NA	NA	NA	NA	NA
Arsenic	ND	NA	NA	NA	NA	NA
Barium	ND	NA	NA	NA	NA	NA
Benzo(a)anthracene	6.2E-01	NA	NA	NA	NA	NA
Benzo(a)pyrene	2.7E-01	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1.3E-01	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	1.1E-01	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	7.9E-02	NA	NA	NA	NA	NA
Chromium III	ND	NA	NA	NA	NA	NA
Chrysene	1.9E+00	NA	NA	NA	NA	NA
Cobalt	6.5E+00	NA	NA	NA	NA	NA
Copper	ND	NA	NA	NA	NA	NA
Cymene	2.8E-03	5.3E-05	1.2E-08	6.2E-08	1.3E-08	2.5E-08
Dibenz(a,h)anthracene	1.3E-01	NA	NA	NA	NA	NA
Fluoranthene	2.0E+00	NA	NA	NA	NA	NA
Fluorene	5.0E-01	6.0E-08	7.4E-08	3.7E-07	7.5E-08	1.5E-07
Indeno(1,2,3-cd)pyrene	7.2E-02	NA	NA	NA	NA	NA
Lead	ND	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA
Mercury (elemental)	6.4E-02	NA	NA	NA	NA	NA
Methylene chloride	9.7E-03	2.5E-03	2.9E-07	1.5E-06	3.0E-07	6.0E-07
Molybdenum	5.1E-01	NA	NA	NA	NA	NA
Naphthalene	9.9E-01	5.0E-06	1.3E-06	6.7E-06	1.4E-06	2.7E-06
Nickel	ND	NA	NA	NA	NA	NA
Phenanthrene	9.1E+00	3.0E-08	9.5E-07	4.7E-06	9.6E-07	1.9E-06
Pyrene	3.7E+00	NA	NA	NA	NA	NA
Selenium	1.6E+00	NA	NA	NA	NA	NA
Thallium	1.5E+00	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	6.4E-03	9.6E-05	3.8E-08	1.9E-07	3.9E-08	7.7E-08
1,3,5-Trimethylbenzene	5.3E-03	9.1E-05	3.0E-08	1.5E-07	3.1E-08	6.2E-08
Vanadium	ND	NA	NA	NA	NA	NA
Xylenes	2.1E-03	4.3E-04	2.6E-08	1.3E-07	2.7E-08	5.3E-08
Zinc	ND	NA	NA	NA	NA	NA

Ei = $$\frac{Cs \times pb \times 2 \times Da \times CF_{m2\text{-}cm2} \times CF_{g\text{-}kg}}{(3.14 \times Da \times T)^{1/2}}$$

Source: USEPA, 1996

Parameter	Symbol	Value	Units
Soil Bulk Density	pb	1.5	g/cm^3
Duration - Industrial	T	7.9E+08	sec
Duration - Construction	T	3.2E+07	sec
Duration - Adult	T	7.6E+08	sec
Duration - Child	T	1.9E+08	sec
Conversion Factor from m^2 to cm^2	$CF_{m2\text{-}cm2}$	1E+04	cm^2/m^2
Conversion Factor from g to kg	$CF_{g\text{-}kg}$	1E-03	kg/g

APPENDIX I
HUMAN HEALTH RISK ASSESSMENT CALCULATIONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California
Project #15317.000

AMBIENT AIR CONCENTRATIONS DUE TO VOLATILE COPCS FROM SOIL - X / Q MODEL

Chemical	Emission Rate (Ei)				Concentration Air (Caa)			
	Industrial (mg/m^2-sec)	Construction (mg/m^2-sec)	Residential (cancer) (mg/m^2-sec)	Residential (noncancer) (mg/m^2-sec)	Industrial (mg/m^3)	Construction (mg/m^3)	Residential (cancer) (mg/m^3)	Residential (noncancer) (mg/m^3)
Acenaphthene	3.1E-06	1.5E-05	3.2E-06	6.3E-06	6.7E-05	3.3E-04	6.8E-05	1.4E-04
Acenaphthylene	1.8E-06	9.0E-06	1.8E-06	3.7E-06	3.9E-05	1.9E-04	3.9E-05	7.9E-05
Anthracene	2.4E-07	1.2E-06	2.5E-07	4.9E-07	5.2E-06	2.6E-05	5.3E-06	1.1E-05
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Chromium III	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA
Cymene	1.2E-08	6.2E-08	1.3E-08	2.5E-08	2.7E-07	1.3E-06	2.7E-07	5.4E-07
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	7.4E-08	3.7E-07	7.5E-08	1.5E-07	1.6E-06	7.9E-06	1.6E-06	3.2E-06
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (elemental)	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	2.9E-07	1.5E-06	3.0E-07	6.0E-07	6.3E-06	3.2E-05	6.4E-06	1.3E-05
Molybdenum	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	1.3E-06	6.7E-06	1.4E-06	2.7E-06	2.9E-05	1.4E-04	2.9E-05	5.9E-05
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	9.5E-07	4.7E-06	9.6E-07	1.9E-06	2.0E-05	1.0E-04	2.1E-05	4.1E-05
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	3.8E-08	1.9E-07	3.9E-08	7.7E-08	8.1E-07	4.1E-06	8.3E-07	1.7E-06
1,3,5-Trimethylbenzene	3.0E-08	1.5E-07	3.1E-08	6.2E-08	6.5E-07	3.3E-06	6.7E-07	1.3E-06
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	2.6E-08	1.3E-07	2.7E-08	5.3E-08	5.6E-07	2.8E-06	5.7E-07	1.1E-06
Zinc	NA	NA	NA	NA	NA	NA	NA	NA

Ca =	Ei x X/Q
Source:	USEPA, 1996

Parameter	Symbol	Value	Units
Air Dispersion Factor (soil)	X/Q	2.1E+01	mg/m^3 per mg/m^2-sec

CALCULATION OF DERMALLY ABSORBED DOSE PER EVENT (DAevent)

Chemical	Inorganic/ Organic	Molecular Weight (MW) (g/mole)	Log Octanol Water Partition Coefficient (log Kow)	Permeability Constant (Kp) (cm/hr)	Fraction Absorbed (FA) (--)	Permeability Ratio (B) (--)	Diffusivity Through Skin (Dsc) (cm^2/hr)	Lag Time (tau) (hr)	Constant b (--)	Constant c (--)	Steady-State Time (t*) (hr)	Concentration Groundwater (Cgw) (mg/cm^3)	Dermal Absorbed Dose Per Event (DAevent) Construction (mg/cm^2-event)
Acenaphthene	o	154.21	3.92	0.084	1	4.01E-01	2.17E-04	7.68E-04	6.11E-01	6.39E-01	0.002	ND	NA
Acenaphthylene	o	152.2	4.01	0.098	1	4.65E-01	2.23E-04	7.48E-04	6.74E-01	6.93E-01	0.002	ND	NA
Anthracene	o	178.24	4.55	0.16	1	8.22E-01	1.59E-04	1.05E-03	1.11E+00	1.00E+00	0.004	ND	NA
Arsenic	i	75	NA	0.001	1	3.33E-03	6.03E-04	2.77E-04	3.05E-01	3.36E-01	0.001	4.8E-05	2.4E-08
Barium	i	137	NA	0.001	1	4.50E-03	2.71E-04	6.15E-04	3.06E-01	3.36E-01	0.001	7.8E-05	3.9E-08
Benzo(a)anthracene	o	228.3	5.70	0.483	1	2.73E+00	8.35E-05	2.00E-03	6.04E+00	2.82E+00	8.530	ND	NA
Benzo(a)pyrene	o	252.32	6.11	0.66	1	4.28E+00	6.12E-05	2.72E-03	1.34E+01	4.34E+00	11.670	ND	NA
Benzo(b)fluoranthene	o	252.32	6.20	0.757	1	4.28E+00	6.12E-05	2.72E-03	1.34E+01	4.34E+00	12.030	ND	NA
Benzo(g,h,i)perylene	o	276.34	7.10	2.18	1	1.39E+01	4.49E-05	3.71E-03	1.28E+02	1.40E+01	0.017	ND	NA
Benzo(k)fluoranthene	o	252.32	6.20	0.757	1	4.62E+00	6.12E-05	2.72E-03	1.55E+01	4.68E+00	0.012	ND	NA
Chromium III	i	52	NA	0.001	1	2.77E-03	8.11E-04	2.06E-04	3.05E-01	3.35E-01	0.000	2.8E-05	1.4E-08
Chrysene	o	228.3	5.70	0.483	1	2.73E+00	8.35E-05	2.00E-03	6.04E+00	2.82E+00	8.530	ND	NA
Cobalt	i	59	NA	0.001	1	2.95E-03	7.41E-04	2.25E-04	3.05E-01	3.35E-01	0.001	3.0E-06	1.5E-09
Copper	i	64	NA	0.001	1	3.08E-03	6.94E-04	2.40E-04	3.05E-01	3.35E-01	0.001	1.4E-05	6.8E-09
Cymene	o	134.22	4.10	0.143	1	6.37E-01	2.81E-04	5.94E-04	8.66E-01	8.41E-01	0.002	ND	NA
Dibenz(a,h)anthracene	o	278.36	6.69	1.139	1	9.63E+00	4.38E-05	3.81E-03	6.22E+01	9.66E+00	17.570	ND	NA
Fluoranthene	o	202.26	5.12	0.28	1	1.20E+00	1.17E-04	1.43E-03	1.74E+00	1.35E+00	5.680	ND	NA
Fluorene	o	166.22	4.21	0.112	1	5.55E-01	1.86E-04	8.97E-04	7.70E-01	7.70E-01	0.002	ND	NA
Indeno(1,2,3-cd)pyrene	o	276.34	6.65	1.1	1	6.39E+00	4.49E-05	3.71E-03	2.84E+01	6.44E+00	16.830	ND	NA
Lead	i	207.2	NA	0.001	1	5.54E-03	1.10E-04	1.52E-03	3.07E-01	3.37E-01	0.004	2.8E-06	1.4E-09
Mercury (elemental)	i	200.59	NA	0.001	1	5.45E-03	1.19E-04	1.40E-03	3.07E-01	3.37E-01	0.003	ND	NA
Methylene chloride	o	84.93	1.25	0.0035	1	1.24E-02	5.30E-04	3.14E-04	3.11E-01	3.42E-01	0.760	2.6E-06	3.2E-10
Molybdenum	i	95.94	NA	0.001	1	3.77E-03	4.60E-04	3.62E-04	3.06E-01	3.36E-01	0.001	4.1E-05	2.1E-08
Naphthalene	o	128.18	3.36	0.047	1	2.05E-01	3.04E-04	5.49E-04	4.43E-01	4.81E-01	1.340	ND	NA
Nickel	i	59	NA	0.0002	1	5.91E-04	7.41E-04	2.25E-04	3.04E-01	3.34E-01	0.001	2.1E-05	2.1E-09
Phenanthrene	o	178.24	4.48	0.144	1	7.19E-01	1.59E-04	1.05E-03	9.68E-01	9.13E-01	4.110	ND	NA
Pyrene	o	202.26	5.11	0.275	1	1.50E+00	1.17E-04	1.43E-03	2.36E+00	1.64E+00	0.006	ND	NA
Selenium	i	79	NA	0.001	1	3.42E-03	5.72E-04	2.91E-04	3.05E-01	3.36E-01	0.001	1.4E-05	7.0E-09
Thallium	i	204	NA	0.001	1	5.49E-03	1.14E-04	1.46E-03	3.07E-01	3.37E-01	0.004	ND	NA
1,2,4-Trimethylbenzene	o	120.2	3.72	0.096	1	4.05E-01	3.36E-04	4.95E-04	6.14E-01	6.42E-01	0.001	ND	NA
1,3,5-Trimethylbenzene	o	120.2	3.54	0.073	1	3.08E-01	3.36E-04	4.95E-04	5.26E-01	5.63E-01	0.001	ND	NA
Vanadium	i	51	NA	0.001	1	2.75E-03	8.21E-04	2.03E-04	3.05E-01	3.35E-01	0.000	1.1E-04	5.5E-08
Xylenes	o	106.17	3.17	0.053	1	2.10E-01	4.03E-04	4.13E-04	4.47E-01	4.86E-01	1.010	ND	NA
Zinc	i	65	NA	0.0006	1	1.86E-03	6.85E-04	2.43E-04	3.04E-01	3.35E-01	0.001	1.5E-04	4.5E-08

For Organics: If tevent < t* DAevent = $2 * FA * Kp * Cgw * (6 * tau * tevent/Pi)^{1/2}$

or

If tevent > t* DAevent = $FA * Kp * Cgw * [tevent/(1+B) + 2*tau*(1 + 3*B + 3*B^2) / (1+B)^2]$

For Inorganics: DAevent = Kp * Cgw * tevent

If log Kow < 4

Kp = Kp USEPA, 2004, Exhibit B-3 if available, or 10^(-2.8 + 0.66*logKow - 0.0056*MW)

If log Kow >4

Kp = 10^(-2.8 + 0.66*logKow - 0.0056*MW)

Source: USEPA, 2004

$B = \frac{Kp * (MW)^{1/2}}{2.6}$

t* = USEPA, 2004 Exhibit B-3, or

If B ≤ 0.6, t* = 2.4 * tau

If B > 0.6, $t^* = \frac{(b - (b^2 - c^2)^{1/2})*1E-6}{Dsc}$

Dsc = 10^(-2.8 - 0.0056*MW)

$tau = \frac{1E-6}{6 * Dsc}$

$b = \frac{2*(1 + B)^2 - c}{Pi}$

$c = \frac{1 + 3*B + 3*B^2}{3*(1 + B)}$

Parameter	Symbol	Value	Units
Event Duration - Residential	tevent	NA	hr
Event Duration - Construction/Mainter	tevent	0.50	hr

TOTAL SOLUTE CONCENTRATION OF VOLATILE COPCS IN GROUNDWATER

Chemical	Concentration Groundwater (Cgw) (mg/L)	Henry's Law Constant (H') (unitless)	Soil-Organic Partition Coefficient (Kd) (cm^3/g)	Concentration Soil Vapor (Cv) (mg/cm^3)	Total Solute Concentration (CT) (mg/cm^3)
Acenaphthene	ND	6.3E-03	4.2E+01	NA	NA
Acenaphthylene	ND	4.6E-03	2.9E+01	NA	NA
Anthracene	ND	2.7E-03	1.8E+02	NA	NA
Arsenic	4.8E-02	NA	NA	NA	NA
Barium	7.8E-02	NA	NA	NA	NA
Benzo(a)anthracene	ND	1.4E-04	2.4E+03	NA	NA
Benzo(a)pyrene	ND	4.6E-05	6.1E+03	NA	NA
Benzo(b)fluoranthene	ND	4.5E-03	7.4E+03	NA	NA
Benzo(g,h,i)perylene	ND	1.1E-05	4.7E+04	NA	NA
Benzo(k)fluoranthene	ND	3.4E-05	7.4E+03	NA	NA
Chromium III	2.8E-02	NA	NA	NA	NA
Chrysene	ND	3.9E-03	2.4E+03	NA	NA
Cobalt	3.0E-03	NA	NA	NA	NA
Copper	1.4E-02	NA	NA	NA	NA
Cymene	ND	4.5E-01	2.4E+01	NA	NA
Dibenz(a,h)anthracene	ND	6.0E-07	2.3E+04	NA	NA
Fluoranthene	ND	6.6E-04	6.4E+02	NA	NA
Fluorene	ND	2.6E-03	8.3E+01	NA	NA
Indeno(1,2,3-cd)pyrene	ND	6.6E-05	2.1E+04	NA	NA
Lead	2.8E-03	NA	NA	NA	NA
Mercury (elemental)	ND	4.4E-01	3.1E-01	NA	NA
Methylene chloride	2.6E-03	9.0E-02	7.0E-02	2.3E-07	7.3E-07
Molybdenum	4.1E-02	NA	NA	NA	NA
Naphthalene	ND	2.0E-02	1.2E+01	NA	NA
Nickel	2.1E-02	NA	NA	NA	NA
Phenanthrene	ND	1.6E-03	1.6E+02	NA	NA
Pyrene	ND	4.5E-04	6.3E+02	NA	NA
Selenium	1.4E-02	NA	NA	NA	NA
Thallium	ND	NA	NA	NA	NA
1,2,4-Trimethylbenzene	ND	2.5E-01	8.1E+00	NA	NA
1,3,5-Trimethylbenzene	ND	2.4E-01	8.1E+00	NA	NA
Vanadium	1.1E-01	NA	NA	NA	NA
Xylenes	ND	2.7E-01	2.7E+00	NA	NA
Zinc	1.5E-01	NA	NA	NA	NA

CT =	Cv x (pb x Kd/H' + Pw/H' + Pa)
Cv =	Cgw x H' x CF_{cm3-L}
Kd =	Koc x foc
Source:	USEPA, 1996

Parameter	Symbol	Value	Units
Bulk Density	pb	1.5	g/cm^3
Fraction Organic Carbon	foc	0.006	unitless
Water Filled Soil Porosity	Pw	0.15	unitless
Air Filled Soil Porosity	Pa	0.28	unitless
Conversion Factor from cm^3 to L	CF_{cm3-L}	1E-03	L/cm^3

APPENDIX I
HUMAN HEALTH RISK ASSESSMENT CALCULATIONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California
Project #15317.000

EMISSION RATES OF VOLATILE COPCS FROM GROUNDWATER

Chemical	Total Solute Concentration (CT) (mg/cm^3)	Effective Diffusivity (Da) (cm^2/sec)	Emission Rate (Ei)			
			Industrial (mg/m^2-sec)	Construction (mg/m^2-sec)	Residential (cancer) (mg/m^2-sec)	Residential (noncancer) (mg/m^2-sec)
Acenaphthene	NA	3.3E-07	NA	NA	NA	NA
Acenaphthylene	NA	3.7E-07	NA	NA	NA	NA
Anthracene	NA	2.6E-08	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA
Chromium III	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA
Cymene	NA	5.3E-05	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA
Fluorene	NA	6.0E-08	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA
Mercury (elemental)	NA	NA	NA	NA	NA	NA
Methylene chloride	7.3E-07	2.5E-03	1.5E-08	7.3E-08	1.5E-08	3.0E-08
Molybdenum	NA	NA	NA	NA	NA	NA
Naphthalene	NA	5.0E-06	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	3.0E-08	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	9.6E-05	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	9.1E-05	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA
Xylenes	NA	4.3E-04	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA

$$Ei = \frac{CT \times 2 \times Da \times CF_{m2\text{-}cm2}}{(3.14 \times Da \times T)^{1/2}}$$

Source: USEPA, 1996

Parameter	Symbol	Value	Units
Duration - Industrial	T	7.9E+08	sec
Duration - Construction	T	3.2E+07	sec
Duration - Trespasser	T	3.5E+08	sec
Duration - Residential Cancer	T	7.6E+08	sec
Duration - Non-cancer	T	1.9E+08	sec
Conversion Factor from m^2 to cm^2	$CF_{m2\text{-}cm2}$	1E+04	cm^2/m^2

APPENDIX I
HUMAN HEALTH RISK ASSESSMENT CALCULATIONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California
Project #15317.000

AMBIENT AIR CONCENTRATIONS - VOLATILE COPCS FROM GROUNDWATER - X / Q MODEL

Chemical	Emission Rate (Ei)				Concentration Air (Caa)			
	Industrial (mg/m^2-sec)	Construction (mg/m^2-sec)	Residential (cancer) (mg/m^2-sec)	Residential (noncancer) (mg/m^2-sec)	Industrial (mg/m^3)	Construction (mg/m^3)	Residential (cancer) (mg/m^3)	Residential (noncancer) (mg/m^3)
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Chromium III	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA
Cymene	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (elemental)	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	1.5E-08	7.3E-08	1.5E-08	3.0E-08	3.2E-07	1.6E-06	3.2E-07	6.4E-07
Molybdenum	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA

Caa =	Ei x X/Q
Source:	USEPA, 1996

Parameter	Symbol	Value	Units
Air Dispersion Factor	X/Q	21.5	mg/m^3 per mg/m^2-sec

APPENDIX I
HUMAN HEALTH RISK ASSESSMENT CALCULATIONS
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California
Project #15317.000

AMBIENT AIR CONCENTRATIONS -
VOLATILE COPCS FROM EXPOSED GROUNDWATER - BOX MODEL

Chemical	Emission Rate (Ei)	Concentration Air (Caa)
	(mg/m^2-sec)	(mg/m^3)
Acenaphthene	NA	NA
Acenaphthylene	NA	NA
Anthracene	NA	NA
Arsenic	NA	NA
Barium	NA	NA
Benzo(a)anthracene	NA	NA
Benzo(a)pyrene	NA	NA
Benzo(b)fluoranthene	NA	NA
Benzo(g,h,i)perylene	NA	NA
Benzo(k)fluoranthene	NA	NA
Chromium III	NA	NA
Chrysene	NA	NA
Cobalt	NA	NA
Copper	NA	NA
Cymene	NA	NA
Dibenz(a,h)anthracene	NA	NA
Fluoranthene	NA	NA
Fluorene	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA
Lead	NA	NA
Mercury (elemental)	NA	NA
Methylene chloride	3.1E-13	9.5E-14
Molybdenum	NA	NA
Naphthalene	NA	NA
Nickel	NA	NA
Phenanthrene	NA	NA
Pyrene	NA	NA
Selenium	NA	NA
Thallium	NA	NA
1,2,4-Trimethylbenzene	NA	NA
1,3,5-Trimethylbenzene	NA	NA
Vanadium	NA	NA
Xylenes	NA	NA
Zinc	NA	NA

$$Caa = \frac{Ei \times A}{(LS \times WS \times MH)}$$

Source: Box Model

Parameter	Symbol	Value	Units
Emission Area - trench	A_tench	4.6	m^2
Length of Area - trench	LS_trench	3	m
Wind Speed	WS	2.5	m
Mixing Height	MH	2	m

INCIDENTAL INGESTION OF SOIL: CONSTRUCTION WORKER

Chemical	Concentration Soil (Cs) (mg/kg)	Oral Absorption Factor-Soil (ABSos) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Oral Chronic Reference Dose (RfDo) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Oral Slope Factor (SFo) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	9.0E+00	1	4.2E-05	6.0E-02	7.0E-04	6.0E-07	NA	NA
Acenaphthylene	4.9E+00	1	2.3E-05	6.0E-02	3.8E-04	3.3E-07	NC	NA
Anthracene	2.5E+00	1	1.2E-05	3.0E-01	3.9E-05	1.7E-07	NC	NA
Arsenic	ND	1	NA	3.0E-04	NA	NA	9.5E+00	NA
Barium	ND	1	NA	2.0E-01	NA	NA	NC	NA
Benzo(a)anthracene	6.2E-01	1	2.9E-06	NA	NA	4.2E-08	1.2E+00	5.0E-08
Benzo(a)pyrene	2.7E-01	1	1.3E-06	NA	NA	1.8E-08	1.2E+01	2.2E-07
Benzo(b)fluoranthene	1.3E-01	1	6.1E-07	NA	NA	8.7E-09	1.2E+00	1.0E-08
Benzo(g,h,i)perylene	1.1E-01	1	5.2E-07	6.0E-02	8.6E-06	7.4E-09	NC	NA
Benzo(k)fluoranthene	7.9E-02	1	3.7E-07	NA	NA	5.3E-09	1.2E+00	6.4E-09
Chromium III	ND	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	1.9E+00	1	9.0E-06	NA	NA	1.3E-07	1.2E-01	1.5E-08
Cobalt	6.5E+00	1	3.0E-05	2.0E-02	1.5E-03	4.3E-07	NA	NA
Copper	ND	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	2.8E-03	1	1.3E-08	8.0E-02	1.6E-07	1.9E-10	NC	NA
Dibenz(a,h)anthracene	1.3E-01	1	6.2E-07	NA	NA	8.8E-09	4.1E+00	3.6E-08
Fluoranthene	2.0E+00	1	9.6E-06	4.0E-02	2.4E-04	1.4E-07	NC	NA
Fluorene	5.0E-01	1	2.3E-06	4.0E-02	5.9E-05	3.4E-08	NC	NA
Indeno(1,2,3-cd)pyrene	7.2E-02	1	3.4E-07	NA	NA	4.8E-09	1.2E+00	5.8E-09
Lead	ND	1	NA	NA	NA	NA	8.5E-03	NA
Mercury (elemental)	6.4E-02	1	3.0E-07	8.6E-06	3.5E-02	4.3E-09	NA	NA
Methylene chloride	9.7E-03	1	4.6E-08	6.0E-02	7.6E-07	6.5E-10	1.4E-02	9.1E-12
Molybdenum	5.1E-01	1	2.4E-06	5.0E-03	4.8E-04	3.4E-08	NA	NA
Naphthalene	9.9E-01	1	4.6E-06	2.0E-02	2.3E-04	6.6E-08	1.2E-01	8.0E-09
Nickel	ND	1	NA	2.0E-02	NA	NA	NA	NA
Phenanthrene	9.1E+00	1	4.3E-05	4.0E-02	1.1E-03	6.1E-07	NC	NA
Pyrene	3.7E+00	1	1.8E-05	3.0E-02	5.8E-04	2.5E-07	NC	NA
Selenium	1.6E+00	1	7.5E-06	5.0E-03	1.5E-03	1.1E-07	NC	NA
Thallium	1.5E+00	1	7.0E-06	8.0E-05	8.8E-02	1.0E-07	NA	NA
1,2,4-Trimethylbenzene	6.4E-03	1	3.0E-08	5.0E-02	6.0E-07	4.3E-10	NA	NA
1,3,5-Trimethylbenzene	5.3E-03	1	2.5E-08	5.0E-02	5.0E-07	3.6E-10	NA	NA
Vanadium	ND	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	2.1E-03	1	9.9E-09	2.0E-01	4.9E-08	1.4E-10	NA	NA
Zinc	ND	1	NA	3.0E-01	NA	NA	NC	NA
					1E-01			3E-07

$$AADD = \frac{(Cs \times IRs \times ABSos \times EFig \times ED \times CFmg\text{-}kg)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDo}$$

$$LADD = \frac{(Cs \times IRs \times ABSos \times EFig \times ED \times CFmg\text{-}kg)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFo$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFig	250	days/year
Exposure Duration	ED	1	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	365	days
Averaging Time-Cancer	ATca	25,550	days
Ingestion Rate	IRs	480	mg/day
Conversion Factor from mg to kg	$CF_{mg\text{-}kg}$	1E-06	kg/mg

DERMAL CONTACT WITH SOIL: CONSTRUCTION WORKER

Chemical	Concentration Soil (Cs) (mg/kg)	Dermal Absorption Factor-Soil (ABSds) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Dermal Chronic Reference Dose (RfDd) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Dermal Slope Factor (SFd) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	9.0E+00	0.13	3.4E-05	6.0E-02	5.6E-04	4.8E-07	NA	NA
Acenaphthylene	4.9E+00	0.13	1.8E-05	6.0E-02	3.1E-04	2.6E-07	NA	NA
Anthracene	2.5E+00	0.13	9.4E-06	3.0E-01	3.1E-05	1.3E-07	NA	NA
Arsenic	ND	0.03	NA	3.0E-04	NA	NA	9.5E+00	NA
Barium	ND	0.01	NA	1.4E-02	NA	NA	NA	NA
Benzo(a)anthracene	6.2E-01	0.13	2.3E-06	NA	NA	3.3E-08	1.2E+00	4.0E-08
Benzo(a)pyrene	2.7E-01	0.13	1.0E-06	NA	NA	1.5E-08	1.2E+01	1.7E-07
Benzo(b)fluoranthene	1.3E-01	0.13	4.9E-07	NA	NA	7.0E-09	1.2E+00	8.4E-09
Benzo(g,h,i)perylene	1.1E-01	0.13	4.1E-07	6.0E-02	6.9E-06	5.9E-09	NA	NA
Benzo(k)fluoranthene	7.9E-02	0.13	3.0E-07	NA	NA	4.2E-09	1.2E+00	5.1E-09
Chromium III	ND	0.01	NA	2.0E-02	NA	NA	NA	NA
Chrysene	1.9E+00	0.13	7.2E-06	NA	NA	1.0E-07	1.2E-01	1.2E-08
Cobalt	6.5E+00	0.01	1.9E-06	2.0E-02	9.4E-05	2.7E-08	NA	NA
Copper	ND	0.01	NA	3.7E-02	NA	NA	NA	NA
Cymene	2.8E-03	0.1	8.1E-09	8.0E-02	1.0E-07	1.2E-10	NA	NA
Dibenz(a,h)anthracene	1.3E-01	0.13	4.9E-07	NA	NA	7.0E-09	4.1E+00	2.9E-08
Fluoranthene	2.0E+00	0.13	7.7E-06	4.0E-02	1.9E-04	1.1E-07	NA	NA
Fluorene	5.0E-01	0.13	1.9E-06	4.0E-02	4.7E-05	2.7E-08	NA	NA
Indeno(1,2,3-cd)pyrene	7.2E-02	0.13	2.7E-07	NA	NA	3.9E-09	1.2E+00	4.6E-09
Lead	ND	0.01	NA	NA	NA	NA	8.5E-03	NA
Mercury (elemental)	6.4E-02	0.01	1.9E-08	8.6E-06	2.2E-03	2.6E-10	NA	NA
Methylene chloride	9.7E-03	0.1	2.8E-08	6.0E-02	4.7E-07	4.0E-10	1.4E-02	5.6E-12
Molybdenum	5.1E-01	0.01	1.5E-07	5.0E-03	3.0E-05	2.1E-09	NA	NA
Naphthalene	9.9E-01	0.1	2.9E-06	2.0E-02	1.4E-04	4.1E-08	1.2E-01	4.9E-09
Nickel	ND	0.01	NA	8.0E-04	NA	NA	NA	NA
Phenanthrene	9.1E+00	0.13	3.4E-05	4.0E-02	8.6E-04	4.9E-07	NA	NA
Pyrene	3.7E+00	0.13	1.4E-05	3.0E-02	4.7E-04	2.0E-07	NA	NA
Selenium	1.6E+00	0.01	4.6E-07	5.0E-03	9.3E-05	6.6E-09	NA	NA
Thallium	1.5E+00	0.01	4.3E-07	8.0E-05	5.4E-03	6.2E-09	NA	NA
1,2,4-Trimethylbenzene	6.4E-03	0.1	1.9E-08	5.0E-02	3.7E-07	2.6E-10	NA	NA
1,3,5-Trimethylbenzene	5.3E-03	0.1	1.5E-08	5.0E-02	3.1E-07	2.2E-10	NA	NA
Vanadium	ND	0.01	NA	1.8E-04	NA	NA	NA	NA
Xylenes	2.1E-03	0.1	6.1E-09	2.0E-01	3.0E-08	8.7E-11	NA	NA
Zinc	ND	0.01	NA	3.0E-01	NA	NA	NA	NA
					1E-02			3E-07

$$AADD = \frac{(Cs \times SAs \times SAF \times ABSds \times EFdc \times ED \times CFmg\text{-}kg)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDo}$$

$$LADD = \frac{(Cs \times SAs \times SAF \times ABSds \times EFdc \times ED \times CFmg\text{-}kg)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFo$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFdc	250	days/year
Exposure Duration	ED	1	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	365	days
Averaging Time-Cancer	ATca	25,550	days
Surface Area	SAs	5,800	cm^2
Soil-to-Skin Adherence Factor	SAF	0.51	mg/cm^2
Conversion Factor from mg to kg	$CF_{mg\text{-}kg}$	1E-06	kg/mg

INHALATION OF RESUSPENDED PARTICULATES FROM SOIL: CONSTRUCTION WORKER

Chemical	Concentration Soil (Cs) (mg/kg)	Inhalation Absorption Factor-Dusts (ABSip) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	NA	1	NA	6.0E-02	NA	NA	NA	NA
Acenaphthylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Anthracene	NA	1	NA	3.0E-01	NA	NA	NC	NA
Arsenic	ND	1	NA	4.3E-06	NA	NA	12	NA
Barium	ND	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	6.2E-01	1	8.4E-08	NA	NA	1.2E-09	0.39	4.7E-10
Benzo(a)pyrene	2.7E-01	1	3.7E-08	NA	NA	5.2E-10	3.9	2.0E-09
Benzo(b)fluoranthene	1.3E-01	1	1.8E-08	NA	NA	2.5E-10	0.39	9.8E-11
Benzo(g,h,i)perylene	1.1E-01	1	1.5E-08	6.0E-02	2.5E-07	2.1E-10	NC	NA
Benzo(k)fluoranthene	7.9E-02	1	1.1E-08	NA	NA	1.5E-10	0.39	6.0E-11
Chromium III	ND	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	1.9E+00	1	2.6E-07	NA	NA	3.7E-09	0.039	1.4E-10
Cobalt	6.5E+00	1	8.8E-07	5.7E-06	1.5E-01	1.3E-08	NA	NA
Copper	ND	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	NA	1	NA	1.4E+00	NA	NA	NC	NA
Dibenz(a,h)anthracene	1.3E-01	1	1.8E-08	NA	NA	2.5E-10	4.1	1.0E-09
Fluoranthene	2.0E+00	1	2.8E-07	4.0E-02	6.9E-06	4.0E-09	NC	NA
Fluorene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Indeno(1,2,3-cd)pyrene	7.2E-02	1	9.8E-09	NA	NA	1.4E-10	0.39	5.5E-11
Lead	ND	1	NA	NA	NA	NA	0.042	NA
Mercury (elemental)	6.4E-02	1	8.7E-09	8.6E-06	1.0E-03	1.2E-10	NA	NA
Methylene chloride	NA	1	NA	1.1E-01	NA	NA	0.0035	NA
Molybdenum	5.1E-01	1	6.9E-08	5.0E-03	1.4E-05	9.9E-10	NA	NA
Naphthalene	NA	1	NA	2.6E-03	NA	NA	0.12	NA
Nickel	ND	1	NA	1.4E-05	NA	NA	0.91	NA
Phenanthrene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Pyrene	3.7E+00	1	5.1E-07	3.0E-02	1.7E-05	7.2E-09	NC	NA
Selenium	1.6E+00	1	2.2E-07	5.7E-03	3.8E-05	3.1E-09	NC	NA
Thallium	1.5E+00	1	2.0E-07	8.0E-05	2.5E-03	2.9E-09	NA	NA
1,2,4-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
Vanadium	ND	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	NA	1	NA	2.0E-01	NA	NA	NC	NA
Zinc	ND	1	NA	3.0E-01	NA	NA	NC	NA
					2E-01			4E-09

$$AADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATnc)}$$

$$Hazard\ Quotient = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATca)}$$

$$Excess\ Cancer\ Risk = LADD \times SFi$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFpe	250	day/year
Exposure Duration	ED	1	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	365	days
Averaging Time-Cancer	ATca	25,550	days
Inhalation Rate	IHRpe	2.5	m^3/hour
Exposure Time	ETpe	8	hour/day
Particulate Emission Factor	PEF	1.4E+06	m^3/kg

INHALATION OF VOCS IN AMBIENT AIR FROM SOIL EMISSIONS: CONSTRUCTION WORKER

Chemical	Concentration Air (Caa) (mg/m^3)	Inhalation Absorption Factor-Volatiles (ABSiv) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	3.33E-04	1	6.5E-05	6.0E-02	1.1E-03	9.3E-07	NA	NA
Acenaphthylene	1.93E-04	1	3.8E-05	6.0E-02	6.3E-04	5.4E-07	NC	NA
Anthracene	2.59E-05	1	5.1E-06	3.0E-01	1.7E-05	7.2E-08	NC	NA
Arsenic	NA	1	NA	4.3E-06	NA	NA	1.2E+01	NA
Barium	NA	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Benzo(a)pyrene	NA	1	NA	NA	NA	NA	3.9E+00	NA
Benzo(b)fluoranthene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Benzo(g,h,i)perylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Benzo(k)fluoranthene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Chromium III	NA	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	NA	1	NA	NA	NA	NA	3.9E-02	NA
Cobalt	NA	1	NA	5.7E-06	NA	NA	NA	NA
Copper	NA	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	1.33E-06	1	2.6E-07	1.4E+00	1.9E-07	3.7E-09	NC	NA
Dibenz(a,h)anthracene	NA	1	NA	NA	NA	NA	4.1E+00	NA
Fluoranthene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Fluorene	7.91E-06	1	1.5E-06	4.0E-02	3.9E-05	2.2E-08	NC	NA
Indeno(1,2,3-cd)pyrene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Lead	NA	1	NA	NA	NA	NA	4.2E-02	NA
Mercury (elemental)	NA	1	NA	8.6E-06	NA	NA	NA	NA
Methylene chloride	3.15E-05	1	6.2E-06	1.1E-01	5.4E-05	8.8E-08	3.5E-03	3.1E-10
Molybdenum	NA	1	NA	5.0E-03	NA	NA	NA	NA
Naphthalene	1.43E-04	1	2.8E-05	2.6E-03	1.1E-02	4.0E-07	1.2E-01	4.8E-08
Nickel	NA	1	NA	1.4E-05	NA	NA	9.1E-01	NA
Phenanthrene	1.02E-04	1	2.0E-05	4.0E-02	5.0E-04	2.8E-07	NC	NA
Pyrene	NA	1	NA	3.0E-02	NA	NA	NC	NA
Selenium	NA	1	NA	5.7E-03	NA	NA	NC	NA
Thallium	NA	1	NA	8.0E-05	NA	NA	NA	NA
1,2,4-Trimethylbenzene	4.06E-06	1	7.9E-07	1.7E-03	4.7E-04	1.1E-08	NA	NA
1,3,5-Trimethylbenzene	3.27E-06	1	6.4E-07	1.7E-03	3.8E-04	9.2E-09	NA	NA
Vanadium	NA	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	2.81E-06	1	5.5E-07	2.0E-01	2.7E-06	7.9E-09	NC	NA
Zinc	NA	1	NA	3.0E-01	NA	NA	NC	NA
					1E-02			5E-08

$$AADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATnc)}$$

$$Hazard\ Quotient = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATca)}$$

$$Excess\ Cancer\ Risk = LADD \times SFi$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFaa	250	day/year
Exposure Duration	ED	1	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	365	days
Averaging Time-Cancer	ATca	25,550	days
Inhalation Rate	IHRaa	2.5	m^3/hour
Exposure Time	ETaa	8	hr/day

INHALATION OF VOCS IN AMBIENT AIR FROM GROUNDWATER EMISSIONS: CONSTRUCTION WORKER

Chemical	Concentration Air (Caa) (mg/m^3)	Inhalation Absorption Factor-Volatiles (ABSiv) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	NA	1	NA	6.0E-02	NA	NA	NA	NA
Acenaphthylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Anthracene	NA	1	NA	3.0E-01	NA	NA	NC	NA
Arsenic	NA	1	NA	4.3E-06	NA	NA	1.2E+01	NA
Barium	NA	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Benzo(a)pyrene	NA	1	NA	NA	NA	NA	3.9E+00	NA
Benzo(b)fluoranthene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Benzo(g,h,i)perylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Benzo(k)fluoranthene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Chromium III	NA	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	NA	1	NA	NA	NA	NA	3.9E-02	NA
Cobalt	NA	1	NA	5.7E-06	NA	NA	NA	NA
Copper	NA	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	NA	1	NA	1.4E+00	NA	NA	NC	NA
Dibenz(a,h)anthracene	NA	1	NA	NA	NA	NA	4.1E+00	NA
Fluoranthene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Fluorene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Indeno(1,2,3-cd)pyrene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Lead	NA	1	NA	NA	NA	NA	4.2E-02	NA
Mercury (elemental)	NA	1	NA	8.6E-06	NA	NA	NA	NA
Methylene chloride	1.6E-06	1	3.1E-07	1.1E-01	2.7E-06	4.4E-09	3.5E-03	1.5E-11
Molybdenum	NA	1	NA	5.0E-03	NA	NA	NA	NA
Naphthalene	NA	1	NA	2.6E-03	NA	NA	1.2E-01	NA
Nickel	NA	1	NA	1.4E-05	NA	NA	9.1E-01	NA
Phenanthrene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Pyrene	NA	1	NA	3.0E-02	NA	NA	NC	NA
Selenium	NA	1	NA	5.7E-03	NA	NA	NC	NA
Thallium	NA	1	NA	8.0E-05	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
Vanadium	NA	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	NA	1	NA	2.0E-01	NA	NA	NC	NA
Zinc	NA	1	NA	3.0E-01	NA	NA	NC	NA
					3E-06			2E-11

$$AADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFi$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFaa	250	day/year
Exposure Duration	ED	1	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	365	days
Averaging Time-Cancer	ATca	25,550	days
Inhalation Rate	IHRaa	2.5	m^3/hour
Exposure Time	ETaa	8	hr/day

DERMAL CONTACT WITH GROUNDWATER: CONSTRUCTION WORKER

Chemical	Dermal Absorbed Dose Per Event (DAevent) (mg/cm^2-event)	Annual Average Daily Dose (AADD) (mg/kg-d)	Dermal Chronic Reference Dose (RfDd) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Dermal Slope Factor (SFd) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	NA	NA	6.0E-02	NA	NA	NA	NA
Acenaphthylene	NA	NA	6.0E-02	NA	NA	NA	NA
Anthracene	NA	NA	3.0E-01	NA	NA	NA	NA
Arsenic	2.4E-08	1.3E-07	3.0E-04	4.3E-04	1.9E-09	9.5E+00	1.8E-08
Barium	3.9E-08	2.1E-07	1.4E-02	1.5E-05	3.1E-09	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	1.2E+00	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	1.2E+01	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	1.2E+00	NA
Benzo(g,h,i)perylene	NA	NA	6.0E-02	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	1.2E+00	NA
Chromium III	1.4E-08	7.6E-08	2.0E-02	3.9E-06	1.1E-09	NA	NA
Chrysene	NA	NA	NA	NA	NA	1.2E-01	NA
Cobalt	1.5E-09	8.2E-09	2.0E-02	4.1E-07	1.2E-10	NA	NA
Copper	6.8E-09	3.7E-08	3.7E-02	1.0E-06	5.3E-10	NA	NA
Cymene	NA	NA	8.0E-02	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	4.1E+00	NA
Fluoranthene	NA	NA	4.0E-02	NA	NA	NA	NA
Fluorene	NA	NA	4.0E-02	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	1.2E+00	NA
Lead	1.4E-09	7.7E-09	NA	NA	1.1E-10	8.5E-03	9.3E-13
Mercury (elemental)	NA	NA	8.6E-06	NA	NA	NA	NA
Methylene chloride	3.2E-10	1.7E-09	6.0E-02	2.9E-08	2.5E-11	1.4E-02	3.5E-13
Molybdenum	2.1E-08	1.1E-07	5.0E-03	2.2E-05	1.6E-09	NA	NA
Naphthalene	NA	NA	2.0E-02	NA	NA	1.2E-01	NA
Nickel	2.1E-09	1.1E-08	8.0E-04	1.4E-05	1.6E-10	NA	NA
Phenanthrene	NA	NA	4.0E-02	NA	NA	NA	NA
Pyrene	NA	NA	3.0E-02	NA	NA	NA	NA
Selenium	7.0E-09	3.8E-08	5.0E-03	7.7E-06	5.5E-10	NA	NA
Thallium	NA	NA	8.0E-05	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	NA	5.0E-02	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	NA	5.0E-02	NA	NA	NA	NA
Vanadium	5.5E-08	3.0E-07	1.8E-04	1.7E-03	4.3E-09	NA	NA
Xylenes	NA	NA	2.0E-01	NA	NA	NA	NA
Zinc	4.5E-08	2.5E-07	3.0E-01	8.2E-07	3.5E-09	NA	NA
				2E-03			2E-08

$$AADD = \frac{(DAevent \times SAswr \times EVswr \times EFswr \times ED)}{(BW \times ATnc)} \qquad Hazard\ Quotient = \frac{AADD}{RfDo}$$

$$LADD = \frac{(DAevent \times SAswr \times EVswr \times EFswr \times ED)}{(BW \times ATca)} \qquad Excess\ Cancer\ Risk = LADD \times SFo$$

Parameter	Symbol	Value	Units
Event Frequency	EVswr	1	events/day
Exposure Frequency	EFswr	20	day/year
Exposure Duration	ED	1	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	365	days
Averaging Time-Cancer	ATca	25,550	days
Skin Surface Area	SAswr	7,000	cm^2

SUMMARY OF NONCARCINOGENIC HAZARDS: CONSTRUCTION WORKER

Chemical	Incidental Ingestion of Soil	Dermal Contact with Soil	Inhalation of Particulates	Inhalation of Volatiles in Ambient Air from Soil	Inhalation of Volatiles in Ambient Air from Groundwater	Dermal Contact with Groundwater	Hazard Index
Acenaphthene	7.0E-04	5.6E-04	NA	1.1E-03	NA	NA	2.4E-03
Acenaphthylene	3.8E-04	3.1E-04	NA	6.3E-04	NA	NA	1.3E-03
Anthracene	3.9E-05	3.1E-05	NA	1.7E-05	NA	NA	8.7E-05
Arsenic	NA	NA	NA	NA	NA	4.3E-04	4.3E-04
Barium	NA	NA	NA	NA	NA	1.5E-05	1.5E-05
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	8.6E-06	6.9E-06	2.5E-07	NA	NA	NA	1.6E-05
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA
Chromium III	NA	NA	NA	NA	NA	3.9E-06	3.9E-06
Chrysene	NA	NA	NA	NA	NA	NA	NA
Cobalt	1.5E-03	9.4E-05	1.5E-01	NA	NA	4.1E-07	1.6E-01
Copper	NA	NA	NA	NA	NA	1.0E-06	1.0E-06
Cymene	1.6E-07	1.0E-07	NA	1.9E-07	NA	NA	4.5E-07
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	2.4E-04	1.9E-04	6.9E-06	NA	NA	NA	4.4E-04
Fluorene	5.9E-05	4.7E-05	NA	3.9E-05	NA	NA	1.4E-04
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA
Mercury (elemental)	3.5E-02	2.2E-03	1.0E-03	NA	NA	NA	3.8E-02
Methylene chloride	7.6E-07	4.7E-07	NA	5.4E-05	2.7E-06	2.9E-08	5.8E-05
Molybdenum	4.8E-04	3.0E-05	1.4E-05	NA	NA	2.2E-05	5.4E-04
Naphthalene	2.3E-04	1.4E-04	NA	1.1E-02	NA	NA	1.1E-02
Nickel	NA	NA	NA	NA	NA	1.4E-05	1.4E-05
Phenanthrene	1.1E-03	8.6E-04	NA	5.0E-04	NA	NA	2.4E-03
Pyrene	5.8E-04	4.7E-04	1.7E-05	NA	NA	NA	1.1E-03
Selenium	1.5E-03	9.3E-05	3.8E-05	NA	NA	7.7E-06	1.6E-03
Thallium	8.8E-02	5.4E-03	2.5E-03	NA	NA	NA	9.6E-02
1,2,4-Trimethylbenzene	6.0E-07	3.7E-07	NA	4.7E-04	NA	NA	4.7E-04
1,3,5-Trimethylbenzene	5.0E-07	3.1E-07	NA	3.8E-04	NA	NA	3.8E-04
Vanadium	NA	NA	NA	NA	NA	1.7E-03	1.7E-03
Xylenes	4.9E-08	3.0E-08	NA	2.7E-06	NA	NA	2.8E-06
Zinc	NA	NA	NA	NA	NA	8.2E-07	8.2E-07
Total	1E-01	1E-02	2E-01	1E-02	3E-06	2E-03	**3E-01**

NA = not applicable

SUMMARY OF CARCINOGENIC RISK CHARACTERIZATION: CONSTRUCTION WORKER

Chemical	Incidental Ingestion of Soil	Dermal Contact with Soil	Inhalation of Particulates	Inhalation of Volatiles in Ambient Air from Soil	Inhalation of Volatiles in Ambient Air from Groundwater	Dermal Contact with Groundwater	Excess Cancer Risk
Acenaphthene	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	1.8E-08	1.8E-08
Barium	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	5.0E-08	4.0E-08	4.7E-10	NA	NA	NA	9.0E-08
Benzo(a)pyrene	2.2E-07	1.7E-07	2.0E-09	NA	NA	NA	3.9E-07
Benzo(b)fluoranthene	1.0E-08	8.4E-09	9.8E-11	NA	NA	NA	1.9E-08
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	6.4E-09	5.1E-09	6.0E-11	NA	NA	NA	1.2E-08
Chromium III	NA	NA	NA	NA	NA	NA	NA
Chrysene	1.5E-08	1.2E-08	1.4E-10	NA	NA	NA	2.8E-08
Cobalt	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA
Cymene	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	3.6E-08	2.9E-08	1.0E-09	NA	NA	NA	6.6E-08
Fluoranthene	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	5.8E-09	4.6E-09	5.5E-11	NA	NA	NA	1.0E-08
Lead	NA	NA	NA	NA	NA	9.3E-13	9.3E-13
Mercury (elemental)	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	9.1E-12	5.6E-12	NA	3.1E-10	1.5E-11	3.5E-13	3.4E-10
Molybdenum	NA	NA	NA	NA	NA	NA	NA
Naphthalene	8.0E-09	4.9E-09	NA	4.8E-08	NA	NA	6.1E-08
Nickel	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Xylenes	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA
Total	3E-07	3E-07	4E-09	5E-08	2E-11	2E-08	7E-07

NA = not applicable

INHALATION OF RESUSPENDED PARTICULATES FROM SOIL: OFF-SITE ADULT RESIDENT DURING CONSTRUCTION

Chemical	Concentration Soil (Cs) (mg/kg)	Inhalation Absorption Factor-Dusts (ABSip) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	NA	1	NA	6.0E-02	NA	NA	NA	NA
Acenaphthylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Anthracene	NA	1	NA	3.0E-01	NA	NA	NC	NA
Arsenic	ND	1	NA	4.3E-06	NA	NA	12	NA
Barium	ND	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	6.2E-01	1	1.2E-07	NA	NA	4.0E-08	0.39	1.6E-08
Benzo(a)pyrene	2.7E-01	1	5.1E-08	NA	NA	1.8E-08	3.9	6.8E-08
Benzo(b)fluoranthene	1.3E-01	1	2.5E-08	NA	NA	8.4E-09	0.39	3.3E-09
Benzo(g,h,i)perylene	1.1E-01	1	2.1E-08	6.0E-02	3.5E-07	7.1E-09	NC	NA
Benzo(k)fluoranthene	7.9E-02	1	1.5E-08	NA	NA	5.1E-09	0.39	2.0E-09
Chromium III	ND	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	1.9E+00	1	3.6E-07	NA	NA	1.2E-07	0.039	4.8E-09
Cobalt	6.5E+00	1	1.2E-06	5.7E-06	2.1E-01	4.2E-07	NA	NA
Copper	ND	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	NA	1	NA	1.4E+00	NA	NA	NC	NA
Dibenz(a,h)anthracene	1.3E-01	1	2.5E-08	NA	NA	8.5E-09	4.1	3.5E-08
Fluoranthene	2.0E+00	1	3.9E-07	4.0E-02	9.7E-06	1.3E-07	NC	NA
Fluorene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Indeno(1,2,3-cd)pyrene	7.2E-02	1	1.4E-08	NA	NA	4.7E-09	0.39	1.8E-09
Lead	ND	1	NA	NA	NA	NA	0.042	NA
Mercury (elemental)	6.4E-02	1	1.2E-08	8.6E-06	1.4E-03	4.2E-09	NA	NA
Methylene chloride	NA	1	NA	1.1E-01	NA	NA	0.0035	NA
Molybdenum	5.1E-01	1	9.7E-08	5.0E-03	1.9E-05	3.3E-08	NA	NA
Naphthalene	NA	1	NA	2.6E-03	NA	NA	0.12	NA
Nickel	ND	1	NA	1.4E-05	NA	NA	0.91	NA
Phenanthrene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Pyrene	3.7E+00	1	7.1E-07	3.0E-02	2.4E-05	2.4E-07	NC	NA
Selenium	1.6E+00	1	3.0E-07	5.7E-03	5.3E-05	1.0E-07	NC	NA
Thallium	1.5E+00	1	2.8E-07	8.0E-05	3.6E-03	9.7E-08	NA	NA
1,2,4-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
Vanadium	ND	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	NA	1	NA	2.0E-01	NA	NA	NC	NA
Zinc	ND	1	NA	3.0E-01	NA	NA	NC	NA
					2E-01			1E-07

$$AADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATnc)}$$

$$Hazard\ Quotient = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATca)}$$

$$Excess\ Cancer\ Risk = LADD \times SFi$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFpe	350	days/year
Exposure Duration	ED	24	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	8,760	days
Averaging Time-Cancer	ATca	25,550	days
Inhalation Rate	IHRpe	0.83	m^3/hour
Exposure Time	ETpe	24	hour/d
Particulate Emission Factor	PEF	1.4E+06	m^3/kg

INHALATION OF VOCS IN AMBIENT AIR FROM SOIL EMISSIONS: ADULT RESIDENT DURING CONSTRUCTION

Chemical	Concentration Air (Caa) (mg/m^3)	Inhalation Absorption Factor-Volatiles (ABSiv) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	6.8E-05	1	1.9E-05	6.0E-02	3.1E-04	6.4E-06	NA	NA
Acenaphthylene	3.9E-05	1	1.1E-05	6.0E-02	1.8E-04	3.7E-06	NC	NA
Anthracene	5.3E-06	1	1.4E-06	3.0E-01	4.8E-06	4.9E-07	NC	NA
Arsenic	NA	1	NA	4.3E-06	NA	NA	12	NA
Barium	NA	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	NA	1	NA	NA	NA	NA	0.39	NA
Benzo(a)pyrene	NA	1	NA	NA	NA	NA	3.9	NA
Benzo(b)fluoranthene	NA	1	NA	NA	NA	NA	0.39	NA
Benzo(g,h,i)perylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Benzo(k)fluoranthene	NA	1	NA	NA	NA	NA	0.39	NA
Chromium III	NA	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	NA	1	NA	NA	NA	NA	0.039	NA
Cobalt	NA	1	NA	5.7E-06	NA	NA	NA	NA
Copper	NA	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	2.7E-07	1	7.4E-08	1.4E+00	5.3E-08	2.5E-08	NC	NA
Dibenz(a,h)anthracene	NA	1	NA	NA	NA	NA	4.1	NA
Fluoranthene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Fluorene	1.6E-06	1	4.4E-07	4.0E-02	1.1E-05	1.5E-07	NC	NA
Indeno(1,2,3-cd)pyrene	NA	1	NA	NA	NA	NA	0.39	NA
Lead	NA	1	NA	NA	NA	NA	0.042	NA
Mercury (elemental)	NA	1	NA	8.6E-06	NA	NA	NA	NA
Methylene chloride	6.4E-06	1	1.8E-06	1.1E-01	1.5E-05	6.0E-07	0.0035	2.1E-09
Molybdenum	NA	1	NA	5.0E-03	NA	NA	NA	NA
Naphthalene	2.9E-05	1	8.0E-06	2.6E-03	3.1E-03	2.7E-06	0.12	3.3E-07
Nickel	NA	1	NA	1.4E-05	NA	NA	0.91	NA
Phenanthrene	2.1E-05	1	5.7E-06	4.0E-02	1.4E-04	1.9E-06	NC	NA
Pyrene	NA	1	NA	3.0E-02	NA	NA	NC	NA
Selenium	NA	1	NA	5.7E-03	NA	NA	NC	NA
Thallium	NA	1	NA	8.0E-05	NA	NA	NA	NA
1,2,4-Trimethylbenzene	8.3E-07	1	2.3E-07	1.7E-03	1.3E-04	7.7E-08	NA	NA
1,3,5-Trimethylbenzene	6.7E-07	1	1.8E-07	1.7E-03	1.1E-04	6.3E-08	NA	NA
Vanadium	NA	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	5.7E-07	1	1.6E-07	2.0E-01	7.8E-07	5.4E-08	NC	NA
Zinc	NA	1	NA	3.0E-01	NA	NA	NC	NA
					4E-03			3E-07

$$AADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFi$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFaa	350	days/year
Exposure Duration	ED	24	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	8,760	days
Averaging Time-Cancer	ATca	25,550	days
Inhalation Rate	IHRaa	0.83	m^3/hour
Exposure Time	ETaa	24	hour/day

INHALATION OF VOCS IN AMBIENT AIR FROM GROUNDWATER EMISSIONS: ADULT RESIDENT DURING CONSTRUCTION

Chemical	Concentration Air (Caa) (mg/m^3)	Inhalation Absorption Factor-Volatiles (ABSiv) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	NA	1	NA	6.0E-02	NA	NA	NA	NA
Acenaphthylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Anthracene	NA	1	NA	3.0E-01	NA	NA	NC	NA
Arsenic	NA	1	NA	4.3E-06	NA	NA	12	NA
Barium	NA	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	NA	1	NA	NA	NA	NA	0.39	NA
Benzo(a)pyrene	NA	1	NA	NA	NA	NA	3.9	NA
Benzo(b)fluoranthene	NA	1	NA	NA	NA	NA	0.39	NA
Benzo(g,h,i)perylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Benzo(k)fluoranthene	NA	1	NA	NA	NA	NA	0.39	NA
Chromium III	NA	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	NA	1	NA	NA	NA	NA	0.039	NA
Cobalt	NA	1	NA	5.7E-06	NA	NA	NA	NA
Copper	NA	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	NA	1	NA	1.4E+00	NA	NA	NC	NA
Dibenz(a,h)anthracene	NA	1	NA	NA	NA	NA	4.1	NA
Fluoranthene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Fluorene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Indeno(1,2,3-cd)pyrene	NA	1	NA	NA	NA	NA	0.39	NA
Lead	NA	1	NA	NA	NA	NA	0.042	NA
Mercury (elemental)	NA	1	NA	8.6E-06	NA	NA	NA	NA
Methylene chloride	3.2E-07	1	8.8E-08	1.1E-01	7.7E-07	3.0E-08	0.0035	1.1E-10
Molybdenum	NA	1	NA	5.0E-03	NA	NA	NA	NA
Naphthalene	NA	1	NA	2.6E-03	NA	NA	0.12	NA
Nickel	NA	1	NA	1.4E-05	NA	NA	0.91	NA
Phenanthrene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Pyrene	NA	1	NA	3.0E-02	NA	NA	NC	NA
Selenium	NA	1	NA	5.7E-03	NA	NA	NC	NA
Thallium	NA	1	NA	8.0E-05	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
Vanadium	NA	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	NA	1	NA	2.0E-01	NA	NA	NC	NA
Zinc	NA	1	NA	3.0E-01	NA	NA	NC	NA
					8E-07			1E-10

$$AADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATnc)}$$

$$Hazard\ Quotient = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATca)}$$

$$Excess\ Cancer\ Risk = LADD \times SFi$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFaa	350	days/year
Exposure Duration	ED	24	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	8,760	days
Averaging Time-Cancer	ATca	25,550	days
Inhalation Rate	IHRaa	0.83	m^3/hour
Exposure Time	ETaa	24	hour/day

INHALATION OF RESUSPENDED PARTICULATES FROM SOIL: CHILD RESIDENT DURING CONSTRUCTION

Chemical	Concentration Soil (Cs) (mg/kg)	Inhalation Absorption Factor-Dusts (ABSip) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	NA	1	NA	6.0E-02	NA	NA	NA	NA
Acenaphthylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Anthracene	NA	1	NA	3.0E-01	NA	NA	NC	NA
Arsenic	ND	1	NA	4.3E-06	NA	NA	12	NA
Barium	ND	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	6.2E-01	1	2.8E-07	NA	NA	2.4E-08	0.39	9.3E-09
Benzo(a)pyrene	2.7E-01	1	1.2E-07	NA	NA	1.0E-08	3.9	4.0E-08
Benzo(b)fluoranthene	1.3E-01	1	5.8E-08	NA	NA	5.0E-09	0.39	1.9E-09
Benzo(g,h,i)perylene	1.1E-01	1	4.9E-08	6.0E-02	8.2E-07	4.2E-09	NC	NA
Benzo(k)fluoranthene	7.9E-02	1	3.5E-08	NA	NA	3.0E-09	0.39	1.2E-09
Chromium III	ND	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	1.9E+00	1	8.5E-07	NA	NA	7.3E-08	0.039	2.9E-09
Cobalt	6.5E+00	1	2.9E-06	5.7E-06	5.1E-01	2.5E-07	NA	NA
Copper	ND	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	NA	1	NA	1.4E+00	NA	NA	NC	NA
Dibenz(a,h)anthracene	1.3E-01	1	5.9E-08	NA	NA	5.0E-09	4.1	2.1E-08
Fluoranthene	2.0E+00	1	9.1E-07	4.0E-02	2.3E-05	7.8E-08	NC	NA
Fluorene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Indeno(1,2,3-cd)pyrene	7.2E-02	1	3.2E-08	NA	NA	2.8E-09	0.39	1.1E-09
Lead	ND	1	NA	NA	NA	NA	0.042	NA
Mercury (elemental)	6.4E-02	1	2.9E-08	8.6E-06	3.3E-03	2.5E-09	NA	NA
Methylene chloride	NA	1	NA	1.1E-01	NA	NA	0.0035	NA
Molybdenum	5.1E-01	1	2.3E-07	5.0E-03	4.6E-05	2.0E-08	NA	NA
Naphthalene	NA	1	NA	2.6E-03	NA	NA	0.12	NA
Nickel	ND	1	NA	1.4E-05	NA	NA	0.91	NA
Phenanthrene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Pyrene	3.7E+00	1	1.7E-06	3.0E-02	5.6E-05	1.4E-07	NC	NA
Selenium	1.6E+00	1	7.2E-07	5.7E-03	1.3E-04	6.1E-08	NC	NA
Thallium	1.5E+00	1	6.7E-07	8.0E-05	8.4E-03	5.8E-08	NA	NA
1,2,4-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
Vanadium	ND	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	NA	1	NA	2.0E-01	NA	NA	NC	NA
Zinc	ND	1	NA	3.0E-01	NA	NA	NC	NA
					5.2E-01			7.7E-08

$$AADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATnc)}$$

$$Hazard\ Quotient = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATca)}$$

$$Excess\ Cancer\ Risk = LADD \times SFi$$

Parameter	Symbol	Units	Values
Exposure Frequency	EFpe	d/yr	350
Exposure Duration	ED	yr	6
Body Weight	BW	kg	15
Averaging Time-Non-cancer	ATnc	days	2,190
Averaging Time-Cancer	ATca	days	25,550
Inhalation Rate	IHRpe	m^3/hr	0.42
Exposure Time	ETpe	hr/d	24
Particulate Emission Factor	PEF	m^3/kg	1E+06

INHALATION OF VOCS IN AMBIENT AIR FROM SOIL EMISSIONS: CHILD RESIDENT DURING CONSTRUCTION

Chemical	Concentration Air (Caa) (mg/m^3)	Inhalation Absorption Factor-Volatiles (ABSiv) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	1.4E-04	1	8.8E-05	6.0E-02	1.5E-03	7.5E-06	NA	NA
Acenaphthylene	7.9E-05	1	5.1E-05	6.0E-02	8.5E-04	4.3E-06	NC	NA
Anthracene	1.1E-05	1	6.8E-06	3.0E-01	2.3E-05	5.8E-07	NC	NA
Arsenic	NA	1	NA	4.3E-06	NA	NA	12	NA
Barium	NA	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	NA	1	NA	NA	NA	NA	0.39	NA
Benzo(a)pyrene	NA	1	NA	NA	NA	NA	3.9	NA
Benzo(b)fluoranthene	NA	1	NA	NA	NA	NA	0.39	NA
Benzo(g,h,i)perylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Benzo(k)fluoranthene	NA	1	NA	NA	NA	NA	0.39	NA
Chromium III	NA	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	NA	1	NA	NA	NA	NA	0.039	NA
Cobalt	NA	1	NA	5.7E-06	NA	NA	NA	NA
Copper	NA	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	5.4E-07	1	3.5E-07	1.4E+00	2.5E-07	3.0E-08	NC	NA
Dibenz(a,h)anthracene	NA	1	NA	NA	NA	NA	4.1	NA
Fluoranthene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Fluorene	3.2E-06	1	2.1E-06	4.0E-02	5.2E-05	1.8E-07	NC	NA
Indeno(1,2,3-cd)pyrene	NA	1	NA	NA	NA	NA	0.39	NA
Lead	NA	1	NA	NA	NA	NA	0.042	NA
Mercury (elemental)	NA	1	NA	8.6E-06	NA	NA	NA	NA
Methylene chloride	1.3E-05	1	8.3E-06	1.1E-01	7.3E-05	7.1E-07	0.0035	2.5E-09
Molybdenum	NA	1	NA	5.0E-03	NA	NA	NA	NA
Naphthalene	5.9E-05	1	3.8E-05	2.6E-03	1.5E-02	3.2E-06	0.12	3.9E-07
Nickel	NA	1	NA	1.4E-05	NA	NA	0.91	NA
Phenanthrene	4.1E-05	1	2.7E-05	4.0E-02	6.7E-04	2.3E-06	NC	NA
Pyrene	NA	1	NA	3.0E-02	NA	NA	NC	NA
Selenium	NA	1	NA	5.7E-03	NA	NA	NC	NA
Thallium	NA	1	NA	8.0E-05	NA	NA	NA	NA
1,2,4-Trimethylbenzene	1.7E-06	1	1.1E-06	1.7E-03	6.3E-04	9.1E-08	NA	NA
1,3,5-Trimethylbenzene	1.3E-06	1	8.6E-07	1.7E-03	5.1E-04	7.4E-08	NA	NA
Vanadium	NA	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	1.1E-06	1	7.4E-07	2.0E-01	3.7E-06	6.3E-08	NC	NA
Zinc	NA	1	NA	3.0E-01	NA	NA	NC	NA
					1.9E-02			3.9E-07

$$AADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFi$$

Parameter	Symbol	Units	Values
Exposure Frequency	EFaa	d/yr	350
Exposure Duration	ED	yr	6
Body Weight	BW	kg	15
Averaging Time-Non-cancer	ATnc	days	2,190
Averaging Time-Cancer	ATca	days	25,550
Inhalation Rate	IHRaa	m^3/hr	0.42
Exposure Time	ETaa	hr/d	24

INHALATION OF VOCS IN AMBIENT AIR FROM GROUNDWATER EMISSIONS: CHILD RESIDENT DURING CONSTRUCTION

Chemical	Concentration Air (Caa) (mg/m^3)	Inhalation Absorption Factor-Volatiles (ABSiv) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	NA	1	NA	6.0E-02	NA	NA	NA	NA
Acenaphthylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Anthracene	NA	1	NA	3.0E-01	NA	NA	NC	NA
Arsenic	NA	1	NA	4.3E-06	NA	NA	12	NA
Barium	NA	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	NA	1	NA	NA	NA	NA	0.39	NA
Benzo(a)pyrene	NA	1	NA	NA	NA	NA	3.9	NA
Benzo(b)fluoranthene	NA	1	NA	NA	NA	NA	0.39	NA
Benzo(g,h,i)perylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Benzo(k)fluoranthene	NA	1	NA	NA	NA	NA	0.39	NA
Chromium III	NA	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	NA	1	NA	NA	NA	NA	0.039	NA
Cobalt	NA	1	NA	5.7E-06	NA	NA	NA	NA
Copper	NA	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	NA	1	NA	1.4E+00	NA	NA	NC	NA
Dibenz(a,h)anthracene	NA	1	NA	NA	NA	NA	4.1	NA
Fluoranthene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Fluorene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Indeno(1,2,3-cd)pyrene	NA	1	NA	NA	NA	NA	0.39	NA
Lead	NA	1	NA	NA	NA	NA	0.042	NA
Mercury (elemental)	NA	1	NA	8.6E-06	NA	NA	NA	NA
Methylene chloride	6.4E-07	1	4.1E-07	1.1E-01	3.6E-06	3.6E-08	0.0035	1.2E-10
Molybdenum	NA	1	NA	5.0E-03	NA	NA	NA	NA
Naphthalene	NA	1	NA	2.6E-03	NA	NA	0.12	NA
Nickel	NA	1	NA	1.4E-05	NA	NA	0.91	NA
Phenanthrene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Pyrene	NA	1	NA	3.0E-02	NA	NA	NC	NA
Selenium	NA	1	NA	5.7E-03	NA	NA	NC	NA
Thallium	NA	1	NA	8.0E-05	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
Vanadium	NA	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	NA	1	NA	2.0E-01	NA	NA	NC	NA
Zinc	NA	1	NA	3.0E-01	NA	NA	NC	NA
					3.6E-06			1.2E-10

$$AADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFi$$

Parameter	Symbol	Units	Values
Exposure Frequency	EFaa	d/yr	350
Exposure Duration	ED	yr	6
Body Weight	BW	kg	15
Averaging Time-Non-cancer	ATnc	days	2,190
Averaging Time-Cancer	ATca	days	25,550
Inhalation Rate	IHRaa	m^3/hr	0.42
Exposure Time	ETaa	hr/d	24

SUMMARY OF NONCARCINOGENIC HAZARDS: OFF-SITE RESIDENT DURING CONSTRUCTION[1]

Chemical	Soil		Groundwater	
	Inhalation of Particulates	Inhalation of Volatiles in Ambient Air from Soil	Inhalation of Volatiles in Ambient Air from Groundwater	Hazard Index
Acenaphthene	NA	1.5E-03	NA	1.5E-03
Acenaphthylene	NA	8.5E-04	NA	8.5E-04
Anthracene	NA	2.3E-05	NA	2.3E-05
Arsenic	NA	NA	NA	NA
Barium	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA
Benzo(g,h,i)perylene	8.2E-07	NA	NA	8.2E-07
Benzo(k)fluoranthene	NA	NA	NA	NA
Chromium III	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA
Cobalt	5.1E-01	NA	NA	5.1E-01
Copper	NA	NA	NA	NA
Cymene	NA	2.5E-07	NA	2.5E-07
Dibenz(a,h)anthracene	NA	NA	NA	NA
Fluoranthene	2.3E-05	NA	NA	2.3E-05
Fluorene	NA	5.2E-05	NA	5.2E-05
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA
Lead	NA	NA	NA	NA
Mercury (elemental)	3.3E-03	NA	NA	3.3E-03
Methylene chloride	NA	7.3E-05	3.6E-06	7.6E-05
Molybdenum	4.6E-05	NA	NA	4.6E-05
Naphthalene	NA	1.5E-02	NA	1.5E-02
Nickel	NA	NA	NA	NA
Phenanthrene	NA	6.7E-04	NA	6.7E-04
Pyrene	5.6E-05	NA	NA	5.6E-05
Selenium	1.3E-04	NA	NA	1.3E-04
Thallium	8.4E-03	NA	NA	8.4E-03
1,2,4-Trimethylbenzene	NA	6.3E-04	NA	6.3E-04
1,3,5-Trimethylbenzene	NA	5.1E-04	NA	5.1E-04
Vanadium	NA	NA	NA	NA
Xylenes	NA	3.7E-06	NA	3.7E-06
Zinc	NA	NA	NA	NA
Total	5.2E-01	1.9E-02	3.6E-06	5E-01

Notes:
[1] Noncarcinogenic health effects for off-site residents are based on exposures to children.

Abbreviations:
NA = Not applicable

SUMMARY CARCINOGENIC RISK CHARACTERIZATION: RESIDENT DURING CONSTRUCTION[1]

Chemical	Soil		Groundwater	Excess Cancer Risk
	Inhalation of Particulates	Inhalation of Volatiles in Ambient Air from Soil	Inhalation of Volatiles in Ambient Air from Groundwater	
Acenaphthene	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA
Barium	NA	NA	NA	NA
Benzo(a)anthracene	2.5E-08	NA	NA	2.5E-08
Benzo(a)pyrene	1.1E-07	NA	NA	1.1E-07
Benzo(b)fluoranthene	5.2E-09	NA	NA	5.2E-09
Benzo(g,h,i)perylene	NA	NA	NA	NA
Benzo(k)fluoranthene	3.2E-09	NA	NA	3.2E-09
Chromium III	NA	NA	NA	NA
Chrysene	7.7E-09	NA	NA	7.7E-09
Cobalt	NA	NA	NA	NA
Copper	NA	NA	NA	NA
Cymene	NA	NA	NA	NA
Dibenz(a,h)anthracene	5.5E-08	NA	NA	5.5E-08
Fluoranthene	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	2.9E-09	NA	NA	2.9E-09
Lead	NA	NA	NA	NA
Mercury (elemental)	NA	NA	NA	NA
Methylene chloride	NA	4.6E-09	2.3E-10	4.8E-09
Molybdenum	NA	NA	NA	NA
Naphthalene	NA	7.2E-07	NA	7.2E-07
Nickel	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA
Selenium	NA	NA	NA	NA
Thallium	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA
Xylenes	NA	NA	NA	NA
Zinc	NA	NA	NA	NA
Total	2.1E-07	7.2E-07	2.3E-10	9.3E-07

Notes:
[1] Theoretical excess cancer risks presented for the residential scenario as the summation of the risks associated with both the child and adult resident.

Abbreviations:
NA = Not applicable

INCIDENTAL INGESTION OF SOIL: ON-SITE WORKER DURING OPERATIONS

Chemical	Concentration Soil (Cs) (mg/kg)	Oral Absorption Factor-Soil (ABSos) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Oral Chronic Reference Dose (RfDo) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Oral Slope Factor (SFo) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	9.0E+00	1	8.8E-06	6.0E-02	1.5E-04	3.1E-06	NA	NA
Acenaphthylene	4.9E+00	1	4.8E-06	6.0E-02	8.0E-05	1.7E-06	NC	NA
Anthracene	2.5E+00	1	2.4E-06	3.0E-01	8.2E-06	8.7E-07	NC	NA
Arsenic	ND	1	ND	3.0E-04	NA	ND	9.5E+00	NA
Barium	ND	1	ND	2.0E-01	NA	ND	NC	NA
Benzo(a)anthracene	6.2E-01	1	6.1E-07	NA	NA	2.2E-07	1.2E+00	2.6E-07
Benzo(a)pyrene	2.7E-01	1	2.6E-07	NA	NA	9.4E-08	1.2E+01	1.1E-06
Benzo(b)fluoranthene	1.3E-01	1	1.3E-07	NA	NA	4.5E-08	1.2E+00	5.5E-08
Benzo(g,h,i)perylene	1.1E-01	1	1.1E-07	6.0E-02	1.8E-06	3.8E-08	NC	NA
Benzo(k)fluoranthene	7.9E-02	1	7.7E-08	NA	NA	2.8E-08	1.2E+00	3.3E-08
Chromium III	ND	1	ND	1.5E+00	NA	ND	NC	NA
Chrysene	1.9E+00	1	1.9E-06	NA	NA	6.7E-07	1.2E-01	8.0E-08
Cobalt	6.5E+00	1	6.3E-06	2.0E-02	3.2E-04	2.3E-06	NA	NA
Copper	ND	1	ND	3.7E-02	NA	ND	NC	NA
Cymene	2.8E-03	1	2.7E-09	8.0E-02	3.4E-08	9.8E-10	NC	NA
Dibenz(a,h)anthracene	1.3E-01	1	1.3E-07	NA	NA	4.6E-08	4.1E+00	1.9E-07
Fluoranthene	2.0E+00	1	2.0E-06	4.0E-02	5.0E-05	7.1E-07	NC	NA
Fluorene	5.0E-01	1	4.9E-07	4.0E-02	1.2E-05	1.7E-07	NC	NA
Indeno(1,2,3-cd)pyrene	7.2E-02	1	7.0E-08	NA	NA	2.5E-08	1.2E+00	3.0E-08
Lead	ND	1	ND	NA	NA	ND	8.5E-03	NA
Mercury (elemental)	6.4E-02	1	6.3E-08	8.6E-06	7.3E-03	2.2E-08	NA	NA
Methylene chloride	9.7E-03	1	9.5E-09	6.0E-02	1.6E-07	3.4E-09	1.4E-02	4.8E-11
Molybdenum	5.1E-01	1	5.0E-07	5.0E-03	1.0E-04	1.8E-07	NA	NA
Naphthalene	9.9E-01	1	9.7E-07	2.0E-02	4.8E-05	3.5E-07	1.2E-01	4.2E-08
Nickel	ND	1	ND	2.0E-02	NA	ND	NA	NA
Phenanthrene	9.1E+00	1	8.9E-06	4.0E-02	2.2E-04	3.2E-06	NC	NA
Pyrene	3.7E+00	1	3.6E-06	3.0E-02	1.2E-04	1.3E-06	NC	NA
Selenium	1.6E+00	1	1.6E-06	5.0E-03	3.1E-04	5.6E-07	NC	NA
Thallium	1.5E+00	1	1.5E-06	8.0E-05	1.8E-02	5.2E-07	NA	NA
1,2,4-Trimethylbenzene	6.4E-03	1	6.3E-09	5.0E-02	1.3E-07	2.2E-09	NA	NA
1,3,5-Trimethylbenzene	5.3E-03	1	5.2E-09	5.0E-02	1.0E-07	1.9E-09	NA	NA
Vanadium	ND	1	ND	7.0E-03	NA	ND	NA	NA
Xylenes	2.1E-03	1	2.1E-09	2.0E-01	1.0E-08	7.3E-10	NA	NA
Zinc	ND	1	ND	3.0E-01	NA	ND	NC	NA
					3E-02			2E-06

$$AADD = \frac{(Cs \times IRs \times ABSos \times EFig \times ED \times CFmg\text{-}kg)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDo}$$

$$LADD = \frac{(Cs \times IRs \times ABSos \times EFig \times ED \times CFmg\text{-}kg)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFo$$

Parameter	Symbol	Value	Units
Exposure Frequency	EFig	250	days/year
Exposure Duration	ED	25	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	9,125	days
Averaging Time-Cancer	ATca	25,550	days
Ingestion Rate	IRs	100	mg/day
Conversion Factor from mg to kg	$CF_{mg\text{-}kg}$	1E-06	kg/mg

DERMAL CONTACT WITH SOIL: ON-SITE WORKER DURING OPERATIONS

Chemical	Concentration Soil (Cs) (mg/kg)	Dermal Absorption Factor-Soil (ABSds) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Dermal Chronic Reference Dose (RfDd) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Dermal Slope Factor (SFd) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	9.0E+00	0.13	7.6E-06	6.0E-02	1.3E-04	2.7E-06	NA	NA
Acenaphthylene	4.9E+00	0.13	4.1E-06	6.0E-02	6.9E-05	1.5E-06	NA	NA
Anthracene	2.5E+00	0.13	2.1E-06	3.0E-01	7.0E-06	7.5E-07	NA	NA
Arsenic	ND	0.03	NA	3.0E-04	NA	NA	9.5E+00	NA
Barium	ND	0.01	NA	1.4E-02	NA	NA	NA	NA
Benzo(a)anthracene	6.2E-01	0.13	5.2E-07	NA	NA	1.9E-07	1.2E+00	2.2E-07
Benzo(a)pyrene	2.7E-01	0.13	2.3E-07	NA	NA	8.1E-08	1.2E+01	9.7E-07
Benzo(b)fluoranthene	1.3E-01	0.13	1.1E-07	NA	NA	3.9E-08	1.2E+00	4.7E-08
Benzo(g,h,i)perylene	1.1E-01	0.13	9.2E-08	6.0E-02	1.5E-06	3.3E-08	NA	NA
Benzo(k)fluoranthene	7.9E-02	0.13	6.6E-08	NA	NA	2.4E-08	1.2E+00	2.8E-08
Chromium III	ND	0.01	NA	2.0E-02	NA	NA	NA	NA
Chrysene	1.9E+00	0.13	1.6E-06	NA	NA	5.7E-07	1.2E-01	6.9E-08
Cobalt	6.5E+00	0.01	4.2E-07	2.0E-02	2.1E-05	1.5E-07	NA	NA
Copper	ND	0.01	NA	3.7E-02	NA	NA	NA	NA
Cymene	2.8E-03	0.1	1.8E-09	8.0E-02	2.3E-08	6.5E-10	NA	NA
Dibenz(a,h)anthracene	1.3E-01	0.13	1.1E-07	NA	NA	3.9E-08	4.1E+00	1.6E-07
Fluoranthene	2.0E+00	0.13	1.7E-06	4.0E-02	4.3E-05	6.1E-07	NA	NA
Fluorene	5.0E-01	0.13	4.2E-07	4.0E-02	1.0E-05	1.5E-07	NA	NA
Indeno(1,2,3-cd)pyrene	7.2E-02	0.13	6.0E-08	NA	NA	2.2E-08	1.2E+00	2.6E-08
Lead	ND	0.01	NA	NA	NA	NA	8.5E-03	NA
Mercury (elemental)	6.4E-02	0.01	4.1E-09	8.6E-06	4.8E-04	1.5E-09	NA	NA
Methylene chloride	9.7E-03	0.1	6.3E-09	6.0E-02	1.0E-07	2.2E-09	1.4E-02	3.1E-11
Molybdenum	5.1E-01	0.01	3.3E-08	5.0E-03	6.6E-06	1.2E-08	NA	NA
Naphthalene	9.9E-01	0.1	6.4E-07	2.0E-02	3.2E-05	2.3E-07	1.2E-01	2.7E-08
Nickel	ND	0.01	NA	8.0E-04	NA	NA	NA	NA
Phenanthrene	9.1E+00	0.13	7.6E-06	4.0E-02	1.9E-04	2.7E-06	NA	NA
Pyrene	3.7E+00	0.13	3.1E-06	3.0E-02	1.0E-04	1.1E-06	NA	NA
Selenium	1.6E+00	0.01	1.0E-07	5.0E-03	2.1E-05	3.7E-08	NA	NA
Thallium	1.5E+00	0.01	9.7E-08	8.0E-05	1.2E-03	3.5E-08	NA	NA
1,2,4-Trimethylbenzene	6.4E-03	0.1	4.1E-09	5.0E-02	8.3E-08	1.5E-09	NA	NA
1,3,5-Trimethylbenzene	5.3E-03	0.1	3.4E-09	5.0E-02	6.8E-08	1.2E-09	NA	NA
Vanadium	ND	0.01	NA	1.8E-04	NA	NA	NA	NA
Xylenes	2.1E-03	0.1	1.4E-09	2.0E-01	6.8E-09	4.8E-10	NA	NA
Zinc	ND	0.01	NA	3.0E-01	NA	NA	NA	NA
					2E-03			2E-06

$$AADD = \frac{(Cs \times SAs \times SAF \times ABSds \times EFdc \times ED \times CFmg\text{-}kg)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDo}$$

$$LADD = \frac{(Cs \times SAs \times SAF \times ABSds \times EFdc \times ED \times CFmg\text{-}kg)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFo$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFdc	250	days/year
Exposure Duration	ED	25	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	9,125	days
Averaging Time-Cancer	ATca	25,550	days
Surface Area	SAs	3,300	cm^2
Soil-to-Skin Adherence Factor	SAF	0.2	mg/cm^2
Conversion Factor from mg to kg	$CF_{mg\text{-}kg}$	1E-06	kg/mg

INHALATION OF RESUSPENDED PARTICULATES FROM SOIL: ON-SITE WORKER DURING OPERATIONS

Chemical	Concentration Soil (Cs) (mg/kg)	Inhalation Absorption Factor-Dusts (ABSip) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	NA	1	NA	6.0E-02	NA	NA	NA	NA
Acenaphthylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Anthracene	NA	1	NA	3.0E-01	NA	NA	NC	NA
Arsenic	ND	1	NA	4.3E-06	NA	NA	1.2E+01	NA
Barium	ND	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	6.2E-01	1	5.9E-11	NA	NA	2.1E-11	3.9E-01	8.2E-12
Benzo(a)pyrene	2.7E-01	1	2.6E-11	NA	NA	9.1E-12	3.9E+00	3.6E-11
Benzo(b)fluoranthene	1.3E-01	1	1.2E-11	NA	NA	4.4E-12	3.9E-01	1.7E-12
Benzo(g,h,i)perylene	1.1E-01	1	1.0E-11	6.0E-02	1.7E-10	3.7E-12	NC	NA
Benzo(k)fluoranthene	7.9E-02	1	7.5E-12	NA	NA	2.7E-12	3.9E-01	1.0E-12
Chromium III	ND	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	1.9E+00	1	1.8E-10	NA	NA	6.5E-11	3.9E-02	2.5E-12
Cobalt	6.5E+00	1	6.1E-10	5.7E-06	1.1E-04	2.2E-10	NA	NA
Copper	ND	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	NA	1	NA	1.4E+00	NA	NA	NC	NA
Dibenz(a,h)anthracene	1.3E-01	1	1.2E-11	NA	NA	4.4E-12	4.1E+00	1.8E-11
Fluoranthene	2.0E+00	1	1.9E-10	4.0E-02	4.8E-09	6.9E-11	NC	NA
Fluorene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Indeno(1,2,3-cd)pyrene	7.2E-02	1	6.8E-12	NA	NA	2.4E-12	3.9E-01	9.5E-13
Lead	ND	1	NA	NA	NA	NA	4.2E-02	NA
Mercury (elemental)	6.4E-02	1	6.1E-12	8.6E-06	7.1E-07	2.2E-12	NA	NA
Methylene chloride	NA	1	NA	1.1E-01	NA	NA	3.5E-03	NA
Molybdenum	5.1E-01	1	4.8E-11	5.0E-03	9.7E-09	1.7E-11	NA	NA
Naphthalene	NA	1	NA	2.6E-03	NA	NA	1.2E-01	NA
Nickel	ND	1	NA	1.4E-05	NA	NA	9.1E-01	NA
Phenanthrene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Pyrene	3.7E+00	1	3.5E-10	3.0E-02	1.2E-08	1.3E-10	NC	NA
Selenium	1.6E+00	1	1.5E-10	5.7E-03	2.7E-08	5.4E-11	NC	NA
Thallium	1.5E+00	1	1.4E-10	8.0E-05	1.8E-06	5.1E-11	NA	NA
1,2,4-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
Vanadium	ND	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	NA	1	NA	2.0E-01	NA	NA	NC	NA
Zinc	ND	1	NA	3.0E-01	NA	NA	NC	NA
					1E-04			7E-11

$$AADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFi$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFpe	250	days/year
Exposure Duration	ED	25	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	9,125	days
Averaging Time-Cancer	ATca	25,550	days
Inhalation Rate	IHRpe	1.6	m^3/hour
Exposure Time	ETpe	8	hour/day
Particulate Emission Factor	PEF	1.3E+09	m^3/kg

INHALATION OF VOCS IN AMBIENT AIR FROM SOIL EMISSIONS: ON-SITE WORKER DURING OPERATIONS

Chemical	Concentration Air (Caa) (mg/m^3)	Inhalation Absorption Factor-Volatiles (ABSiv) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	6.7E-05	1	8.3E-06	6.0E-02	1.4E-04	3.0E-06	NA	NA
Acenaphthylene	3.9E-05	1	4.8E-06	6.0E-02	8.0E-05	1.7E-06	NC	NA
Anthracene	5.2E-06	1	6.5E-07	3.0E-01	2.2E-06	2.3E-07	NC	NA
Arsenic	NA	1	NA	4.3E-06	NA	NA	1.2E+01	NA
Barium	NA	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Benzo(a)pyrene	NA	1	NA	NA	NA	NA	3.9E+00	NA
Benzo(b)fluoranthene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Benzo(g,h,i)perylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Benzo(k)fluoranthene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Chromium III	NA	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	NA	1	NA	NA	NA	NA	3.9E-02	NA
Cobalt	NA	1	NA	5.7E-06	NA	NA	NA	NA
Copper	NA	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	2.7E-07	1	3.3E-08	1.4E+00	2.4E-08	1.2E-08	NC	NA
Dibenz(a,h)anthracene	NA	1	NA	NA	NA	NA	4.1E+00	NA
Fluoranthene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Fluorene	1.6E-06	1	2.0E-07	4.0E-02	5.0E-06	7.1E-08	NC	NA
Indeno(1,2,3-cd)pyrene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Lead	NA	1	NA	NA	NA	NA	4.2E-02	NA
Mercury (elemental)	NA	1	NA	8.6E-06	NA	NA	NA	NA
Methylene chloride	6.3E-06	1	7.9E-07	1.1E-01	6.9E-06	2.8E-07	3.5E-03	9.9E-10
Molybdenum	NA	1	NA	5.0E-03	NA	NA	NA	NA
Naphthalene	2.9E-05	1	3.6E-06	2.6E-03	1.4E-03	1.3E-06	1.2E-01	1.5E-07
Nickel	NA	1	NA	1.4E-05	NA	NA	9.1E-01	NA
Phenanthrene	2.0E-05	1	2.5E-06	4.0E-02	6.4E-05	9.1E-07	NC	NA
Pyrene	NA	1	NA	3.0E-02	NA	NA	NC	NA
Selenium	NA	1	NA	5.7E-03	NA	NA	NC	NA
Thallium	NA	1	NA	8.0E-05	NA	NA	NA	NA
1,2,4-Trimethylbenzene	8.1E-07	1	1.0E-07	1.7E-03	6.0E-05	3.6E-08	NA	NA
1,3,5-Trimethylbenzene	6.5E-07	1	8.2E-08	1.7E-03	4.8E-05	2.9E-08	NA	NA
Vanadium	NA	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	5.6E-07	1	7.0E-08	2.0E-01	3.5E-07	2.5E-08	NC	NA
Zinc	NA	1	NA	3.0E-01	NA	NA	NC	NA
					2E-03			2E-07

$$AADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFi$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFaa	250	days/year
Exposure Duration	ED	25	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	9,125	days
Averaging Time-Cancer	ATca	25,550	days
Inhalation Rate	IHRaa	1.6	m^3/hour
Exposure Time	ETaa	8	hour/day

INHALATION OF VOCS IN AMBIENT AIR FROM GROUNDWATER EMISSIONS: ON-SITE WORKER DURING OPERATIONS

Chemical	Concentration Air (Caa) (mg/m^3)	Inhalation Absorption Factor-Volatiles (ABSiv) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	NA	1	NA	6.0E-02	NA	NA	NA	NA
Acenaphthylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Anthracene	NA	1	NA	3.0E-01	NA	NA	NC	NA
Arsenic	NA	1	NA	4.3E-06	NA	NA	1.2E+01	NA
Barium	NA	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Benzo(a)pyrene	NA	1	NA	NA	NA	NA	3.9E+00	NA
Benzo(b)fluoranthene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Benzo(g,h,i)perylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Benzo(k)fluoranthene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Chromium III	NA	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	NA	1	NA	NA	NA	NA	3.9E-02	NA
Cobalt	NA	1	NA	5.7E-06	NA	NA	NA	NA
Copper	NA	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	NA	1	NA	1.4E+00	NA	NA	NC	NA
Dibenz(a,h)anthracene	NA	1	NA	NA	NA	NA	4.1E+00	NA
Fluoranthene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Fluorene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Indeno(1,2,3-cd)pyrene	NA	1	NA	NA	NA	NA	3.9E-01	NA
Lead	NA	1	NA	NA	NA	NA	4.2E-02	NA
Mercury (elemental)	NA	1	NA	8.6E-06	NA	NA	NA	NA
Methylene chloride	3.2E-07	1	4.0E-08	1.1E-01	3.5E-07	1.4E-08	3.5E-03	4.9E-11
Molybdenum	NA	1	NA	5.0E-03	NA	NA	NA	NA
Naphthalene	NA	1	NA	2.6E-03	NA	NA	1.2E-01	NA
Nickel	NA	1	NA	1.4E-05	NA	NA	9.1E-01	NA
Phenanthrene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Pyrene	NA	1	NA	3.0E-02	NA	NA	NC	NA
Selenium	NA	1	NA	5.7E-03	NA	NA	NC	NA
Thallium	NA	1	NA	8.0E-05	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
Vanadium	NA	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	NA	1	NA	2.0E-01	NA	NA	NC	NA
Zinc	NA	1	NA	3.0E-01	NA	NA	NC	NA
					3E-07			5E-11

$$AADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATnc)} \qquad \text{Hazard Quotient} = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATca)} \qquad \text{Excess Cancer Risk} = LADD \times SFi$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFaa	250	days/year
Exposure Duration	ED	25	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	9,125	days
Averaging Time-Cancer	ATca	25,550	days
Inhalation Rate	IHRaa	1.6	m^3/hour
Exposure Time	ETaa	8	hour/day

INHALATION OF VOCS IN INDOOR AIR FROM SOIL EMISSIONS: ON-SITE WORKER DURING OPERATIONS

Chemical	Concentration Air (Cia) (mg/m^3)	Inhalation Absorption Factor-Volatiles (ABSiv) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	1.1E-05	1	1.4E-06	6.0E-02	2.3E-05	4.8E-07	NA	NA
Acenaphthylene	1.8E-04	1	2.3E-05	6.0E-02	3.8E-04	8.1E-06	NC	NA
Anthracene	1.9E-07	1	2.4E-08	3.0E-01	8.0E-08	8.6E-09	NC	NA
Arsenic	ND	1	NA	4.3E-06	NA	NA	1.2E+01	NA
Barium	ND	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	ND	1	NA	NA	NA	NA	3.9E-01	NA
Benzo(a)pyrene	ND	1	NA	NA	NA	NA	3.9E+00	NA
Benzo(b)fluoranthene	ND	1	NA	NA	NA	NA	3.9E-01	NA
Benzo(g,h,i)perylene	ND	1	NA	6.0E-02	NA	NA	NC	NA
Benzo(k)fluoranthene	ND	1	NA	NA	NA	NA	3.9E-01	NA
Chromium III	ND	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	ND	1	NA	NA	NA	NA	3.9E-02	NA
Cobalt	ND	1	NA	5.7E-06	NA	NA	NA	NA
Copper	ND	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	1.4E-05	1	1.7E-06	1.4E+00	1.2E-06	6.0E-07	NC	NA
Dibenz(a,h)anthracene	ND	1	NA	NA	NA	NA	4.1E+00	NA
Fluoranthene	ND	1	NA	4.0E-02	NA	NA	NC	NA
Fluorene	5.5E-08	1	6.9E-09	4.0E-02	1.7E-07	2.5E-09	NC	NA
Indeno(1,2,3-cd)pyrene	ND	1	NA	NA	NA	NA	3.9E-01	NA
Lead	ND	1	NA	NA	NA	NA	4.2E-02	NA
Mercury (elemental)	ND	1	NA	8.6E-06	NA	NA	NA	NA
Methylene chloride	1.7E-04	1	2.2E-05	1.1E-01	1.9E-04	7.8E-06	3.5E-03	2.7E-08
Molybdenum	ND	1	NA	5.0E-03	NA	NA	NA	NA
Naphthalene	2.0E-05	1	2.5E-06	2.6E-03	9.5E-04	8.8E-07	1.2E-01	1.1E-07
Nickel	ND	1	NA	1.4E-05	NA	NA	9.1E-01	NA
Phenanthrene	2.0E-05	1	2.5E-06	4.0E-02	6.1E-05	8.8E-07	NC	NA
Pyrene	ND	1	NA	3.0E-02	NA	NA	NC	NA
Selenium	ND	1	NA	5.7E-03	NA	NA	NC	NA
Thallium	ND	1	NA	8.0E-05	NA	NA	NA	NA
1,2,4-Trimethylbenzene	2.6E-06	1	3.2E-07	1.7E-03	1.9E-04	1.1E-07	NA	NA
1,3,5-Trimethylbenzene	2.0E-06	1	2.5E-07	1.7E-03	1.5E-04	9.1E-08	NA	NA
Vanadium	ND	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	4.0E-06	1	5.0E-07	2.0E-01	2.5E-06	1.8E-07	NC	NA
Zinc	ND	1	NA	3.0E-01	NA	NA	NC	NA
					2E-03			1E-07

$$AADD = \frac{(Cia \times IHRia \times ETia \times ABSiv \times EFia \times ED)}{(BW \times ATnc)}$$

$$Hazard\ Quotient = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Cia \times IHRia \times ETia \times ABSiv \times EFia \times ED)}{(BW \times ATca)}$$

$$Excess\ Cancer\ Risk = LADD \times SFi$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFia	250	days/year
Exposure Duration	ED	25	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	9,125	days
Averaging Time-Cancer	ATca	25,550	days
Inhalation Rate	IHRia	1.6	m^3/hour
Exposure Time	ETia	8	hour/day

INHALATION OF VOCS IN INDOOR AIR FROM GROUNDWATER EMISSIONS: ON-SITE WORKER DURING OPERATIONS

Chemical	Concentration Air (Caa) (mg/m^3)	Inhalation Absorption Factor-Volatiles (ABSiv) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	ND	1	NA	6.0E-02	NA	NA	NA	NA
Acenaphthylene	ND	1	NA	6.0E-02	NA	NA	NC	NA
Anthracene	ND	1	NA	3.0E-01	NA	NA	NC	NA
Arsenic	ND	1	NA	4.3E-06	NA	NA	1.2E+01	NA
Barium	ND	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	ND	1	NA	NA	NA	NA	3.9E-01	NA
Benzo(a)pyrene	ND	1	NA	NA	NA	NA	3.9E+00	NA
Benzo(b)fluoranthene	ND	1	NA	NA	NA	NA	3.9E-01	NA
Benzo(g,h,i)perylene	ND	1	NA	6.0E-02	NA	NA	NC	NA
Benzo(k)fluoranthene	ND	1	NA	NA	NA	NA	3.9E-01	NA
Chromium III	ND	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	ND	1	NA	NA	NA	NA	3.9E-02	NA
Cobalt	ND	1	NA	5.7E-06	NA	NA	NA	NA
Copper	ND	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	ND	1	NA	1.4E+00	NA	NA	NC	NA
Dibenz(a,h)anthracene	ND	1	NA	NA	NA	NA	4.1E+00	NA
Fluoranthene	ND	1	NA	4.0E-02	NA	NA	NC	NA
Fluorene	ND	1	NA	4.0E-02	NA	NA	NC	NA
Indeno(1,2,3-cd)pyrene	ND	1	NA	NA	NA	NA	3.9E-01	NA
Lead	ND	1	NA	NA	NA	NA	4.2E-02	NA
Mercury (elemental)	ND	1	NA	8.6E-06	NA	NA	NA	NA
Methylene chloride	2.2E-05	1	2.8E-06	1.1E-01	2.5E-05	1.0E-06	3.5E-03	3.5E-09
Molybdenum	ND	1	NA	5.0E-03	NA	NA	NA	NA
Naphthalene	ND	1	NA	2.6E-03	NA	NA	1.2E-01	NA
Nickel	ND	1	NA	1.4E-05	NA	NA	9.1E-01	NA
Phenanthrene	ND	1	NA	4.0E-02	NA	NA	NC	NA
Pyrene	ND	1	NA	3.0E-02	NA	NA	NC	NA
Selenium	ND	1	NA	5.7E-03	NA	NA	NC	NA
Thallium	ND	1	NA	8.0E-05	NA	NA	NA	NA
1,2,4-Trimethylbenzene	ND	1	NA	1.7E-03	NA	NA	NA	NA
1,3,5-Trimethylbenzene	ND	1	NA	1.7E-03	NA	NA	NA	NA
Vanadium	ND	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	ND	1	NA	2.0E-01	NA	NA	NC	NA
Zinc	ND	1	NA	3.0E-01	NA	NA	NC	NA
					2E-05			4E-09

$$AADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATnc)}$$

$$Hazard\ Quotient = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Caa \times IHRaa \times ETaa \times ABSiv \times EFaa \times ED)}{(BW \times ATca)}$$

$$Excess\ Cancer\ Risk = LADD \times SFi$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFia	250	days/year
Exposure Duration	ED	25	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	9,125	days
Averaging Time-Cancer	ATca	25,550	days
Inhalation Rate	IHRia	1.6	m^3/hour
Exposure Time	ETia	8	hour/day

SUMMARY OF NONCARCINOGENIC HAZARDS: ON-SITE WORKER DURING OPERATIONS

Chemical	Incidental Ingestion of Soil	Dermal Contact with Soil	Inhalation of Particulates	Inhalation of Volatiles in Ambient Air from Soil	Inhalation of Volatiles in Indoor Air from Soil	Inhalation of Volatiles in Ambient Air from Groundwater	Inhalation of Volatiles in Indoor Air from Groundwater	Hazard Index
Acenaphthene	1.5E-04	1.3E-04	NA	1.4E-04	2.3E-05	NA	NA	4.3E-04
Acenaphthylene	8.0E-05	6.9E-05	NA	8.0E-05	3.8E-04	NA	NA	6.0E-04
Anthracene	8.2E-06	7.0E-06	NA	2.2E-06	8.0E-08	NA	NA	1.7E-05
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	1.8E-06	1.5E-06	1.7E-10	NA	NA	NA	NA	3.3E-06
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Chromium III	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	3.2E-04	2.1E-05	1.1E-04	NA	NA	NA	NA	4.4E-04
Copper	NA	NA	NA	NA	NA	NA	NA	NA
Cymene	3.4E-08	2.3E-08	NA	2.4E-08	1.2E-06	NA	NA	1.3E-06
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	5.0E-05	4.3E-05	4.8E-09	NA	NA	NA	NA	9.3E-05
Fluorene	1.2E-05	1.0E-05	NA	5.0E-06	1.7E-07	NA	NA	2.8E-05
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (elemental)	7.3E-03	4.8E-04	7.1E-07	NA	NA	NA	NA	7.8E-03
Methylene chloride	1.6E-07	1.0E-07	NA	6.9E-06	1.9E-04	3.5E-07	2.5E-05	2.2E-04
Molybdenum	1.0E-04	6.6E-06	9.7E-09	NA	NA	NA	NA	1.1E-04
Naphthalene	4.8E-05	3.2E-05	NA	1.4E-03	9.5E-04	NA	NA	2.4E-03
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	2.2E-04	1.9E-04	NA	6.4E-05	6.1E-05	NA	NA	5.4E-04
Pyrene	1.2E-04	1.0E-04	1.2E-08	NA	NA	NA	NA	2.3E-04
Selenium	3.1E-04	2.1E-05	2.7E-08	NA	NA	NA	NA	3.3E-04
Thallium	1.8E-02	1.2E-03	1.8E-06	NA	NA	NA	NA	2.0E-02
1,2,4-Trimethylbenzene	1.3E-07	8.3E-08	NA	6.0E-05	1.9E-04	NA	NA	2.5E-04
1,3,5-Trimethylbenzene	1.0E-07	6.8E-08	NA	4.8E-05	1.5E-04	NA	NA	2.0E-04
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	1.0E-08	6.8E-09	NA	3.5E-07	2.5E-06	NA	NA	2.9E-06
Zinc	NA	NA	NA	NA	NA	NA	NA	NA
Total	3E-02	2E-03	1E-04	2E-03	2E-03	3E-07	2E-05	3E-02

NA = not applicable

SUMMARY OF CARCINOGENIC RISK CHARACTERIZATION: ON-SITE WORKER DURING OPERATIONS

Chemical	Incidental Ingestion of Soil	Dermal Contact with Soil	Inhalation of Particulates	Inhalation of Volatiles in Ambient Air from Soil	Inhalation of Volatiles in Indoor Air from Soil	Inhalation of Volatiles in Ambient Air from Groundwater	Inhalation of Volatiles in Indoor Air from Groundwater	Excess Cancer Risk
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	2.6E-07	2.2E-07	8.2E-12	NA	NA	NA	NA	4.8E-07
Benzo(a)pyrene	1.1E-06	9.7E-07	3.6E-11	NA	NA	NA	NA	2.1E-06
Benzo(b)fluoranthene	5.5E-08	4.7E-08	1.7E-12	NA	NA	NA	NA	1.0E-07
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	3.3E-08	2.8E-08	1.0E-12	NA	NA	NA	NA	6.2E-08
Chromium III	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	8.0E-08	6.9E-08	2.5E-12	NA	NA	NA	NA	1.5E-07
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA
Cymene	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	1.9E-07	1.6E-07	1.8E-11	NA	NA	NA	NA	3.5E-07
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3.0E-08	2.6E-08	9.5E-13	NA	NA	NA	NA	5.6E-08
Lead	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (elemental)	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	4.8E-11	3.1E-11	NA	9.9E-10	2.7E-08	4.9E-11	3.5E-09	3.2E-08
Molybdenum	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	4.2E-08	2.7E-08	NA	1.5E-07	1.1E-07	NA	NA	3.3E-07
Nickel	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA
Total	2E-06	2E-06	7E-11	2E-07	1E-07	5E-11	4E-09	4E-06

NA = not applicable

INHALATION OF RESUSPENDED PARTICULATES FROM SOIL: OFF-SITE ADULT RESIDENT DURING OPERATIONS

Chemical	Concentration Soil (Cs) (mg/kg)	Inhalation Absorption Factor-Dusts (ABSip) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	NA	1	NA	6.0E-02	NA	NA	NA	NA
Acenaphthylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Anthracene	NA	1	NA	3.0E-01	NA	NA	NC	NA
Arsenic	ND	1	NA	4.3E-06	NA	NA	12	NA
Barium	ND	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	6.2E-01	1	3.8E-10	NA	NA	1.3E-10	0.39	5.1E-11
Benzo(a)pyrene	2.7E-01	1	1.7E-10	NA	NA	5.7E-11	3.9	2.2E-10
Benzo(b)fluoranthene	1.3E-01	1	8.1E-11	NA	NA	2.8E-11	0.39	1.1E-11
Benzo(g,h,i)perylene	1.1E-01	1	6.8E-11	6.0E-02	1.1E-09	2.3E-11	NC	NA
Benzo(k)fluoranthene	7.9E-02	1	4.9E-11	NA	NA	1.7E-11	0.39	6.6E-12
Chromium III	ND	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	1.9E+00	1	1.2E-09	NA	NA	4.1E-10	0.039	1.6E-11
Cobalt	6.5E+00	1	4.0E-09	5.7E-06	7.0E-04	1.4E-09	NA	NA
Copper	ND	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	NA	1	NA	1.4E+00	NA	NA	NC	NA
Dibenz(a,h)anthracene	1.3E-01	1	8.1E-11	NA	NA	2.8E-11	4.1	1.1E-10
Fluoranthene	2.0E+00	1	1.3E-09	4.0E-02	3.2E-08	4.3E-10	NC	NA
Fluorene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Indeno(1,2,3-cd)pyrene	7.2E-02	1	4.5E-11	NA	NA	1.5E-11	0.39	6.0E-12
Lead	ND	1	NA	NA	NA	NA	0.042	NA
Mercury (elemental)	6.4E-02	1	4.0E-11	8.6E-06	4.6E-06	1.4E-11	NA	NA
Methylene chloride	NA	1	NA	1.1E-01	NA	NA	0.0035	NA
Molybdenum	5.1E-01	1	3.2E-10	5.0E-03	6.3E-08	1.1E-10	NA	NA
Naphthalene	NA	1	NA	2.6E-03	NA	NA	0.12	NA
Nickel	ND	1	NA	1.4E-05	NA	NA	0.91	NA
Phenanthrene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Pyrene	3.7E+00	1	2.3E-09	3.0E-02	7.7E-08	7.9E-10	NC	NA
Selenium	1.6E+00	1	9.9E-10	5.7E-03	1.7E-07	3.4E-10	NC	NA
Thallium	1.5E+00	1	9.3E-10	8.0E-05	1.2E-05	3.2E-10	NA	NA
1,2,4-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
Vanadium	ND	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	NA	1	NA	2.0E-01	NA	NA	NC	NA
Zinc	ND	1	NA	3.0E-01	NA	NA	NC	NA
					7E-04			4E-10

$$AADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATnc)}$$

$$Hazard\ Quotient = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATca)}$$

$$Excess\ Cancer\ Risk = LADD \times SFi$$

Parameter	Symbol	Values	Units
Exposure Frequency	EFpe	350	days/year
Exposure Duration	ED	24	year
Body Weight	BW	70	kg
Averaging Time-Non-cancer	ATnc	8,760	days
Averaging Time-Cancer	ATca	25,550	days
Inhalation Rate	IHRpe	0.83	m^3/hour
Exposure Time	ETpe	24	hour/d
Particulate Emission Factor	PEF	4.4E+08	m^3/kg

INHALATION OF RESUSPENDED PARTICULATES FROM SOIL: OFF-SITE CHILD RESIDENT DURING OPERATIONS

Chemical	Concentration Soil (Cs) (mg/kg)	Inhalation Absorption Factor-Dusts (ABSip) (--)	Annual Average Daily Dose (AADD) (mg/kg-d)	Inhalation Chronic Reference Dose (RfDi) (mg/kg-d)	Hazard Quotient (--)	Lifetime Average Daily Dose (LADD) (mg/kg-d)	Inhalation Slope Factor (SFi) $(mg/kg\text{-}d)^{-1}$	Excess Cancer Risk (--)
Acenaphthene	NA	1	NA	6.0E-02	NA	NA	NA	NA
Acenaphthylene	NA	1	NA	6.0E-02	NA	NA	NC	NA
Anthracene	NA	1	NA	3.0E-01	NA	NA	NC	NA
Arsenic	ND	1	NA	4.3E-06	NA	NA	12	NA
Barium	ND	1	NA	1.4E-04	NA	NA	NC	NA
Benzo(a)anthracene	6.2E-01	1	9.1E-10	NA	NA	7.8E-11	0.39	3.0E-11
Benzo(a)pyrene	2.7E-01	1	4.0E-10	NA	NA	3.4E-11	3.9	1.3E-10
Benzo(b)fluoranthene	1.3E-01	1	1.9E-10	NA	NA	1.6E-11	0.39	6.4E-12
Benzo(g,h,i)perylene	1.1E-01	1	1.6E-10	6.0E-02	2.7E-09	1.4E-11	NC	NA
Benzo(k)fluoranthene	7.9E-02	1	1.2E-10	NA	NA	9.9E-12	0.39	3.9E-12
Chromium III	ND	1	NA	1.5E+00	NA	NA	NC	NA
Chrysene	1.9E+00	1	2.8E-09	NA	NA	2.4E-10	0.039	9.4E-12
Cobalt	6.5E+00	1	9.5E-09	5.7E-06	1.7E-03	8.1E-10	NA	NA
Copper	ND	1	NA	3.7E-02	NA	NA	NC	NA
Cymene	NA	1	NA	1.4E+00	NA	NA	NC	NA
Dibenz(a,h)anthracene	1.3E-01	1	1.9E-10	NA	NA	1.6E-11	4.1	6.7E-11
Fluoranthene	2.0E+00	1	3.0E-09	4.0E-02	7.5E-08	2.6E-10	NC	NA
Fluorene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Indeno(1,2,3-cd)pyrene	7.2E-02	1	1.1E-10	NA	NA	9.0E-12	0.39	3.5E-12
Lead	ND	1	NA	NA	NA	NA	0.042	NA
Mercury (elemental)	6.4E-02	1	9.4E-11	8.6E-06	1.1E-05	8.0E-12	NA	NA
Methylene chloride	NA	1	NA	1.1E-01	NA	NA	0.0035	NA
Molybdenum	5.1E-01	1	7.5E-10	5.0E-03	1.5E-07	6.4E-11	NA	NA
Naphthalene	NA	1	NA	2.6E-03	NA	NA	0.12	NA
Nickel	ND	1	NA	1.4E-05	NA	NA	0.91	NA
Phenanthrene	NA	1	NA	4.0E-02	NA	NA	NC	NA
Pyrene	3.7E+00	1	5.5E-09	3.0E-02	1.8E-07	4.7E-10	NC	NA
Selenium	1.6E+00	1	2.3E-09	5.7E-03	4.1E-07	2.0E-10	NC	NA
Thallium	1.5E+00	1	2.2E-09	8.0E-05	2.7E-05	1.9E-10	NA	NA
1,2,4-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NA	1	NA	1.7E-03	NA	NA	NA	NA
Vanadium	ND	1	NA	7.0E-03	NA	NA	NA	NA
Xylenes	NA	1	NA	2.0E-01	NA	NA	NC	NA
Zinc	ND	1	NA	3.0E-01	NA	NA	NC	NA
					1.7E-03			2.5E-10

$$AADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATnc)}$$

$$Hazard\ Quotient = \frac{AADD}{RfDi}$$

$$LADD = \frac{(Cs \times IHRaa \times ETaa \times ABSip \times EFaa \times ED)}{(BW \times PEF \times ATca)}$$

$$Excess\ Cancer\ Risk = LADD \times SFi$$

Parameter	Symbol	Units	Values
Exposure Frequency	EFpe	d/yr	350
Exposure Duration	ED	yr	6
Body Weight	BW	kg	15
Averaging Time-Non-cancer	ATnc	days	2,190
Averaging Time-Cancer	ATca	days	25,550
Inhalation Rate	IHRpe	m^3/hr	0.42
Exposure Time	ETpe	hr/d	24
Particulate Emission Factor	PEF	m^3/kg	#NAME?

SUMMARY OF NONCARCINOGENIC HAZARDS: OFF-SITE RESIDENT DURING OPERATIONS[1]

Chemical	Soil	
	Inhalation of Particulates	Hazard Index
Acenaphthene	NA	NA
Acenaphthylene	NA	NA
Anthracene	NA	NA
Arsenic	NA	NA
Barium	NA	NA
Benzo(a)anthracene	NA	NA
Benzo(a)pyrene	NA	NA
Benzo(b)fluoranthene	NA	NA
Benzo(g,h,i)perylene	2.7E-09	2.7E-09
Benzo(k)fluoranthene	NA	NA
Chromium III	NA	NA
Chrysene	NA	NA
Cobalt	1.7E-03	1.7E-03
Copper	NA	NA
Cymene	NA	NA
Dibenz(a,h)anthracene	NA	NA
Fluoranthene	7.5E-08	7.5E-08
Fluorene	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA
Lead	NA	NA
Mercury (elemental)	1.1E-05	1.1E-05
Methylene chloride	NA	NA
Molybdenum	1.5E-07	1.5E-07
Naphthalene	NA	NA
Nickel	NA	NA
Phenanthrene	NA	NA
Pyrene	1.8E-07	1.8E-07
Selenium	4.1E-07	4.1E-07
Thallium	2.7E-05	2.7E-05
1,2,4-Trimethylbenzene	NA	NA
1,3,5-Trimethylbenzene	NA	NA
Vanadium	NA	NA
Xylenes	NA	NA
Zinc	NA	NA
Total	1.7E-03	2E-03

Notes:
[1] Noncarcinogenic health effects for residents are based on exposures to children.

Abbreviations:
NA = Not applicable

SUMMARY CARCINOGENIC RISK CHARACTERIZATION: OFF-SITE RESIDENT DURING OPERATIONS[1]

Chemical	Soil Inhalation of Particulates	Excess Cancer Risk
Acenaphthene	NA	NA
Acenaphthylene	NA	NA
Anthracene	NA	NA
Arsenic	NA	NA
Barium	NA	NA
Benzo(a)anthracene	8.2E-11	8.2E-11
Benzo(a)pyrene	3.6E-10	3.6E-10
Benzo(b)fluoranthene	1.7E-11	1.7E-11
Benzo(g,h,i)perylene	NA	NA
Benzo(k)fluoranthene	1.0E-11	1.0E-11
Chromium III	NA	NA
Chrysene	2.5E-11	2.5E-11
Cobalt	NA	NA
Copper	NA	NA
Cymene	NA	NA
Dibenz(a,h)anthracene	1.8E-10	1.8E-10
Fluoranthene	NA	NA
Fluorene	NA	NA
Indeno(1,2,3-cd)pyrene	9.5E-12	9.5E-12
Lead	NA	NA
Mercury (elemental)	NA	NA
Methylene chloride	NA	NA
Molybdenum	NA	NA
Naphthalene	NA	NA
Nickel	NA	NA
Phenanthrene	NA	NA
Pyrene	NA	NA
Selenium	NA	NA
Thallium	NA	NA
1,2,4-Trimethylbenzene	NA	NA
1,3,5-Trimethylbenzene	NA	NA
Vanadium	NA	NA
Xylenes	NA	NA
Zinc	NA	NA
Total	6.8E-10	6.8E-10

Notes:
[1] Theoretical excess cancer risks presented for the residential scenario as the summation of the risks associated with

Abbreviations:
NA = Not applicable

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
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APPLICATION FOR CERTIFICATION FOR THE MARSH LANDING GENERATING STATION

DOCKET NO. 08-AFC-3

PROOF OF SERVICE
(REVISED 11/30/2009)

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DECLARATION OF SERVICE

I, Anne Connell, declare that on January 15, 2010, I served and filed copies of the attached Focused Site Investigation Report and Human Health Risk Assessment. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/marshlanding/index.html]**. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

For service to all other parties:

__X__ sent electronically to all email addresses on the Proof of Service list;

____ by personal delivery or by depositing in the United States mail at San Francisco, California with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

For filing with the Energy Commission:

_X__ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (***preferred method***);

OR

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION

Attn: Docket No. 08-AFC-3
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Anne C. Connell

* indicates change