URS

DOCKET	
08-AFC-3	
DATE	NOV 20 2009
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November 20, 2009

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 *Work Plan for Soil and Groundwater Sampling and Focused 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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Pacific Gas and Electric Company®

David Harnish
Manager
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November 20, 2009

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

Subject: ***Work Plan for Soil and Groundwater Sampling and Focused Health Risk Assessment***
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Dear Jon:

PG&E is pleased to provide the enclosed *Work Plan for Soil and Groundwater Sampling and Focused Health Risk Assessment* for the Marsh Landing Generating Station at Mirant's Contra Costa Power Plant. The work plan was prepared by AMEC Geomatrix in response to data requests Mirant received from the California Energy Commission (CEC) Staff as part of its review of the Application for Certification for the Marsh Landing Generating Station project. We understand that Mirant will submit the enclosed work plan to CEC Staff for review and comment.

We would like AMEC Geomatrix to implement the field activities outlined in the work plan in December 2009 with the approval of CEC Staff and Mirant's cooperation. Please contact Neil Ziemba at (707) 709-8787 if you have any questions regarding the enclosed work plan.

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: Work Plan for Soil and Groundwater Sampling and Focused Health Risk Assessment

November 20, 2009

Project 15317.000

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

Subject: Work Plan for Soil and Groundwater Sampling and Focused 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 (AMEC), has prepared this work plan to conduct additional soil and groundwater sampling and prepare a focused health risk assessment (HRA) 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 (Figure 1). This work plan is in response to data requests from the California Energy Commission (CEC) Staff. The additional data are required for CEC Staff to complete its review of the Application for Certification (AFC) submitted by Mirant Marsh Landing, LLC (Mirant Marsh Landing), an affiliate of the current owner, Mirant Delta, LLC, for construction and operation of the proposed MLGS facility. In addition, the CEC has requested that a focused short-format HRA be prepared for the site using existing and new site data. PG&E is conducting 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 work plan includes a summary of background information for the site, the proposed scope of work for the additional investigation, an outline of a focused short-format HRA, and a proposed schedule for completion of the work.

BACKGROUND INFORMATION

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

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

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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 Marsh Landing has proposed constructing a new power plant facility, the MLGS, on approximately 27 acres of the CCPP. The outline of the MLGS boundary within the larger CCPP property is shown on Figure 2. Mirant intends to create a separate parcel for the MLGS by subdividing the existing single parcel that constitutes the CCPP. 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 tanks and the concrete pad beneath them 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 storage of hazardous waste. Based on a recent inspection (URS, 2008), the area currently contains an underground septic system, one satellite hazardous waste accumulation area, transformers, load center, storage and fabrication building, work sheds, a fire pump house and parking areas.

Reportedly, two oil-filled circuit breakers located in the switchyard immediately south of the construction yard exploded in the late 1970's. 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.

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. Due to the low permeability of these units, perched water may be present at the site. The depth to groundwater ranges from 6 to 10 feet below ground surface (bgs) and fluctuates with the tidal cycle and seasonal variations. The direction of groundwater flow is north-northwest towards the San Joaquin River (URS, 2008).

Previous Environmental Investigations

As part of the divestiture of the CCPP, PG&E assessed soil and groundwater conditions at the facility at the time of the sale. To initially evaluate the site, PG&E contracted 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 Fluor Daniel GTI to complete a Phase II environmental investigation and HRA on the entire CCPP (Fluor Daniel, 1998). 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.

OBJECTIVE

The objective of the proposed investigation is to collect additional sampling data and to conduct a focused HRA using the new and historical data from within the MLGS site footprint in response to the CEC's data request. Specifically, the CEC requested the following:

- Groundwater sampling and analysis directly between the river and Tanks 1 and 2 to assess potential impacts from the tanks;
- Soil and groundwater sampling and analysis 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 circuit breaker explosions in the late 1970s; and
- Soil sampling and analysis near the storm water drains that are located near the tank farm berms and within the construction yard to assess potential impacts from off-site run-on.

SCOPE OF WORK

To accomplish the objectives outlined above, AMEC proposes to collect soil and groundwater samples at 16 locations. The proposed investigation locations are shown on Figure 3 and the proposed sampling and analysis plan is outlined in Table 1. Table 1 also presents the data objective for each boring. A summary is presented below:

- Borings SB-1 through SB-4 will be advanced to assess potential groundwater impacts downgradient of the tank farm.
- Borings SB-5 through SB-11 will be advanced to supplement existing PCB data to assess potential soil and groundwater impacts resulting from the reported circuit breaker explosions in the late 1970s. There is no existing PCB data along the western portion of the southern site boundary (in the tank farm); therefore, borings SB-5 through SB-7 will be advanced for the collection of soil samples at 1.0 and 2.0 feet below ground surface. Additionally, a groundwater sample will be collected from boring SB-7. There is existing soil and groundwater data along the eastern portion of the southern boundary (in the construction yard) that indicate PCBs are not present in this area. However, the soil data is reported on a wet weight basis and it is our understanding that the CEC has requested that PCB data be reported on a dry

weight basis. Therefore, shallow soil samples (1.0 bgs) will be collected from borings SB-8 to SB-11 for PCB analysis on a dry weight basis.

- Borings SB-8 through SB-12 will be advanced to assess potential soil impacts at storm drains from run on. Borings SB-8 through SB-12 are located at each of the storm drain catch basins in the construction yard. Where possible, sampling locations will be placed to capture contributions from run-on. During a recent site visit, no obvious locations of run-on or pooling were observed. Sampling at storm drains located within the tank berms is not proposed because no run-on from off-site would reach these storm drains.

Additional soil or groundwater samples may be collected during field activities or additional sample analyses conducted to supplement previous sampling results.

Pre-Field Activities

Prior to conducting field activities, AMEC will obtain a boring permit from Contra Costa County Environmental Health Department (CCEHD), mark proposed drilling locations, contact Underground Service Alert (USA), and retain a utility location contractor to clear the boring locations for utilities. All proposed locations will also be cleared with plant operations. Additionally, AMEC will prepare a site-specific health and safety plan.

Field Activities

AMEC will retain a California-licensed driller to perform drilling activities. All boreholes will be initially advanced using a hand auger to a depth of 5 feet bgs to clear for utilities. Borings for the sampling of groundwater will be further advanced using a direct-push drill rig equipped with a dual-tube direct-push sampling system. Soil will be continuously cored for lithologic logging. A lithologic log will be prepared for each boring by a trained field geologist under the supervision of a California Professional Geologist using visual-manual procedures of the American Society for Testing and Materials (ASTM) Standard D2488-90 for guidance, which is based on the Unified Soil Classification System (USCS). Non-dedicated downhole sampling equipment will be steam cleaned or triple-washed between each soil boring location and prior to reuse. Field screening of soil samples for organic vapors will be performed using a portable photoionization detector (PID) and any detections will be logged.

Soil samples will be collected for laboratory analysis at depth intervals shown in Table 1. Soil samples to be analyzed for semivolatile constituents will be collected in new, clean butyrate liners or brass sleeves and sealed at each end with Teflon sheets, plastic end caps, and silicone tape. Soil samples to be analyzed for non-volatile constituents will be collected in either new, clean brass sleeves and sealed as described above or in new, clean glass jars. Samples will be labeled, sealed in plastic bags, placed in an ice-chilled cooler, and transported to a state-certified analytical laboratory under AMEC chain-of-custody procedures.

AMEC will collect grab groundwater samples from first-encountered groundwater at the five borings indicated on Table 1. The exact depth intervals to be sampled will be determined in the field, based on the depth to groundwater and lithologic observations. Once the sampling

interval has been determined, a pre-pack well screen, attached to PVC riser, will be installed through the outer drive casing. The lower drive casing will then be lifted approximately 5 feet to allow groundwater to flow into the borehole. The groundwater sample will be collected through the pre-pack well screen which will help filter out excess fines from the groundwater sample. If adequate groundwater recharge occurs, AMEC will purge at a low-flow rate to reduce turbidity prior to collecting a groundwater sample at each location. If groundwater recharge is insufficient to allow for purging prior to sampling, a sample will be collected without purging.

Groundwater samples will be collected in appropriate new, laboratory supplied containers, labeled, placed in an ice-chilled cooler, and transported to a state-certified analytical laboratory under AMEC chain-of-custody procedures.

Following completion of sampling activities, the drilling contractor will fill the borings with grout using a tremie pipe, according to CCEHD requirements. AMEC will use a global positioning system (GPS) unit to collect location information for all boring locations. The GPS unit to be used has an accuracy of approximately +/– 1 foot in the horizontal plane, and approximately +/– 3 feet in elevation.

Sample Analysis

Samples will be analyzed by Creek Environmental Laboratories, Inc., of San Luis Obispo, California. Soil and groundwater samples will be analyzed for the constituents indicated on Table 1 using the following methods:

- TPH quantified as diesel (TPHd) and motor oil (TPHmo) using EPA Method 8015M with silica gel preparation prior to analysis,
- VOCs using EPA Method 8260B,
- PAHs using EPA Method 8270C in selective ion monitoring (SIM) mode;
- PCBs using EPA Method 8082 with results reported on a dry-weight basis; and
- Metals using EPA Method 6010B/7471A. Groundwater samples will be filtered in the field with a 0.45-micron filter prior to metals analysis.

Investigation Waste Management

Soil cuttings, purge water, and rinse water generated during drilling will be temporarily stored at the MLGS in labeled, Department of Transportation (DOT)–approved 55-gallon drums, pending profiling, transportation, and off-site disposal or recycling at an appropriate facility. All waste containers will be clearly labeled with generator contact and phone number, drilling location(s), and date of generation. PG&E will be responsible for arranging for waste profiling and disposal.

Any disposable personal protection equipment (e.g, gloves, Tyvek® clothing, etc.) will be disposed as non-hazardous waste in the municipal trash.

Quality Assurance and Quality Control Methodology

Field quality assurance/quality control (QA/QC) samples for chemical analysis will include the collection of one groundwater blind field duplicate and one trip blank. QA/QC procedures will include adherence to protocols for field sampling and decontamination procedures, as well as collection and laboratory analysis of controlled standards, matrix spike samples, and field duplicate samples to evaluate accuracy and precision. Data validation will include a data completeness check of each data package, and a thorough review of all laboratory reporting forms.

FOCUSED HEALTH RISK ASSESSMENT

After the supplemental soil and groundwater data from the MLGS footprint have been received and validated, the data will be used along with the existing data to prepare a short-format HRA. As an initial step, the analytical data and site characteristics will be evaluated to identify the constituents that are potentially related to the site and for which there are data of sufficient quality to be used in the HRA.

The method for evaluating data usability for the HRA will be in general accordance with the procedures outlined in the U.S. EPA publication *Guidance for Data Usability in Risk Assessment – Parts A and B* (U.S. EPA, 1992). Data judged to be of sufficient quality will be tabulated to summarize the frequency of detection, range of detection limits, and range of detected values. With the exception of essential nutrients (e.g., iron, potassium, and sodium), chemicals detected in at least one sample will be considered chemicals of potential concern (COPCs).

The analysis will include the estimation of the hypothetical exposure point concentrations (EPCs) of all COPCs using the Upper-Bound Confidence Limit (UCL) of the arithmetic mean to estimate a reasonable maximum exposure (RME) for each hypothetical scenario. If the calculated 95% UCLs exceed the maximum detected value, the maximum value will be used as the EPC. Distributional tests and UCLs will be calculated using U.S. EPA's ProUCL software, version 4.00.02 (U.S. EPA, 2007).

The hypothetical receptors that will be assessed will include the following, as specified by the CEC in its data request:

- the trenching and excavation worker during construction;
- the off-site public during construction;
- the on-site worker during operations;
- the off-site commercial/industrial worker during operations; and
- the off-site public during operations.

Based on existing data, a preliminary site conceptual model for the MLGS facility is presented as Figure 4. The preliminary SCM depicts current information about potential chemical sources, potential migration pathways, potential exposure routes, and the potential exposure pathways

by which the hypothetical receptors may potentially come into contact with COPCs in the environment. If conditions are different from current information about the site, the preliminary SCM will be revised as warranted.

The "Annual Average Daily Dose" (AADD) or "Lifetime Average Daily Dose" (LADD) will be used to quantify hypothetical potential exposure in the HRA. The AADD is used as a standard measure for characterizing long-term noncarcinogenic effects. The LADD, which addresses hypothetical exposures that may occur over varying durations from a single event to an average 70-year human lifetime, is used to estimate potential carcinogenic risk. Equations for calculating AADD and LADD published by the U.S. EPA will be used (U.S. EPA, 1989, 1991, 1997, 2002, and 2004a).

Hypothetical potential exposure assumptions used in the daily intake calculations will be based on information contained in U.S. EPA and Cal-EPA DTSC risk guidance, site-specific information, and professional judgment, and will represent upper-bound conservative values under a RME scenario. Tables 2 through 6 present the hypothetical potential exposure parameters and values for each receptor.

Toxicity criteria to be used in the HRA will be presented in tabular summaries and will be selected according to the following hierarchy:

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

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

3. U.S. EPA, 2009b, Regional Screening Levels; and

4. U.S. EPA, 2004b, Region 9 Preliminary Remediation Goals (PRGs).

Reference doses (RfDs) are currently not available for lead. Rather the blood-lead level is used to assess potential effects from potential exposure because most adverse human health effects have been correlated in terms of blood-lead levels (e.g., a blood-lead level of "x" is associated with a particular adverse health effect). The U.S. EPA's Adult Lead Methodology (ALM; U.S. EPA, 2003) model and Cal-EPA's model, LeadSpread, will be used (OEHHA, 2009b) to evaluate hypothetical potential health concerns associated with lead exposure.

Finally, the results of the COPC analysis, hypothetical exposure assessment, and toxicity evaluation will be integrated to estimate the possible likelihood of an adverse health effect for the hypothetical receptors identified for the assessment. Potential noncarcinogenic health effects will be expressed in terms of a "hazard quotient," which is equal to the estimated level of exposure (or dose) divided by the RfD. As a screening approach, hazard quotients will be conservatively summed for all COPCs to calculate a hazard index assuming they all affect the same health effect endpoint. A hazard quotient or hazard index less than or equal to one (1) indicates that the predicted potential exposure should not result in noncarcinogenic health

effects. Theoretical excess lifetime cancer risks will be calculated by multiplying the estimated level of exposure (dose) over a lifetime by the chemical-specific cancer slope factor. As with the hazard index, the theoretical estimated cancer risks for each chemical and potential exposure pathway will be summed to estimate the total excess lifetime cancer risk for the hypothetically exposed individual. In discussing the results of the HRA, theoretical carcinogenic risks will be compared with the acceptable risk range of 1×10^{-6} to 1×10^{-4}. The estimates of theoretical risk and hazard will be presented and summarized in tables.

REPORTING

Following completion of field activities, sample analysis, validation of the analytical laboratory results, and analysis of the data, AMEC will prepare a report summarizing the sampling methods and results and presenting the short-form HRA. The report will contain:

- a description of the MLGS background information and previous site investigations, field activities, analytical results, HRA and conclusions;
- a site map depicting sampling locations;
- data tables summarizing the soil and groundwater data, including both historical data and data obtained during this investigation;
- analytical laboratory reports and chain-of-custody forms;
- the EPCs for all COPCs found on the MLGS site;
- a list of all potential exposure pathways and assumptions for all hypothetical receptors assessed;
- a table that provides all potential exposure input values for each hypothetical receptor assessed;
- a table that includes all physical parameters and toxicity values for all COPCs assessed; and
- a table showing the results for theoretical cancer risk, acute hazard index, and chronic hazard index by COPCs and by potential exposure pathway.

SCHEDULE

We anticipate that the field activities will begin 1 week after receiving CEC comments and/or approval of this work plan, depending on contractor availability, and will require 3 days to complete. We currently anticipate field work to be conducted in early/mid-December. Based on this planned schedule, we expect to submit the draft investigation report along with the HRA to CEC by January 15, 2010.

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

Sincerely yours,
AMEC Geomatrix, Inc.

Robert H. Cheung
Senior Toxicologist

Jennifer L. Patterson, PE
Senior Engineer

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cc: Neil Ziemba, PE, WAU & Company

Attachments:
References
Tables 1-6
Figures 1-4

REFERENCES

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

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TABLES

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TABLE 1

SAMPLING AND ANALYSIS PLAN

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

Sampling Location[1]	Objective	Media	Sample Depths to be Analyzed (ft 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	Water Table [3]	X	X			X	X
SB-2 [2]	Assess groundwater quality between Tanks 1 & 2 and river	GW	Water Table [3]	X	X			X	X
SB-3	Assess groundwater quality between Tanks 1 & 2 and river	GW	Water Table [3]	X	X			X	X
SB-4	Assess groundwater quality between Tanks 1 & 2 and river	GW	Water Table [3]	X	X			X	X
SB-5	Assess potential impacts to soil due to historical circuit breaker explosions	Soil	0.5-1.0				X		
			1.5-2.0				X		
SB-6	Assess potential impacts to soil due to historical circuit breaker explosions	Soil	0.5-1.0				X		
			1.5-2.0				X		
SB-7	Assess potential impacts to soil and groundwater due to historical circuit breaker explosions	Soil	0.5-1.0				X		
			1.5-2.0				X		
		GW	Water Table [3]				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	0.0-0.5	X	X	X	X		X
			0.5-1.0				X		
SB-9	Assess potential impacts to soil due to historical circuit breaker explosions	Soil	0.5-1.0				X		
SB-10	Assess potential impacts to soil due to historical circuit breaker explosions	Soil	0.5-1.0				X		
SB-11	Assess potential impacts to soil due to historical circuit breaker explosions	Soil	0.5-1.0				X		
SB-12	Assess potential soil impacts near storm	Soil	0-0.5	X	X	X	X		X
SB-13	Assess potential soil impacts near storm	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	0-0.5	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

TABLE 1

SAMPLING AND ANALYSIS PLAN
Marsh Landing Generating Station
Mirant Contra Costa Power Plant
Contra Costa County, California

Analyses:
Samples to be analyzed for: TPHd and TPHmo using EPA Method 8015M, PCBs using EPA Method 8082 reported on a dry-weight basis, VOCs using EPA Method 8260B, PAHs using EPA Method 8270C-SIM, and Title 22 metals using EPA Methods 6010B/7471A. Groundwater samples for metal analysis will be filtered in the field prior to analysis.

Notes:
[1] Sample locations are shown on Figure 3.
[2] A blind duplicate groundwater sample will be collected at the SB-2 location.
[3] Sampling interval will be from water table (anticipated to be at approximately 5 to 10 feet bgs) to approximately 5 feet below.

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

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TABLE 2

HYPOTHETICAL EXPOSURE PARAMETERS FOR TRENCH EXCAVATION 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:	see chemical physical property table
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

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TABLE 2

HYPOTHETICAL EXPOSURE PARAMETERS FOR TRENCH EXCAVATION 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 $\mu g/m^3$; 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 2

HYPOTHETICAL EXPOSURE PARAMETERS FOR TRENCH EXCAVATION 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	Rationale: 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.

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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.

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TABLE 3

HYPOTHETICAL EXPOSURE PARAMETERS FOR OFF-SITE RESIDENTS

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 3

HYPOTHETICAL EXPOSURE PARAMETERS FOR OFF-SITE RESIDENTS

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.

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TABLE 4

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
Inhalation of Vapors in Ambient Air			
Inhalation Rate (IHR_a)	m^3/hr	Value:	0.83
		Rationale:	DTSC, 1996
Exposure Time (ET)	hrs/day	Value:	8
		Rationale:	DTSC, 1996; U.S. EPA, 1991; Standard work day

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TABLE 4

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:	$9.7x10^8$
		Rationale:	Estimated, see Attachment E
Inhalation Rate (IHR_a)	m^3/hr	Value:	0.83
		Rationale:	DTSC, 1996
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, 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.

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TABLE 5

HYPOTHETICAL EXPOSURE PARAMETERS FOR ON-SITE INDOOR 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) 9,125 (noncarcinogens)
		Rationale:	DTSC, 1996; U.S. EPA, 1991
PATHWAY-SPECIFIC PARAMETERS			
Inhalation of Vapors in Indoor Air			
Inhalation Rate (IHRa)	m^3/hr	Value:	2.5
		Rationale:	DTSC, 1996
Exposure Time (ET)	hours/day	Value:	8
		Rationale:	DTSC, 1996; U.S. EPA, 1991

Abbreviations

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

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

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TABLE 6

HYPOTHETICAL EXPOSURE PARAMETERS FOR OFF-SITE 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		
Inhalation of Vapors in Ambient Air		
Inhalation Rate (IHR_a)	m^3/hr	Value: 0.83 Rationale: DTSC, 1996
Exposure Time (ET)	hrs/day	Value: 8 Rationale: DTSC, 1996; U.S. EPA, 1991; Standard work day
Inhalation of Suspended Soil Particulates		
Inhalation Rate (IHR_a)	m^3/hr	Value: 0.83 Rationale: DTSC, 1996
Particulate Emission Factor (PEF)	m^3/kg	Value: 4.4×10^8 Rationale: U.S. EPA, 2002
Exposure Time (ET)	hrs/day	Value: 8 Rationale: DTSC, 1996; U.S. EPA, 1991; Standard work day

TABLE 6

HYPOTHETICAL EXPOSURE PARAMETERS FOR OFF-SITE WORKER

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

Abbreviations

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

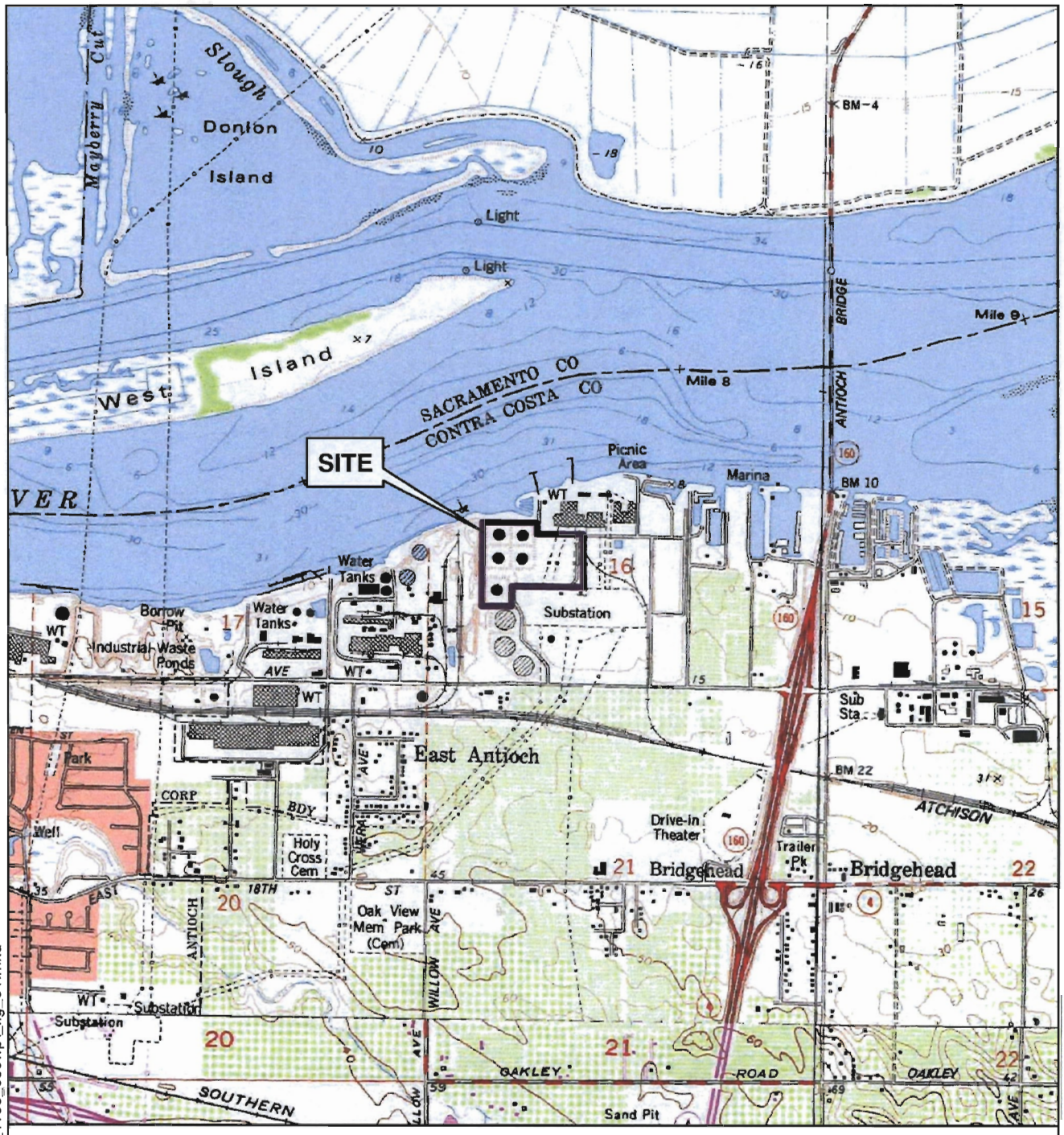
References

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

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.

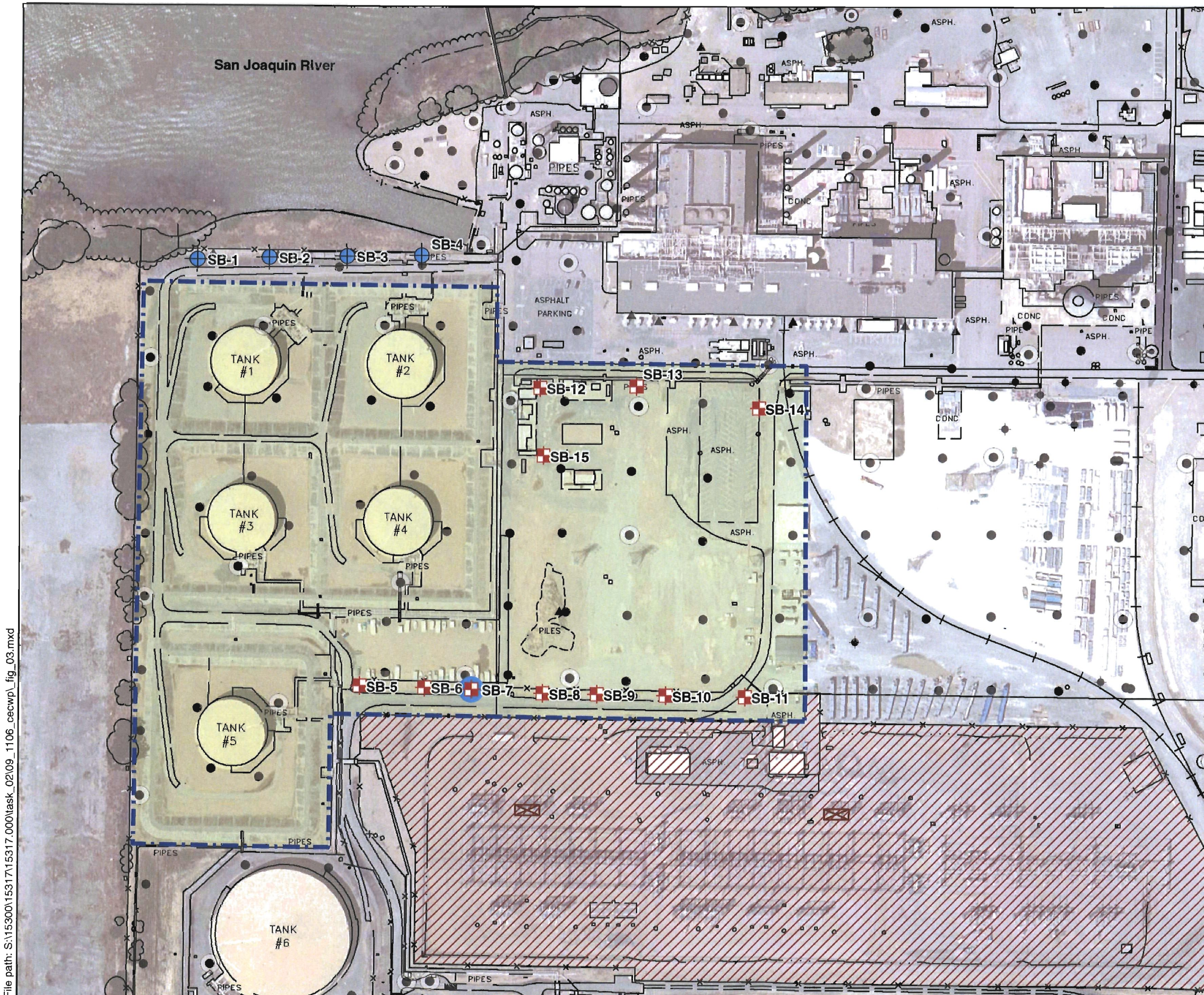
0 500 1,000 Feet

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

- PG&E switchyard
- Proposed grab groundwater sample location
- Proposed shallow soil and grab groundwater sample location
- Proposed shallow soil sample location
- Previous soil boring sample location
- Existing monitoring well
- Previous hand auger sample location
- Previous soil boring and groundwater sample location
- Temporary monitoring well
- Marsh Landing Generating Station project boundary
- Reported oil-filled circuit breaker explosion site

N

0 200 400 Feet

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

PROPOSED SAMPLING LOCATIONS
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 3

File path: S:\15300\15317\15317.000\task_02\09_1106_cecwp_fig_03.mxd

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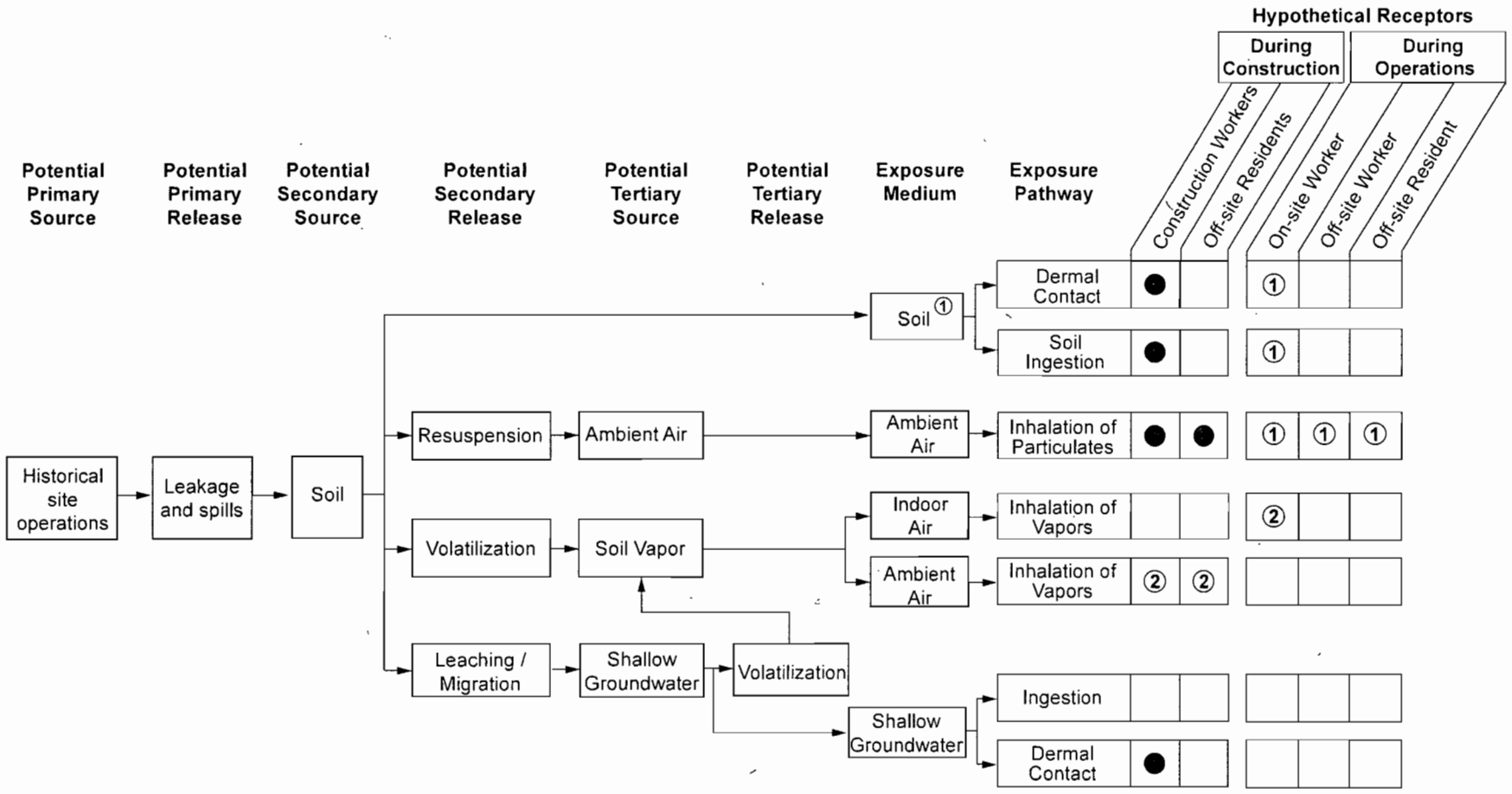

● Potentially complete exposure pathway.

① This pathway may not be complete once construction is finished because portions of the site may be paved and covered by buildings and equipment. However, potential exposure (assuming the site will not be covered) will be evaluated.

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

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

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE MARSH LANDING GENERATING STATION

DOCKET NO. 08-AFC-3

PROOF OF SERVICE
(REVISED 10/23/2009)

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DECLARATION OF SERVICE

I, Anne Connell, declare that on November 20, 2009, I served and filed copies of the attached Work Plan for Soil and Groundwater Sampling and Focused 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