MCCLELLAN AFB
CALIFORNIA

ADMINISTRATIVE RECORD
COVER SHEET

AR File Number 6504

Final

Local Reuse Authority Initial Parcel Record of Decision #2

Former McClellan Air Force Base
Air Force Real Property Agency

McClellan, California

October 2008

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Glossary and Acronyms

Administrative Record	The collection of all pertinent documents that support the final decisions for each site, located at the former McClellan Air Force Base.
Air Force Real Property Agency (AFRPA)	A field-operating agency activated by the Secretary of the Air Force. The mission is to execute the environmental programs and real and personal property disposal for major Air Force bases being closed in the United States.
Air Force	U.S. Air Force.
Applicable or Relevant and Appropriate Requirements (ARARs)	Federal laws and more stringent State laws that apply or are determined to be relevant and appropriate to the remedy.
AOC	Area of concern.
AST	Aboveground storage tank.
Base	Former McClellan Air Force Base.
bgs	Below ground surface.
Bioventing System	A technique used to reduce fuel-related contaminants in soil by introducing air to increase the oxygen content in the soils. The increased oxygen promotes biological activity, allowing microorganisms to break down contaminants.
Bis2CEE	Bis(2-chloroethyl)ether.
CCR	California Code of Regulations.
CERCLIS	A national computerized management information system that automates entry, updating, and retrieval of Comprehensive Environmental Response, Compensation, and Liability Information System data and tracks site and non-site-specific Superfund data in support of the Comprehensive Environmental Response, Compensation, and Liability Act. It contains information on hazardous waste site assessment and remediation.
CFR	Code of Federal Regulations.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)	Legislation passed in 1980 and designed to respond to the past disposal of hazardous substances, which in many cases created inactive, hazardous waste sites. The act was extensively amended in 1986 by the Superfund Amendments and Reauthorization Act, which added many provisions and clarified unclear areas in the original law.
Contaminants of Concern (COCs)	Substances selected for environmental cleanup based on (1) predicted impacts to surface water or groundwater resources, (2) concentration measurements above maximum contaminant levels, and (3) health risk posed by the contaminant.
Corrective Action Management Unit (CAMU)	A long-term soils storage facility. The facility is engineered to safely hold contaminated soils indefinitely.
CS	Confirmed site.
DDD	Dichlorodiphenyldichloroethane.
DDE	Dichlorodiphenyldichloroethene.
DDT	Dichlorodiphenyltrichloroethane.
DTSC	Department of Toxic Substances Control.
EPA	U.S. Environmental Protection Agency.
Environmental Site Folder	A file of all document information related to a site that is available in the administrative record for public review.
Exposure Pathways	Pathways are ways that people can be exposed to chemical contaminants. Common pathways include breathing, ingestion, or absorption through the skin.
Feasibility Study (FS)	A study of a hazardous waste site that must be completed before a cleanup remedy can be chosen and implemented. The Feasibility Study identifies and evaluates alternatives for addressing contamination.
Group 1 Sites	The seven Group 1 sites were evaluated only for nonvolatile organic compounds in soil for the Local Reuse Authority Initial Parcel ROD #1, and are included in this ROD only for volatile organic compounds in shallow soil gas. The Group 1 sites are PRL S-014, PRL S-033, PRL S-040, SA 003, SA 035, SA 041, and SA 091.

Group 2 Sites	The 16 Group 2 sites have not been included in a previous ROD and are included in this ROD for both VOC contaminants in soil gas and non-VOC contaminants in soil. The Group 2 sites are AOC G-2, AOC H-1, AOC H-2, AOC H-3, AOC H-8, AOC H-12, AOC H-13, AOC H-14, CS S-049, PRL S-047, SA 010, SA 015, SA 019, SA 105, Tank 783, and Tank 788.
Groundwater	Underground water that fills pores between particles of soil, sand, and gravel or openings in rocks to the point of saturation. Where groundwater occurs in significant quantity, it can be used as a source of drinking water.
HQ	Hazard quotient.
IC	Investigation Cluster.
Industrial Land Use	Industrial land use includes industrial, commercial, office, retail, and other occupational uses.
Institutional Controls	Administrative or legal mechanisms that protect property users and the public from existing contamination that continues to be present during use of a site.
IRP	Installation Restoration Program.
Local Reuse Authority (LRA)	Sacramento County's Department of Economic Development and Intergovernmental Affairs, Office of McClellan Base Conversion, is charged with the development and implementation of the Base Reuse Plan.
Maximum Contaminant Level (MCL)	The maximum concentrations of contaminants permissible in a water system delivered to the public.
MCPA	methylchlorophenoxyacetic acid
MCPP	2-(2-methyl-4-chlorophenoxy)propionic acid
mg/kg	Milligrams per kilogram.
National Oil and Hazardous Substances Pollution Contingency Plan (NCP)	The Federal regulation that guides determination of the sites to be cleaned up under the Superfund program. This plan also provides the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances in accordance with CERCLA and the Clean Water Act.
National Priorities List (NPL)	U.S. Environmental Protection Agency's published list of the highest priority hazardous waste sites in the United States for investigation and cleanup.

Non-volatile Organic Compound (non-VOC)	A compound that does not readily evaporate at room temperature. This includes heavy metals, pesticides, semi-volatile organic compounds, petroleum, and dioxins.
O&M	Operation and maintenance.
Oil Water Separator	A device, often in the form of a tank, that allows oil to float to the top while the water below is drained off.
OU	Operable unit.
Polycyclic Aromatic Hydrocarbons (PAHs)	Contaminants commonly found in combustion by-products, like the soot in diesel exhaust.
Polychlorinated Biphenyls (PCBs)	A group of synthetic organic chemicals. There are no known natural sources of PCBs in the environment. PCBs are either oily liquids or solids and are colorless to light yellow. Some PCBs are volatile and may exist as a vapor in air. They have no known smell or taste.
PCE	Perchloroethene
Proposed Plan	Proposed Plan for Soil Cleanup at 23 Sites
ppbv	Parts per billion by volume.
Preferred Cleanup Alternative	The Air Force's suggested cleanup method for the contaminated site. The preferred alternative is protective of human health and the environment, complies with applicable or relevant and appropriate requirements, and is cost-effective.
Preliminary Cleanup Goals	Cleanup goals set for the protection of human health. The set risk level is one in a million. An additional person in a million people may contract cancer.
Present-worth Cost	The amount of money that would need to be invested today to yield the funds required over the life of the alternative for capital and annual operation and maintenance costs.
PRL	Potential Release Location.
Proposed Plan	A summary of cleanup alternatives for a contaminated site, including a preferred alternative and the reasons for its selection. This step is the community's opportunity to review and comment on all cleanup alternatives under consideration. The responses to the comments are presented in the Record of Decision. All changes from the Proposed Plan are explained in the Record of Decision.
PW_{30}	Present-worth 30-year costs.
RAO	Remedial action objective.

RCRA	Resource Conservation and Recovery Act of 1976.
Record of Decision (ROD)	A document explaining and legally committing the lead agency to the cleanup alternative(s) that will be used at a site. The Record of Decision is based on information and technical analyses generated during the remedial investigation, the feasibility study, and consideration of public comments and community concerns.
Remedial Investigation (RI)	A hazardous waste site study to examine the nature and extent of site contamination.
Responsiveness Summary	The section within the Record of Decision that summarizes comments received from the public during the public comment period, and provides lead agency response to them.
Restricted Land Use	Risk associated with contamination is such that unrestricted use of the property is prohibited.
Restricted Residential Land Use	Risk associated with VOC contamination is such that residential use of the property would be allowed only if Alternative 3 (Vapor Intrusion Remedy) is implemented.
Restoration Advisory Board (RAB)	A board consisting primarily of members of the public. RAB members have the opportunity to review cleanup reports and provide advice to decision makers on investigation and cleanup matters. The RAB is a forum for the exchange of information between community members, regulatory agencies, and Air Force personnel.
RICS	Remedial investigation characterization summary.
Risk Assessment	A study based on the results of the remedial investigation to determine the extent to which chemical contaminants found at a Superfund site pose a risk to public health and the environment.
RWQCB	Regional Water Quality Control Board.
SA	Study area.
Semivolatile Organic Compound (SVOC)	A group of chemical compounds that evaporate in air at a slower rate than volatile organic compounds.
Shallow Soil Gas	Soil gas within 15 feet of the ground surface.

Soil Gas	Air between soil particles, which may contain contaminants that have vaporized.
Soil Vapor Extraction (SVE)	A method of treating soil contaminants by extracting contaminated soil gas using perforated underground pipes connected to vacuum pumps.
START/STOP Process	The START evaluation is used to determine if an SVE system is needed to protect groundwater, and a STOP evaluation is used to determine if an existing SVE system can be shut down.
State Land Use Covenant (SLUC)	Written instruments and agreements restricting land use.
Total Petroleum Hydrocarbons (TPH)	A wide range of liquid hydrocarbons that includes gasoline and diesel fuels.
Total Petroleum Hydrocarbons as Diesel (TPH-D)	The concentration of the hydrocarbon chemicals found in diesel, analyzed in a sample by an analytical chemistry laboratory.
Total Petroleum Hydrocarbons as Gasoline (TPH-G)	The concentration of the hydrocarbon chemicals found in gasoline, analyzed in a sample by an analytical chemistry laboratory.
Unrestricted Land Use	Risk is reduced to such a low level as to allow anything to be built, including homes and schools.
UST	Underground storage tank.
Volatile Organic Compound (VOC)	An organic compound containing carbon that evaporates (volatilizes) readily at room temperature.
Vapor Inhalation Pathway	A pathway used in risk analysis in which contaminants in the soil volatilize into soil gas, migrate into buildings, and are inhaled by the occupants

SECTION 1

Declaration

1.0 Site Name and Location

This Record of Decision (ROD) is for 23 sites located at the former McClellan Air Force Base (McClellan or Base) in Sacramento County, California.

Department of the Air Force
Air Force Real Property Agency
Former McClellan Air Force Base
McClellan, California 95652
CERCLIS Identification Number: CA4570024337

The sites included in this ROD are organized into two groups. The seven Group 1 sites were evaluated only for nonvolatile organic compounds (non-VOCs) in soil for the Local Reuse Authority (LRA) Initial Parcel ROD #1 (Air Force Real Property Agency [AFRPA], 2004), and are included in this ROD only for volatile organic compounds (VOCs) in shallow soil gas. The 16 Group 2 sites have not been included in a previous soils ROD and are included in this ROD for both VOC contaminants in shallow soil gas and non-VOC contaminants in soil. Figure 2-2 distinguishes the Group 1 and Group 2 sites, which are as follows:

- Group 1: Potential Release Location (PRL) S-014, PRL S-033, PRL S-040, Study Area (SA) 003, SA 035, SA 041, and SA 091
- Group 2: Area of Concern (AOC) G-2, AOC H-1, AOC H-2, AOC H-3, AOC H-8, AOC H-12, AOC H-13, AOC H-14, Confirmed Site (CS) S-049, PRL S-047, SA 010, SA 015, SA 019, SA 105, Tank 783, and Tank 788

1.1 Statement of Basis and Purpose

This decision document presents the selected remedies for 23 sites located at McClellan in Sacramento, California. For the seven Group 1 sites, this ROD addresses VOCs in shallow soil gas that may present a threat to human health through the vapor inhalation pathway. For the 16 Group 2 sites, this ROD addresses VOCs in shallow soil gas for the vapor inhalation pathway and non-VOCs in soil that may present a threat to human health through direct contact, inhalation or ingestion, or to surface water or groundwater quality.

The remedies in this ROD do not address contamination in groundwater that may be present at these sites or the potential threat to surface water or groundwater from VOCs. Impacts to surface water are not expected for VOCs because of their inherent volatility. VOC contamination in groundwater and in the vadose zone that threatens groundwater is addressed under the Basewide VOC Groundwater ROD (VOC ROD) completed in 2007 (AFRPA, 2007a). Non-VOCs that may be present in groundwater at these sites will be addressed in an amendment to the VOC ROD in 2009.

VOCs include many chlorinated solvents and petroleum-related compounds. Non-VOCs include semivolatile organic compounds (SVOCs), metals, and petroleum hydrocarbons. As defined for this ROD, SVOCs include polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and pesticides. Petroleum hydrocarbons include two primary classes of compounds: total petroleum hydrocarbons (TPH) as diesel (TPH-D) and as gasoline (TPH-G). Radiological compounds are not present at these sites and are, therefore, not included within the scope of this ROD.

If TPH contamination at a site is commingled with other contaminants regulated under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), then the TPH contamination is addressed in this ROD. If commingling of TPH and CERCLA contaminants is not evident, then the remedy for that site is identified as No Action in this ROD and the TPH contamination is addressed under State requirements.

The U.S. Air Force (Air Force), which is the lead agency, and the U.S. Environmental Protection Agency (EPA) selected the soil remedial actions in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 42 United States Code, Section 9601 et seq., and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300. This decision is based on the Administrative Record file for this site. The State of California concurs with the selected remedies. The Administrative Record contains the documents used in the selection of the remedial actions and is available for review at the AFRPA's office, located at McClellan.

1.2 Assessment of the Sites

As a result of past industrial activities, releases of hazardous substances have contaminated soil at many of the 23 sites addressed in this ROD. Actual or threatened releases of hazardous substances from these sites present a potential threat to public health, welfare, or the environment, if not addressed by implementing the response actions selected in this ROD. Following are the seven sites requiring a response action as presented in this ROD: AOC G-2, AOC H-12, CS S-049, PRL S-014, SA 010, SA 015, and SA 019. At the remaining 16 sites, the Air Force has determined that No Action is necessary to protect human health or welfare or the environment.

1.3 Description of Selected Remedy

The selected remedies and their major components are summarized in this section for the sites selected for a response action in this ROD. The sites for which the remedy includes institutional controls are identified on Figure 2-2. The selected remedies provide the best approach for cost-effective risk reduction. They will provide protection to human health and the environment by either removing contaminants from the site, thereby reducing any residual risk, or limiting exposure to human receptors by implementing the following institutional controls or mitigation measures:

- The selected remedy for **AOC G-2** is excavation of TPH and PAH contaminated soil to industrial cleanup levels with offsite disposal and an institutional control to prohibit unrestricted use (Alternative 4R). In addition, the selected remedy includes Alternative 3

(Vapor Intrusion Remedy) to address VOCs in shallow soil gas that present an unacceptable risk by requiring either mitigation for vapor intrusion or sampling to show acceptable risk for any future construction. The remedy will allow for industrial use of AOC G-2. At this site, petroleum contamination that is commingled with CERCLA contaminants is present at concentrations that threaten water quality.

- At site **AOC H-12**, the selected remedy is excavation of PCB and mercury contaminated soil to less than unrestricted use levels with offsite disposal (Alternative 4U). In addition, the selected remedy includes Alternative 3 (Vapor Intrusion Remedy) to address VOCs in shallow soil gas that present an unacceptable risk by requiring either mitigation for vapor intrusion or sampling to show acceptable risk for any future construction. The remedy will allow for industrial or restricted residential use of AOC H-12. At this site, a remedial action is required to protect surface-water quality from mercury and PCB contamination in soil. In addition, the contaminants in soil and VOCs in soil gas present a threat to human health.

- **For PRL S-014**, the selected remedy is institutional controls to prohibit residential use (Alternative 2). The remedy is required because VOC contamination in shallow soil gas presents an unacceptable risk to human health for the unrestricted use scenario.

- The selected remedy at three sites (**SA 010, SA 015, and SA 019**) is Alternative 3 (Vapor Intrusion Remedy) to address VOCs in shallow soil gas that may present an unacceptable risk by requiring either mitigation for vapor intrusion or sampling to show acceptable risk for any future construction.

- For **CS S-049**, the selected remedy is a combination of institutional controls to prohibit residential use (Alternative 2) because low levels of non-VOCs in soil present an unacceptable risk to human health for the unrestricted use scenario and Alternative 3 (Vapor Intrusion Remedy) to address VOCs in shallow soil gas that may present an unacceptable risk by requiring either mitigation for vapor intrusion or sampling to show acceptable risk for any future construction.

No Action (Alternative 1) is the selected remedy at 16 sites (**AOC H-1, AOC H-2, AOC H-3, AOC H-8, AOC H-13, AOC H-14, PRL S-033, PRL S-040, PRL S-047, SA 003, SA 035, SA 041, SA 091, SA 105, Tank 783, and Tank 788**). At PRL S-040, VOCs are present in shallow soil gas at levels that may present a threat to human health. However, the source of the VOCs is fuel contamination only, which is exempted from CERCLA. The VOC contamination at this site is being addressed under State requirements; therefore, the No Action remedy is selected under CERCLA. VOCs in shallow soil gas were also identified at SA 003 at levels that may present a threat to human health. However, the VOCs were coincident with non-VOC contaminants that were recently excavated during the remedial action implemented at this site under the LRA Initial Parcel ROD #1. Therefore, the No Action remedy is selected under CERCLA. At the remaining 14 sites, only low levels of contaminants were detected; therefore, significant impacts to human health and the environment are not likely. No further action is required to protect human health.

1.4 Statutory Determinations

With the exception of the No Action sites, the selected remedies will result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure. Therefore, a five-year review will be required for the remedial actions. In the event the remedial actions cannot achieve the ROD remedial action objectives (RAOs), an amendment to the ROD or a ROD Explanation of Significant Differences would be performed to resolve the discrepancy.

1.4.1 AOC G-2

The Air Force and EPA have selected a remedy (Excavation and Offsite Disposal with Institutional Controls to prohibit residential use and the Vapor Intrusion remedy to address VOCs in shallow soil gas) at AOC G-2 that is protective of human health and the environment, complies with Federal and State applicable or relevant and appropriate requirements (ARARs) for the remedial action, is cost effective, and utilizes permanent solutions, to the maximum extent practicable. The selected site remedy does not satisfy the statutory preference for treatment as a principal element of the remedy because costs to achieve the same risk reduction using treatment are significantly higher. Under the VOC ROD (AFRPA, 2007), VOCs that threaten groundwater quality at AOC G-2 are currently being addressed by the soil vapor extraction (SVE) system at the adjacent site PRL T-044. At the appropriate time, a STOP analysis will be performed for PRL T-044 to include AOC G-2 that will demonstrate that VOCs have been remediated to levels protective of the environment to the extent feasible as defined by the STOP process.

1.4.2 AOC H-12

The Air Force and EPA have selected a remedy for non-VOCs in soil (Excavation and Offsite Disposal) and VOCs in soil gas (Vapor Intrusion remedy) at AOC H-12 that is protective of human health and the environment, complies with Federal and State ARARs for the remedial action, is cost effective, and utilizes permanent solutions, to the maximum extent practicable. The selected site remedy does not satisfy the statutory preference for treatment as a principal element of the remedy because costs to achieve the same risk reduction using treatment are significantly higher.

1.4.3 PRL S-014

The Air Force and EPA have selected a remedy (institutional controls to prohibit residential use) for VOCs in shallow soil gas at PRL S-014 that is protective of human health and the environment, complies with Federal and State ARARs for the remedial action, and is cost effective. The selected site remedy does not satisfy the statutory preference for treatment as a principal element of the remedy and contaminants remain in place because costs to achieve the same risk reduction using treatment or excavation are significantly higher.

1.4.4 CS S-049, SA 010, SA 015, and SA 019

The Air Force and EPA have selected a remedy (Vapor Intrusion Remedy) at CS S-049, SA 010, SA 015, and SA 019 that is protective of human health and the environment, complies with Federal and State ARARs for the remedial action, and is cost effective.

In addition, for CS S-049, residential use of the site will be prohibited. The selected site remedies do not satisfy the statutory preference for treatment as a principal element of the remedy and contaminants remain in place because costs to achieve the same risk reduction using treatment or excavation are significantly higher.

1.4.5 SA 003

The Air Force and EPA have determined that No Action is required for VOCs in soil gas at SA 003 because a remedial action for non-VOCs has been completed to protect human health and the environment (Initial Parcel #1 Remedial Action Completion Report, EQM, 2006). Since the VOC contamination was coincident with the non-VOC contamination, and excavation of the contaminated soil and confirmation sampling have been performed, VOC hazardous substances, pollutants, or contaminants are not remaining onsite above levels that allow for unlimited use and unrestricted exposure.

1.4.6 PRL S-040

The Air Force and EPA have determined that No Action is required for VOCs in soil at PRL S-040 because PRL S-040 is solely contaminated with fuel-related compounds. Sites contaminated with fuel-related compounds are excluded from CERCLA requirements. Therefore, the Air Force is currently remediating the fuel-related contaminants under State requirements.

1.4.7 Additional No Action Sites

The Air Force and EPA have determined that No Action is required for contaminants in soil or soil gas to protect human health and the environment at the following 14 sites: AOC H-1, AOC H-2, AOC H-3, AOC H-8, AOC H-13, AOC H-14, PRL S-033, PRL S-047, SA 035, SA 041, SA 091, SA 105, Tank 783, and Tank 788. In addition, no cleanup of fuel-related contamination that is excluded from CERCLA is underway or anticipated for these sites.

1.5 Data Certification Checklist

The following information is included in Section 2 of this ROD, (additional information can be found in the Administrative Record for the Base):

- Chemicals of concern and their respective concentrations (Section 2.4 and Appendixes A and B)
- Risk represented by the chemicals of concern (Section 2.4 and Appendixes A and B)
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (Section 2.4 and Appendixes A and B)
- Cleanup levels established for chemicals of concern and the basis for these levels (Tables 2-2 through 2-5)
- How source materials constituting principal threats are addressed (Section 2.8)
- Key factor(s) that led to selecting the remedies (Section 2.9.1)

- Estimated capital; annual operation and maintenance (O&M); and total present-worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 2.9.3)
- Potential land use that will be available at the sites as a result of the selected remedies (Section 2.9.4)

This ROD was prepared in accordance with guidance published by EPA for preparation of records of decision (EPA, 1999).

1.6 Authorizing Signatures

This is the signature sheet for the LRA Initial Parcel Record of Decision #2 for McClellan. The Air Force and EPA jointly select the remedies described in this ROD:

JEFFREY DOMM
Acting Director, Air Force Real Property Agency
U.S. Air Force

31 Jul 08
Date

MICHAEL MONTGOMERY
Chief, Federal Facilities and Site Cleanup Branch
Region IX, U.S. Environmental Protection Agency

19/Sept 08
Date

The Department of Toxic Substances Control (DTSC) and the Regional Water Quality Control Board (RWQCB) (the State) had an opportunity to review and comment on the Initial Parcel ROD #2, and State concerns have been addressed.

for ANTHONY J. LANDIS, P.E.
Supervising Hazardous Substances Engineer II
Sacramento Office Brownfields and
Environmental Restoration Program
Department of Toxic Substance Control
California Environmental Protection Agency

9/29/08
Date

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SECTION 2

Decision Summary

2.0 Site Name, Location, and Description

McClellan is located in Sacramento County, 7 miles northeast of downtown Sacramento, California (CERCLIS Identification Number CA4570024337). It comprises approximately 3,000 acres and is bounded by the city of Sacramento on the west and southwest, the unincorporated areas of Antelope on the north, Rio Linda on the northwest, and North Highlands on the east. A location map is shown on Figure 2-1. This ROD focuses on 23 sites within the Initial Parcel, a portion of the Base with high reuse potential. The locations of the 23 sites within the Initial Parcel are shown on Figure 2-2. Details regarding the characterization of contaminants and risk at the 23 sites are provided in Appendixes A and B.

The predominant current land uses at McClellan are industrial, aviation, commercial, and residential. Open areas also present are not currently used for any of these purposes. Most of the land surrounding McClellan is zoned for low-density residential and agricultural use. Land parcels designated for commercial, office, and industrial uses are interspersed around the Base and are used for shopping centers, office complexes, and warehouses.

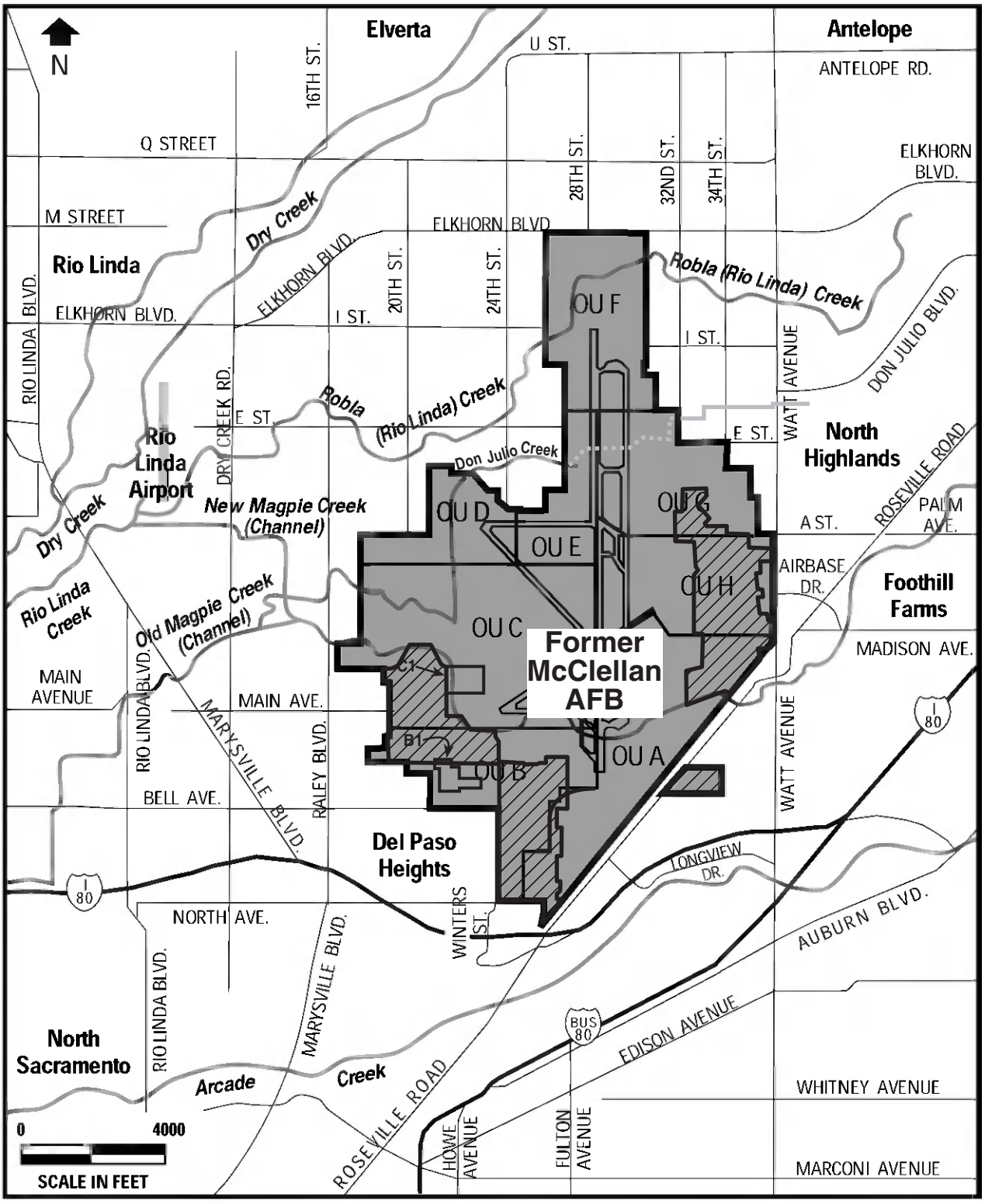
In the past, most of the industrial facilities were located in the southeastern part of the Base. The southwestern part has both industrial and storage areas. The far western part of the Base has environmentally sensitive vernal pools and wetlands. Between these wetlands and the taxiways, an open area exists that was used historically for industrial waste disposal pits, and a series of engine test cells is located there. Aircraft parking areas, hangars, and washracks are located in the northeastern area of the Base. Current and proposed land uses at McClellan, as described in the McClellan Air Force Base Reuse Plan (Sacramento County, 2000) and the McClellan Park Special Planning Area (Sacramento County, 2002), do not differ significantly from those used while McClellan was an active military installation. The use of the facilities at the sites included both industrial operations and storage areas. A brief summary of the site characteristics for each site is presented in Section 2.4 of this ROD.

2.1 Site History and Enforcement Activities

2.1.1 Site History

McClellan was an active industrial facility almost since its dedication in 1936, when it was called the Sacramento Air Depot. Operations changed from the maintenance of bombers during World War II and the Korean conflict to the maintenance of jet aircraft in the 1960s.

More recently, operations were expanded to include the maintenance and repair of communications equipment and electronics. A summary of the history of Base operations is provided in Table 2-1. On July 22, 1987, McClellan was officially added to the National Priorities List (NPL) by EPA. In 1995, the Congressional Base Realignment and Closure Commission recommended closure of McClellan; and on July 13, 2001, McClellan was closed as an active military facility.



Works Consulted: Final McClellan AFB PEIS/EIR, July 1997; California State Automobile Association, Greater Sacramento, Northern Area, copyright 1993; Thomas Brothers Maps, The Thomas Guide, 1994 Sacramento County, copyright 1994.

LEGEND

INITIAL PARCEL

FIGURE 2-1
LOCATION OF FORMER McCLELLAN AIR FORCE BASE
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

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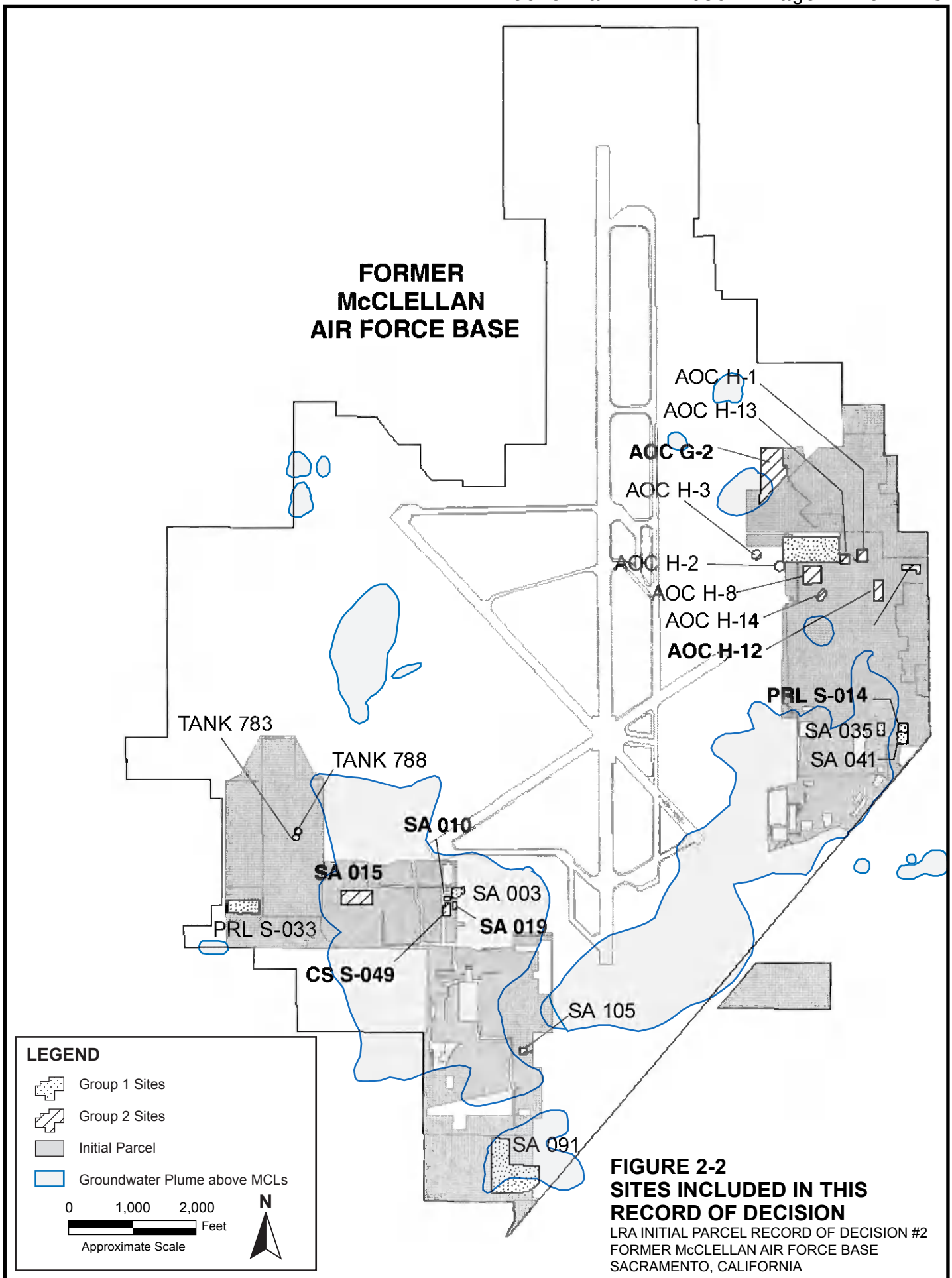

FIGURE 2-2
SITES INCLUDED IN THIS RECORD OF DECISION
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

NOTE: **BOLD** font indicates remedy in this ROD includes institutional controls

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CH2MHILL

TABLE 2-1
History of Base Operations
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, Sacramento, California

Period	Types of Operations	Hazardous Material Facilities/Activities
Pre-1936	Farm and rangeland	None
1936-1939	Base construction	Demolition and construction
1939-1946	Aircraft maintenance, modification, and repair	Disposal pits, aircraft storage, aircraft maintenance and repair, aircraft painting, hangars, machine shops, washracks, wastewater treatment, fuel/oil storage, open storage, firing range, ammunition storage
1946-1956	Aircraft maintenance, modification, repair, disassembly, and shipment	Disposal pits, aircraft storage, aircraft maintenance and repair, aircraft painting, hangars, machine shops, washracks, wastewater treatment, open storage, fuel/oil storage, electronics testing and repair, firing range, ammunition storage
1956-1964	Aircraft maintenance, modification, repair, disassembly, and shipment	Disposal pits, aircraft storage, aircraft maintenance and repair, aircraft painting hangars, machine shops, washracks, wastewater treatment, open storage, fuel/oil storage, electronics testing and repair, firing range, ammunition storage
1964-1974	Aircraft maintenance, modification, and repair	Disposal pits, aircraft storage, aircraft maintenance and repair, hangars, machine shops, washracks, wastewater treatment, open storage, fuel/oil storage, electronics testing and repair, generator dismantling, aircraft painting, firing range, ammunition storage
1974-1982	Aircraft maintenance, modification, and repair; electronics maintenance and repair	Disposal pits, aircraft storage, aircraft maintenance and repair, hangars, machine shops, washracks, wastewater treatment, open storage, fuel/oil storage, electronics testing and repair, generator dismantling, aircraft painting, firing range, ammunition storage
1982-2001	Aircraft maintenance, modification, and repair; electronics maintenance and repair	Aircraft storage, aircraft maintenance and repair, hangars, machine shops, washracks, wastewater treatment, open storage, fuel/oil storage, electronics testing and repair, generator dismantling, aircraft painting, firing range, ammunition storage, fire training

Source: Base Realignment and Closure Cleanup Plan (CH2M HILL, 1997).

Other Significant Dates:
1987 - McClellan added to NPL
1995 - Base Realignment and Closure Commission recommends Base closure
2001 - Base closure

Historical operations conducted at McClellan released contaminants that impacted the soil and groundwater. A brief summary of the historical operations at the 23 sites is provided in this section. More detailed information regarding the past operations at each site is included in Appendixes A and B.

2.1.2 Previous Investigations

In response to detections of contamination, McClellan initiated the first phase of the Installation Restoration Program (IRP) in 1981. Under the IRP, the investigation and remediation of contamination at the Base has been conducted in accordance with CERCLA as amended by Superfund Amendments and Reauthorization Act. The principal data

collection and analysis component of the restoration program is the remedial investigation (RI) at the Base. The RI is the primary source of site characterization data for the 23 sites.

Several phases of investigation have been conducted at each site. Generally, the media collected during the sampling events included soil, soil gas, and groundwater. The investigations conducted at the sites are listed in the following sections (detailed references are provided in each site summary included in Appendixes A and B).

The following investigations have been conducted for the sites:

- AOC G-2
  - Preliminary Site Assessment in 1995 (OUs E-H Preliminary Assessment Report, Radian, 1995a).
  - RI in 1997-1998 (OUs E-H Remedial Investigation Characterization Summary [RICS] 2, Jacobs, 2000).
  - Bioventing System Operations (Baseline Services Report for Five Bioventing Sites at McClellan and Davis Global Communications Site, Parsons, 2003).
  - Petroleum, Oil, and Lubricant/Shallow Soil Gas Phase 1 Investigation in 2003 (OU G RICS Addendum, Petroleum, Oil, and Lubricant/Shallow Soil Gas Investigation, URS, 2004a).
  - Pre-Decision Sampling (Pre-Decision Sampling Results for AOC G-2, Appendix D of this document).
- AOC H-1
  - Leak testing at four fuel tanks and one waste oil tank (Leak Testing Report, American Environmental Management Corporation, 1986).
  - Soil and groundwater sample collection during underground storage tank (UST) removal in 1991 (Building 900 UST Removal Project Report, Allen, John SM0ALC/EMR, 1992).
  - Preliminary Site Assessment in 1995 (OUs E-H Preliminary Assessment Report, Radian, 1995a).
  - RI in 1997-1998 (OUs E-H RICS 2, Jacobs, 2000).
- AOC H-2
  - Preliminary Site Assessment in 1995 (OUs E-H Preliminary Assessment Report, Radian, 1995a).
  - Phase I RI in 1997 (OUs E-H RICS, Jacobs, 1998).
- AOC H-3
  - Preliminary Site Assessment in 1995 (OUs E-H Preliminary Assessment Report, Radian, 1995).
  - Phase I RI in 1997 (OUs E-H RICS, Jacobs, 1998).

- AOC H-8
  - Soil investigation in preparation for expansion of Building 911 in 1990 (OUs E-H Preliminary Assessment Report, Radian, 1995a).
  - Phase I RI during 1997 (OUs E-H RICS, Jacobs, 1998).
- AOC H-12
  - Preliminary Site Assessment in 1995 (OUs E-H Preliminary Assessment Report, Radian, 1995a).
  - RI from 1997-1998 (OUs E-H RICS 2, Jacobs, 2000).
  - Pre-Decision Sampling (Pre-Decision Sampling Results for AOC H-12, Appendix D of this document).
- AOC H-13
  - Preliminary Site Assessment in 1995 (OUs E-H Preliminary Assessment Report, Radian, 1995).
  - Phase 1 RI during 1997 (OUs E-H RICS, Jacobs, 1998).
  - Geophysical Survey in April 2004 (Geophysical Survey Findings for AOC H-13, Located at the Former McClellan AFB, Earth Imaging Geologic Services / Dolver, 2004).
- AOC H-14
  - Preliminary Site Assessment in 1995 (OUs E-H Preliminary Assessment Report, Radian, 1995a).
  - Phase 1 RI during 1997 (OUs E-H RICS, Jacobs, 1998).
  - Shallow soil gas sampling in 2007 associated with the PRL S-039 SVE system installation (see Attachment 1 for AOC H-14 in Appendix B of this document).
- CS S-049
  - Soil and Soil Gas Investigation in 1990 (OU B RI Sampling and Analysis Plan, Radian, 1991a).
  - RI in 1991-1992 (OU B RICS, Radian, 1995b).
  - Pre-Decision Sampling (Pre-Decision Sampling Results for CS S-049, Appendix D of this document).
- PRL S-014
  - Preliminary Site Assessment in 1991 (OU A Preliminary Assessment, Radian, 1991b).
  - Phases 1 and 2 RIs, and a Data Gap 3 Investigation from 1992 through 2000. Soil, soil gas, and groundwater were sampled (OU A RICS, Jacobs, 2001).
  - Site Closure Data Gap Investigation in 2001 (OU A RICS Addendum, Jacobs, 2002).

  - Initial Parcel Feasibility Study (FS) Data Gaps Investigation in 2002 (Appendix E, Initial Parcel FS #1, CH2M HILL, 2003).
  - Initial Parcel #1 Remedial Action Completion Report (EQM, 2006).

- PRL S-033
  - Preliminary Site Assessment in 1991 (OU B Preliminary Assessment, Radian, 1991c).
  - Soil Gas Investigation in 1991 (OU B RICS, Radian, 1995b).
  - RI in 1992-1993 (OU B RICS, Radian, 1995b).
  - Data Gaps Investigation in 1998 (OU B RICS Addendum, URS, 2004b).
  - PAH Removal Action in 2001 (Weston and Kleinfelder, 2002).
  - START 1: Site Evaluations for Applicability of Soil Vapor Extraction (URS, 2006).
- PRL S-040
  - Site Investigations in 1985 (OUs E-H Preliminary Assessment, Radian, 1995a).
  - RI in 2000 (OUs E-H RICS 2, Jacobs, 2000).
  - Initial Parcel #1 Remedial Action Completion Report, Bioventing Operations (EQM, 2006).
- PRL S-047
  - Soil Investigation by McClellan Environmental Management from 1987-1988 (OUs E-H RICS 2, Jacobs, 2000).
  - Soil Investigation in 1990 (OUs E-H RICS 2, Jacobs, 2000).
  - RI in 1997-1998 (OUs E-H RICS 2, Jacobs, 2000).
- SA 003
  - Site investigation for leaks in the industrial waste line in 1988 (OU B RICS, Radian, 1995b).
  - Preliminary Site Assessment in 1991 (OU B Preliminary Assessment, Radian, 1991c).
  - Soil Gas Investigation at Investigation Cluster (IC) 3 in 1991 (OU B Soil Gas Data Summary, Radian, 1991d).
  - Soil Investigation at Magpie Creek in 1993 (OU B RICS Addendum, URS, 2004b).
  - RI in 1995 (OU B RICS, Radian, 1995b).
  - RI Data Gaps Investigation (OU B RICS Addendum, URS, 2004b).
  - Petroleum, Oil, and Lubricant/Shallow Soil Gas Phase 1 Investigation in 2002 (OU B Phase 1 Petroleum, Oil, and Lubricant/Shallow Soil Gas RICS Addenda for Selected Sites, Volumes 1 and 2, URS, 2004a).
  - Site Investigation in 2003 (AFRPA, 2003, provided in Initial Parcel FS #1 Appendix H).
  - Initial Parcel #1 Remedial Action Completion Report (EQM, 2006).

- SA 010
  - Soil Gas Investigation in 1991 (OU B Soil Gas Data Summary Report, Radian, 1991d).
  - Preliminary Assessment in 1991 (OU B Preliminary Assessment Summary Report, Radian, 1991e).
  - Soil Investigation from 1991-1992 (OU B RICS, Radian, 1995b).
- SA 015
  - Soil Gas Investigation in 1991 (OU B Soil Gas Data Summary Report, Radian, 1991d).
  - Preliminary Site Assessment in 1991 (OU B Preliminary Assessment Summary Report, Radian, 1991e).
  - Soil and Soil Gas Investigations from 1992-1993 (OU B RICS, Radian, 1995b).
- SA 019
  - Soil Gas Investigation in 1991 (OU B Soil Gas Data Summary Report, Radian, 1991d).
  - Preliminary Site Assessment in 1991 (OU B Preliminary Assessment Summary Report, Radian, 1991e).
  - Soil Investigation from 1992-1993 (OU B RICS, Radian, 1995b).
- SA 035
  - Preliminary Site Assessment in 1991 (OU A Preliminary Assessment, Radian, 1991b).
  - Soil sample collection during UST removal in 1992 (OU A RICS, Jacobs, 2001).
  - Phase 2 RI and Data Gap 3 Investigations during 1996-1999 (OU A RICS, Jacobs, 2001).
  - Site Closure Data Gaps Investigation 2000-2001 (OU A RICS Addendum, Jacobs, 2002).
  - Additional characterization and limited excavation during December 2003 (AFRPA, Initial Parcel FS #1 Addendum, April 2004).
- SA 041
  - Site Survey in 1991 (OU A Preliminary Assessment, Radian, 1991b).
  - RI in 1992 (OU A RICS, Jacobs, 2001).
- SA 091
  - Soil sample collection as a result of a solvent spill in 1988 (OU A RICS, Jacobs, 2001).
  - Preliminary Site Assessment in 1991 (OU A Preliminary Assessment, Radian, 1991b).
  - Site Inspection in 1992 (OU A RICS, Jacobs, 2001).
  - Phase 1 and 2 RI during 1992-2001 (OU A RICS, Jacobs, 2001).
  - Initial Parcel FS Data Gaps Investigation in 2002 (Appendix E, Initial Parcel FS #1, CH2M HILL, 2003).

- SA 105
  - Preliminary Site Assessment (OU A Preliminary Assessment Summary Report, Radian, 1991b).
  - Phase 1 RI in 1992 (OU A RICS/FSP, Jacobs, 1995).
  - Phase 2 RI in 1997 (OU A RICS, Jacobs, 2001).
  - Site Closure Data Gap Investigation in 2001 (OU A RICS Addendum, Jacobs, 2002).
- Tank 783
  - Soil investigation during UST removal by McClellan Environmental Management in 1991 (OU C RICS, Radian, 1997).
  - Preliminary Site Assessment in 1993 (OU C Preliminary Assessment, CH2M HILL, 1993).
  - Phase 1 RI in 1994 (OU C RICS, Radian, 1997).
- Tank 788
  - Preliminary Site Assessment in 1993 (OU C Preliminary Assessment, CH2M HILL, 1993).
  - Soil and Soil Gas Investigation in 1994 (OU C RI Report – Site Characterization Summaries/Field Sampling Plans and RICS, Radian, 1997).

2.1.3 Enforcement Activities

On October 15, 1984, EPA proposed listing McClellan as a candidate site for inclusion on the NPL. McClellan was formally placed on the NPL on July 22, 1987. In 1989, the Air Force, EPA Region 9, and the California Department of Health Services signed an Interagency Agreement for the cleanup. The Interagency Agreement was implemented in 1990.

The Air Force is the lead agency. As such, the Air Force jointly selects remedies with the U.S. EPA. State agencies such as the RWQCB and the DTSC are support agencies for the cleanup. Funds are provided by the Air Force through the Base Realignment and Closure program.

2.2 Community Participation

McClellan has had an active community relations/public participation program since the beginning of restoration activities in the early 1980s. The purpose of the program is to help community members understand McClellan's cleanup program and learn how to become involved in the cleanup decision making process.

Highlights of the community relations activities undertaken by McClellan are as follows:

- **Restoration Advisory Board (RAB).** In 1995, a RAB was formed to increase communication between the Air Force and the neighboring community. Through open communication and the exchange of ideas, interests, and concerns, the RAB supports the search for safe, timely, and effective cleanup solutions so that McClellan may be

transferred from Air Force ownership to public/private ownership. The RAB meetings are held quarterly. These public meetings include discussions of the RAB's advice on particular issues, information on cleanup actions or public interest items, and updates on the status of the cleanup program. The Air Force provides seminars to RAB members to aid in their review of documents and cleanup actions. In addition, the Technical Assistance for Public Participation program is available to provide funds to retain an independent contractor to assist the community members in their reviews.

- **Administrative Record.** McClellan established the Administrative Record at the beginning of its environmental investigation to store all information that supports cleanup decisions at McClellan. An Information Repository was set up to make all of the information, reports, and reference materials available for public review. More than 15 years of documentation is available for review by the public. The location of this repository is within the AFRPA office, 3411 Olson Street, McClellan, California 95652. Documents related to the cleanup efforts at McClellan also are available for review at DTSC, RWQCB, and EPA Region 9 offices.

- **Community Relations Plan.** The first McClellan Community Relations Plan was approved in August 1985. The Community Relations Plan was revised in 1988, 1991, 1993, 1996, 1999, and 2002. Another revision is planned to be completed in 2008.

- **Mailing List.** A mailing list of all interested parties in the community is maintained by the Air Force and updated regularly. In 2002, blanket mailings to all residents in the vicinity of McClellan were conducted in an effort to add new/interested parties to the mailing list. Since then, the mailing list has been updated repeatedly.

- **Newsletters.** Since May 1984, McClellan's quarterly newsletter, the *Environmental Action Update*, has been distributed to interested individuals and organizations. The newsletter includes articles on the status of the IRP, meeting announcements, listings of recently issued documents, and names of individuals to contact for more information. The newsletter is mailed to more than 2,500 neighbors of the Base, community leaders, businesses, environmental organizations, civic clubs, and the news media.

- **Website.** The Air Force has established a Web site to support communication about its environmental program (http://www.safie.hq.af.mil/afrpa/index.asp). The following information is available on the Web site:

  – A search feature identifying the documents stored in the Administrative Record
  – Announcements for upcoming public meetings and RAB meetings
  – RAB information and meeting minutes
  – Copies of newsletters and fact sheets

- **Fact Sheets.** Since May 1990, the Air Force publishes fact sheets to help explain specific topics. Topics have included descriptions of new cleanup technologies, cleanup milestones, and descriptions of removal action plans. Fact sheets are also provided to increase the community's knowledge of technologies or the science of cleanup at McClellan.

- **Public Comment Periods/Public Meetings.** Public comment periods give the community an opportunity to review documents and provide comments verbally or in

writing. Public meetings are held to solicit public comment on documents or actions and to address areas of public concern or interest. A public comment period on the Initial Parcel Proposed Plan #2 was held from August 1, through August 31, 2005, and a public meeting was held on August 15, 2005. A notice of availability of the Proposed Plan was published in the Sacrament Bee on August 1, 2005. The Air Force's responses to comments received during the public comment period are included in the Responsiveness Summary, which is Section 3 of this ROD. The public participation requirements of CERCLA and the NCP were met for the remedy selection process.

2.3 Scope and Role of Initial Parcel Sites or Response Action

In this section, the scope and role of this ROD are explained in the context of the larger IRP at McClellan. The role of previous and planned response activities that affect the sites in this ROD are explained.

2.3.1 Overall Site Cleanup Strategy

For environmental management purposes, McClellan has subdivided the Base into the following 11 Operable Units (OUs): A, B, B1, C, C1, D, E, F, G, H, and Groundwater, which encompasses the entire Base. The OU boundaries are shown on Figure 2-1. This ROD addresses remedial actions for non-VOC contamination and VOC contamination in shallow soil gas in the Initial Parcel. The sites are located within portions of OUs A, B, C, G, and H.

Because of the complexity of different types of contaminants commingling at McClellan, the presence of contamination in the soil, sediment, and groundwater; and the large extent of contamination across the Base; the investigation and remediation of contamination at the Base under the IRP are subdivided into several programs. This subdivision allows for more efficient planning and implementation of each project.

This discussion of the interaction of remedial programs is focused on those that relate to this ROD for non-VOC and VOC contaminants. The Initial Parcel sites were screened and grouped to allow the sites to move expeditiously through the FS and ROD processes, thereby facilitating transfer of the Initial Parcel to the LRA. Complex sites such as landfills, sites with radiological contamination, or sites that pose a risk to ecological receptors were excluded from the Initial Parcel so that transfer of the Initial Parcel as a whole would not be delayed. The complex sites that were excluded from the Initial Parcel will be addressed in subsequent FS and ROD documents.

The Initial Parcel sites were further subdivided into three groups to facilitate review of the site characterization data, evaluation of remedial alternatives, and selection of remedies. The previous ROD, IP ROD #1, addressed remedial actions for non-VOC contamination in soil at the seven Group 1 sites identified in Section 1.0. These seven sites are also addressed in this IP ROD #2 for VOC contamination in shallow soil gas. The 16 Group 2 sites have not been included in a previous soils ROD and are included in this ROD for both non-VOC contaminants in soil and VOC contaminants in shallow soil gas. The remaining 45 sites within the Initial Parcel will be included in IP ROD #3 planned for early 2009 and will be evaluated for both non-VOC contaminants in soil and VOC contaminants in shallow soil gas.

The remedies presented herein are consistent with the overall cleanup strategy for the former base. Individual site remedies involving dig and haul activities and/or institutional controls will be coordinated to maximize cost effectiveness. Remedial actions implemented for this ROD will be coordinated to the extent possible with any subsequent remedial actions conducted at McClellan.

None of the sites addressed in this ROD was a Resource Conservation and Recovery Act (RCRA)-permitted facility.

2.3.2 Past Removal Actions

In 2001, the Air Force took a non-time-critical removal action to address non-VOC contamination at one of the sites addressed in this ROD, PRL S-033. The site covers approximately 2 acres and consists of a warehouse and associated loading docks, and surrounding property. Approximately 600 cubic yards of PAH-contaminated soil were excavated and disposed of offsite, from an area adjacent to one of the loading docks. Confirmation samples were obtained, and a final risk assessment determined that the cleanup levels were achieved. The site was backfilled with clean soil and the site has been restored. The Air Force and EPA have determined that no further action is required for this site as is documented in this ROD.

The Air Force has previously removed USTs, excavated contaminated soil, and taken other actions to remediate contamination at several of the sites included in this ROD. USTs were removed at AOC H-1, AOC H-12, PRL S-014, Tank 783, and SA 035, and a minor excavation was performed at SA 035 during characterization activities. Lastly, excavations were performed at CS S-049, PRL S-047, and SA 091 during site operations in the late 1980s and early 1990s to remove contamination. Bioventing was previously implemented at AOC G-2, and a bioventing system is currently operating at PRL S-040. None of the sites addressed in this ROD is included in an Interim ROD for soil. Two Interim RODs are in existence at this time: the OU B1 Interim ROD, which maintains an asphalt cap over existing PCB-contaminated soils; and the Groundwater Interim ROD, which facilitated the early groundwater remediation activities and has been superseded by the VOC ROD completed in 2007.

2.3.3 Past Remedial Actions

In accordance with IP ROD #1 (2004) and IP Remedial Action Work Plan #1 (2005), excavation of contaminated soil at PRL S-014 and SA 003 is complete (EQM, 2006).

2.3.4 Future Response Plans

The potential threat to groundwater from VOCs at these sites is being evaluated concurrently under the VOC ROD using the START and STOP processes. The START evaluation is used to determine if an SVE system is needed to protect groundwater, and a STOP evaluation is used to determine if an existing SVE system can be shut down. A START evaluation has been completed for 10 of the VOC sites included in IP ROD #2 (*START 1: Site Evaluations for Applicability of Soil Vapor Extraction*, April 2006). STOPs or STARTs are pending for 6 of the sites, and 7 of the sites were not identified as VOC sites in the VOC ROD.

As with this IP ROD #2, potential impacts from shallow soil gas on human health and from non-VOC contamination on human health and the environment will be addressed together in RODs for the remaining sites at McClellan.

2.4 Site Characteristics

A brief summary of the site characteristics for the 23 sites included in this ROD is presented in the following sections. Included in the summaries is information regarding the current and potential future use of the sites. Many of the sites are either unoccupied and awaiting reuse or are leased.

Site and risk information are provided for each of the sites to develop a basis for the selected remedy. Characterization data from each of the sites was compared with background values (for metals) and screening levels. Background values have been developed for McClellan for various soil types (sands, silts/clays, surface soils, and sediments). For this screening, the "combined" background value was used for all soil types. Concentrations of metals above the "combined" background values may be representative of contamination. Detected concentrations of VOCs, SVOCs, TPH, and metals (reported above the combined background values) were compared with risk-based screening levels. The risk-based screening levels correspond to the lesser of the concentrations equivalent to 1×10^{-6} carcinogenic risk or a noncarcinogenic hazard quotient (HQ) of 1 for a residential scenario including homegrown produce ingestion. Additionally, the detected concentrations of VOCs, SVOCs, TPH, and metals (reported above the combined background values) were compared with screening levels for the protection of surface water and groundwater. These screening levels were calculated using surface water and vadose zone modeling to determine threshold values above which impacts to water resources may be present. The screening levels for protection of human health for unrestricted and industrial use, surface water, and groundwater are provided in Appendix C.

Sites were considered for a remedial action if the cumulative excess carcinogenic risk exceeded the CERCLA risk range (10^{-6} to 10^{-4}) as defined in the NCP (Subpart E, 300.430 (e)(2)(i)(A)(2)), the noncarcinogenic hazard index exceeded 1, a threat to surface water or groundwater was present, or there was significant uncertainty regarding the magnitude of contamination. DTSC believes that remedial action is generally required if risks exceed the low end of the CERCLA risk range; however, DTSC agrees with the remedies selected in this ROD. For each site that was evaluated, there is a detailed description of the site characteristics and risk estimates is included in Appendixes A (Group 1 sites) and B (Group 2 sites). Figure 2-3 illustrates the exposure pathway analysis.

The risk information only addresses human health risk since sites that pose a risk to ecological receptors were excluded from the Initial Parcel as discussed in Section 2.3.1. Thus, there is not a significant risk to ecological receptors at the sites discussed in this ROD.

2.4.1 Group 1

For the Group 1 sites, non-VOCs were evaluated in the LRA IP FS #1, and remedies were selected in the LRA IP ROD #1. These sites were also included in the LRA IP FS #2 for VOCs (CH2M HILL, 2005). Rather than exclude this information herein, both non-VOC and VOC

information is provided in the following subsections so the reader will have a complete picture of potential contamination information for each site.

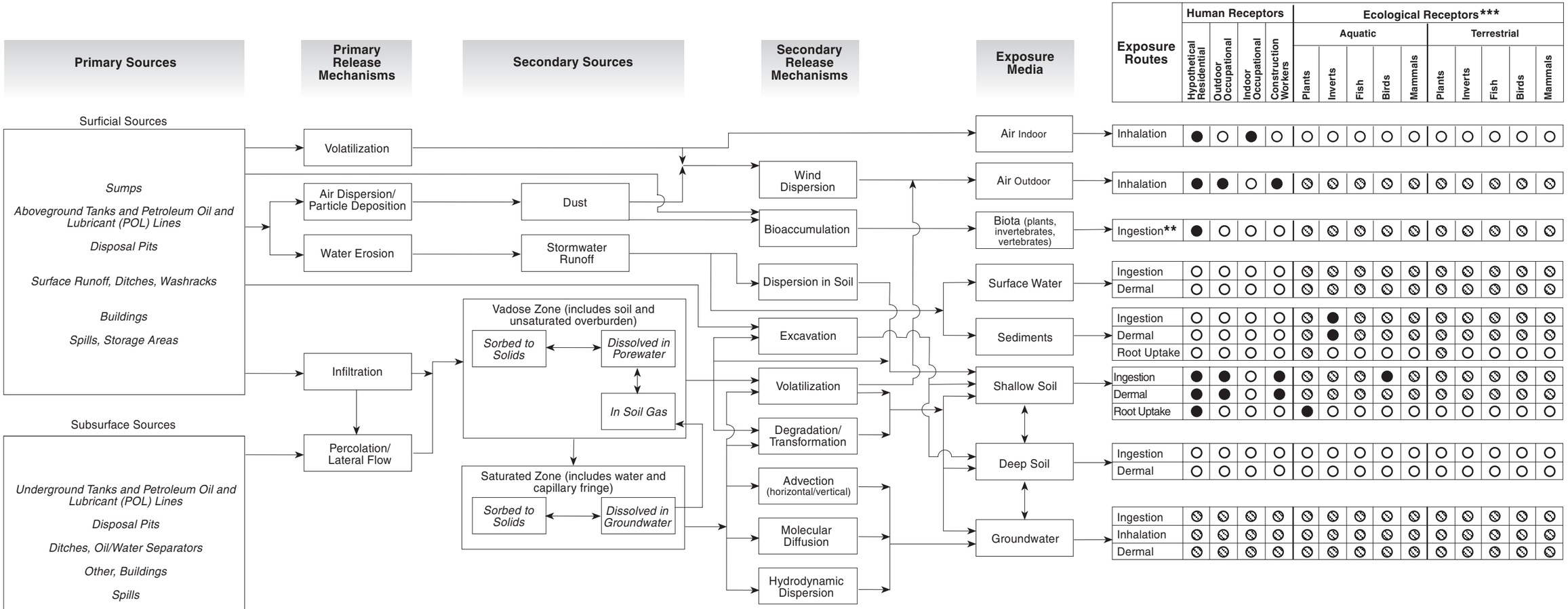
2.4.1.1 PRL S-014

PRL S-014 is located in OU A in IC 26 and consists of Buildings 17 and 22. The site encompasses an area of approximately 0.5 acre and is mostly covered with asphalt, concrete, or buildings. On the north side of Building 22, landscaping is present with a transformer located in a grassy area, and a narrow unpaved strip is present on the eastern side of the site. The area north of Building 22 is referred to as PRL S-014 "North." Building 22 was a former motor pool area. South of Building 22, two USTs and a pump island, a paint facility, a hazardous waste storage area, and a washrack were present. This area is referred to as PRL S-014 "South". The USTs have been removed, and RWQCB has concluded that no further action is required for these USTs (RWQCB, 2000). PRL S-014 is adjacent to SA 041 to the south, and SA 034 to the southeast. PRL S 014 is currently occupied by a catering company, and the anticipated future land use for PRL S-014 is commercial/industrial.

At PRL S-014, the primary contaminants were metals, PCBs, and VOCs. For metals using Method 6010, the maximum concentrations for arsenic and cadmium exceeded "combined" background levels. Under IP ROD #1 excavation and offsite disposal was performed as remedial actions for non-VOCs. Using Method 7060 for arsenic, the maximum concentration detected was also in excess of the "combined" background levels but at a lower concentration. On the north side of Building 22 adjacent to a transformer, concentrations of PCBs exceeded screening levels for the protection of human health and the environment. The LRA Initial Parcel ROD #1 determined that No Action was required for metals at this site but remediation of PCBs was required to protect human health and the environment. The soil contaminated with PCBs above the IP ROD #1 cleanup levels was excavated and disposed offsite.

For VOCs, carbon tetrachloride exceeded the industrial use screening level for protection of human health in two shallow soil gas samples; however, carbon tetrachloride was not detected in the other four shallow soil gas samples. Carbon tetrachloride was not detected at concentrations above screening levels in deeper soil gas samples collected at the site, and the START evaluation concluded that significant impacts to groundwater are not expected (START 1: Site Evaluations for Applicability of Soil Vapor Extraction, April 2006). Concentrations of chloroform, 1,1-dichloroethane, perchloroethene (PCE), and TCE exceeded unrestricted use screening levels for protection of human health.

The incremental carcinogenic risks are at the upper end of the CERCLA risk range for the residential scenarios but are within the low-end of the risk range for the industrial scenarios. The hazard indices are equal to or greater than 1 for the residential scenarios but are less than 1 for the industrial scenarios. The risk drivers are carbon tetrachloride and arsenic. While hazardous wastes were stored and utilized at the site, the risk associated with arsenic may be representative of background conditions. For additional information regarding the site characterization of PRL S-014, see Appendix A, Section 1. A remedy has been selected in this ROD to address the threat to human health from VOC contamination in soil gas with the implementation of institutional controls to prohibit residential use.



NOTES

- ● Potentially complete pathways described in this ROD.
- ⊘ Potentially complete pathway, but not described in this ROD.
- ○ Incomplete pathway for this scenario.
- ** Plants may take up contaminants and hypothetical residents may be exposed through ingestion of homegrown produce affected by contaminants.
- *** For the sites included in this FS, there is no significant ecological habitat. Therefore, no complete exposure pathway exists for ecological receptors.

FIGURE 2-3
EXPOSURE PATHWAY ANALYSIS
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

2.4.1.2 PRL S-033

PRL S-033 is located in OU B and consists of Building 786A. The site was the location of a former chemical storage and chemical waste storage facility. The site covers approximately 2 acres, and Building 786A is approximately 80,000 square feet. Building 786A and its associated loading docks are surrounded by asphalt-covered parking areas, a grass-covered area to the west, and railroad tracks to the east (Radian, 1995b). PRL S-033 is currently being leased to Beutler Heating and Air Conditioning. The anticipated land use for PRL S-033 is commercial/industrial.

At PRL S-033, PAHs, metals, and TPH-D were the primary contaminants. PAHs were detected in surface and shallow soil; however, the PAH contaminated soil was removed in 2001 (Removal Action Report for PRL S-033, Weston and Kleinfelder, 2002). Post-removal action sampling indicated that the removal action objective was attained and that the carcinogenic risk for soil was less than 1×10^{-6} for a hypothetical resident. TPH-D was detected in seven samples; however, the TPH was removed during the PAH removal action. Outside the excavated area, concentrations of TPH-D were below screening levels.

Metals and VOCs were detected outside the excavation area. For metals, arsenic, chromium, cobalt and nickel were detected at concentrations greater than "combined" background using Method 6010. Only the arsenic concentrations exceeded screening levels for protection of human health. However, arsenic concentrations, when measured using Method 6010, are often biased high. Therefore, the metals were not considered significant contaminants at the site and no action was required to address them in the LRA Initial Parcel ROD #1. VOCs were detected in screening-level shallow soil gas samples collected at the site during 1990. Because these samples were not analyzed using a definitive analytical method, samples were collected at the same locations during 2006, and were analyzed using the definitive TO-15 method. Chloroform exceeded unrestricted use screening levels in three samples. All other reported VOC concentrations were less than screening levels.

Risks were calculated after the post-removal action sampling for the hypothetical residential scenario. The post-removal carcinogenic risk is within the CERCLA risk range, and the post-removal noncarcinogenic risk is less than a hazard index of 1 for contaminants in soil. Chloroform in soil gas is the primary contributor to the carcinogenic risk. For additional information regarding the site characterization of PRL S-033, see Appendix A, Section 2. No further action for soils is selected for this site.

2.4.1.3 PRL S-040

PRL S-040 is located in the northern portion of OU H and covers approximately 8 acres. PRL S-040 is the former location of an aircraft maintenance and engine test area. The site is the current location of the Base Commissary (Building 910), Base Exchange (Building 912), and a portion of the parking lot for customers of the Base Exchange and Commissary. The anticipated land use for PRL S-040 is commercial/industrial or community support purposes.

At PRL S-040, the contaminants of concern (COCs) are TPH-D and TPH-G; metals, SVOCs, and VOCs were also detected. For metals, only arsenic, copper and iron slightly exceeded the combined background levels. Three SVOC contaminants, 2,6-dinitrotoluene, naphthalene, and 2-methylnaphthalene were detected at concentrations above the screening level for protection of human health. Elevated levels of TPH-D were reported in the same

samples as had detections of the three SVOCs. In shallow soil gas, fuel related constituents were reported at concentrations exceeding unrestricted use screening levels (benzene, ethylbenzene, and m,p-xylene) and industrial screening levels for (benzene and ethylbenzene).

Soil at site PRL S-040 is only contaminated with fuel-related compounds and, therefore, no action is required under CERCLA. However, the fuel contamination is being remediated under State requirements. In 2005, a bioventing remediation system was installed to treat the TPH. The system includes 15 air injection wells, each with a design radius of influence of 50 feet. In recent monitoring, airflow was determined to be sufficient to sustain biodegradation in the contaminated zone (Biovent O&M and VMP Report, 4Q07/Annual 2007, Environmental Quality Management, November 2007). Monitoring data from the ongoing (and nearly completed) operation of the bioventing system demonstrates that fuel contaminants (including the constituents such as benzene, ethylbenzene, naphthalene, and 2-methylnaphthalene) have been and continue to be remediated, therefore the risk to human health and threat of contaminant migration has been significantly reduced. According to the risk assessment prior to operation of the system, the potential cancer risk for future adult residents was within the CERCLA risk range, and the noncancer hazard indices were equal to or greater than 1 for contaminants in soil. The risk drivers were benzene and ethylbenzene in shallow soil gas; however, neither of these contaminants were detected in soil gas samples from vapor monitoring wells and analyzed by TO-14 during August 2007. For additional information, see Appendix A, Section 3. No further action for soils is selected for this site.

2.4.1.4 SA 003

SA 003 is in the northern portion of IC 3, immediately south of Magpie Creek near the OU C boundary in the north-central portion of OU B. SA 003 consists of a former uncovered vehicle washrack that is connected to a portion of the industrial wastewater line and a former hazardous waste storage area. The site is approximately 0.5 acre and is currently vacant. The anticipated land use for SA 003 is commercial/industrial.

The LRA Initial Parcel ROD #1 determined that remediation of metals and TPH contaminated soil was required to protect human health and the environment ; therefore, excavation and offsite disposal of non-VOC contaminated soil was performed. Excavation and offsite disposal of the non-VOC contaminated soil was completed in late 2005 and a Remedial Action Closure Report has been finalized for this remedial action. A total of 4,250 cubic yards of contaminated soil was removed from SA 003. VOCs were detected in both shallow and deep soil gas samples. In anticipation of the future need to remediate VOC contamination at the site (but not under the IP#1 ROD remedy), the excavation was deepened at one location to ensure that elevated concentrations of VOCs also were removed. In soil gas samples collected beneath the floor of the excavated area, only benzene (12 parts per billion by volume [ppbv]) and chloroform (4.4 ppbv) were detected at concentrations exceeding unrestricted use screening levels. However, this sample was collected at 20 feet below ground surface (bgs) where unrestricted use shallow soil gas screening levels may not be applicable. The excavation was backfilled with clean fill soil after these soil gas samples were collected. For additional information, see Appendix A, Section 4. Risk screening was performed, and under the residential scenario, the carcinogenic risk associated with VOCs remaining at the site is approximately 6×10^{-6}. No further action for soils is selected for site SA 003.

2.4.1.5 SA 035

SA 035 is located in IC 25 in northern OU A and includes Building 20, a former 2,500-gallon UST (removed in 1992), and the surrounding parking lot. The site covers approximately 20,000 square feet, or about 0.5 acre, including about 12,000 square feet covered by Building 20. The site is currently occupied by a lease tenant (Surewest Communications). The anticipated land use for SA 035 is commercial/industrial.

At SA 035, the contaminants of potential concern were SVOCs, metals, and VOCs. Bis(2-chloroethyl)ether (bis2CEE) was the only SVOC to exceed the screening level for the protection of human health. For metals, only arsenic exceeded screening levels for protection of human health and the environment, and acetone was the only reported VOC detection in shallow soil gas. The elevated concentrations of bis2CEE and arsenic were from the same sample. The concentration of acetone was significantly below the screening level for protection of human health.

In December 2003, the Air Force performed a limited excavation of soil during additional characterization of bis2CEE and arsenic contaminated soil. Approximately 1.2 cubic yards of soil were removed at the location where detections exceeded the screening levels. No SVOCs were detected in the three soil samples collected from the excavation sidewall and floor. In addition, no SVOCs were detected in the sample of excavated soil prior to its disposal. The arsenic concentration in the composite sidewall sample and the field duplicate of the discrete excavation floor sample were both less than the combined background concentration for arsenic. However, the arsenic concentration reported in the primary excavation floor sample slightly exceeded the "combined" background concentration.

Upon completion of the additional characterization during 2003, the cancer risk was within the CERCLA risk range, primarily due to background levels of arsenic in soil, and the noncancer hazard index was less than 1. For additional information, see Appendix A, Section 5. No further action for soils was chosen due to the risk at the site being from background levels of arsenic.

2.4.1.6 SA 041

SA 041 is in the central portion of IC 26, which is in the northeastern portion of OU A. It includes Building 54, which consisted of a welding and sheet-metal fabrication shop in the western half of the building, and a carpentry shop in the eastern half of the building. Activities in the building involved minimal use of hazardous materials, such as solvents, adhesives, fuels, and oils. Wastes generated by the operations in the building were taken to a hazardous waste storage area directly north of the building until pick up and final disposal. The building covers the majority of the site, and the total site area is approximately 28,000 square feet. The site is currently occupied by a lease tenant (The Fab Shop) that specializes in custom sheet metal fabrication. The anticipated land use for SA 041 is commercial/industrial.

Suspected sources of contamination were not identified because the building has a concrete floor with no drains and no visual evidence of contamination was noted. The building slab is also surrounded by asphalt and concrete, and based on aerial photos from 1946 to the present, this area has been covered with buildings and asphalt paving. Eight screening level shallow soil gas samples were collected around the perimeter of the building. The sample with the

highest concentration was sent to an offsite laboratory for definitive analysis. In that sample, carbon tetrachloride concentrations exceeded the industrial use screening level for protection of human health. Because building features prevented any contaminant pathways, no soil samples were collected at the site. Higher concentrations of carbon tetrachloride were reported at adjacent sites SA 034 and SA 040 (up to 1000 ppbv and 190 ppbv, respectively), located immediately east and south of SA 041, respectively. Therefore, excess risks at SA 041 are not expected, and additional sampling and a quantitative risk assessment were not performed. For additional information, see Appendix A, Section 6. No further action for soils is selected for this site.

2.4.1.7 SA 091

SA 091 is in southern OU A in IC 43 and consists of the former warehouse Building 621 (Bays A through D) with truck parking and an associated open storage lot to the east. The site is bounded to the south by the base property line. The site is approximately 10 acres, and the former warehouse covered approximately half of the site. The site also included a paved 4.5-acre open storage area east of the building. The building was constructed about 1946 and served as general warehousing until it was likely remodeled in 1981. Bay A then became a designated hazardous materials storage area and the remaining bays were used to receive and store non-hazardous materials. However, a solvent spill was reported west of Bay C in 1988. Records indicate that the spill was monitored and contaminated soil (approximately 16 cubic yards) was subsequently removed. In 1992, soil gas samples were collected in this area. The entire area of the site surrounding the building has been covered by pavement since at least 1953. The site was active until approximately 1994, at which time Building 621 was demolished. Subsequently, the building foundation was also removed. The site is currently used to store piles of crushed concrete. The anticipated land use for SA 091 is commercial/industrial.

At SA 091, detected contaminants were TPH, pesticides, and VOCs. TPH-D was reported from hand-auger borings drilled in the open storage lot. However, the highest reported detection of TPH-D was below the screening level for the protection of groundwater and surface water. For pesticides, the maximum DDT44 and DDE44 concentrations were reported below the screening levels for protection of human health and the environment. Based on interview records, the parking area was a PCB transformer storage location with potential spill and leak occurrences; however PCBs were not detected in 76 samples from 28 borings. While low levels of VOCs were reported in shallow soil gas samples from the site, all reported VOCs were below screening levels for protection of human health. Soil gas at the northeast corner of SA 091 is influenced by the adjacent IC 42 SVE system. However, soil gas contamination at that location, if any, would have originated from IC 42 rather than SA 091 and will continue to be addressed by the SVE system at IC 42.

The risk to human health for pesticides in soil was determined to be approximately 6×10^{-8} for future adult resident (0-to-10-foot-bgs depth interval), and the noncancer hazard index is less than 1. For additional information, see Appendix A, Section 7. No further action for soils is selected for this site.

2.4.2 Group 2

The Group 2 sites discussed in subsequent sections are included in the LRA IP FS #2, where they were evaluated for non-VOC contamination in soil and VOC contamination in shallow soil gas. A more detailed overview of the site characteristics for the Group 2 sites is included in Appendix B.

2.4.2.1 AOC G-2

AOC G-2 is located in the south-central portion of OU G, and is within the proposed Core Aviation/Industrial District. AOC G-2 was formerly known as Tank Farm 7 and served as a storage location for petroleum, oil, and lubricants. The former Wherry Housing area is located directly south and east of AOC G-2 with the nearest housing units located approximately 150 feet from the contaminated areas. The site contained an aboveground storage tank (AST), underground fuel distribution pipelines, fuel filtration units, two fueling stands, and stormwater sewers. The anticipated land use for AOC G-2 is commercial/industrial. The site is currently vacant and the AST has been removed.

The primary contaminants at AOC G-2 are TPH and PAHs in soil, and VOCs in soil gas. TPH-G contamination at the location of the former AST presents a threat to groundwater and surface water quality. The TPH contamination is commingled with CERCLA contaminants in shallow soil gas. PAH concentrations also exceeded unrestricted and industrial use screening levels for protection of human health within the former AST bermed area. Along the fuel distribution line, the concentrations of benzo(a)pyrene and dibenzo(a,h)anthracene exceeded their screening levels for protection of human health in a single field duplicate sample. However, no PAHs were detected in the corresponding sample.

In 1997 and 1998, the maximum benzene concentration in shallow soil gas significantly exceeded the unrestricted and industrial use screening levels for protection of human health also at the location of the former AST. Elevated TCE concentrations were also reported at AOC G-2 but are assumed to be from an adjacent site, PRL T-044, because concentrations of TCE were much higher at PRL T-044 and the AST at AOC G-2 only contained petroleum. VOCs at AOC G-2 are currently being addressed by the SVE system at PRL T-044. At the appropriate time, a STOP analysis will be performed for PRL T-044 to include AOC G-2 that will demonstrate that VOCs have been remediated to levels protective of human health and the environment to the extent feasible as defined by the STOP process. The STOP process evaluates the technical and economic feasibility of continued SVE system operation and is used to determine when an SVE system can be shut down.

A bioventing system was installed at the site in 2000. The system operated until 2003 and has been decommissioned because oxygen levels in the subsurface are high enough to support degradation of the residual contamination without operation of the bioventing system (Parsons, 2003).

The 300-foot radius of influence for the SVE well at PRL T-044 extends into the southern portion of AOC G-2 and the western edge of the Wherry housing area (see Figure B-1b). However, based on data collected during 2007 when the SVE system was in rebound, VOCs in shallow soil gas at the southern end of AOC G-2 only slightly exceed unrestricted use screening levels. In soil gas samples collected during the pre-decision sampling effort in 2007, concentrations

reported for 1,1,2,2-tetrachloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, hexane, m,p-xylene, methylene chloride, n-propylbenzene, o-xylene, and PCE within the berm exceed unrestricted use screening levels. Concentrations of 1,1,2,2-tetrachloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, hexane, m,p-xylene, and o-xylene also exceed industrial use screening levels. Benzene was the only VOC detected in soil gas samples collected outside the bermed area at concentrations exceeding a screening level.

The estimated cancer risk is 5×10^{-3} for the residential scenario, and the noncarcinogenic risk is 400. For the industrial scenario, the estimated cancer risk is 3×10^{-4} and the noncarcinogenic risk is 30. The primary drivers for the carcinogenic risk are 1,1,2,2-tetrachloroethane and ethylbenzene. Fuel-related VOCs are the primary contributors to the noncarcinogenic risk. For additional information, see Appendix B, Section 1.
A remedy has been selected in this ROD to address the threat to human health, surface water, and groundwater quality from the commingled TPH contamination at the location of the former AST. The fuel contamination will be excavated for offsite disposal, and institutional controls will be applied to reduce the threat to human health associated with the residual contamination by prohibiting residential use. In addition, to address the human health risk from shallow gas a deed covenant will require additional sampling or mitigation for any future construction.

2.4.2.2 AOC H-1

AOC H-1 is located in the northeast portion of OU H and is within the East McClellan District. The site served as the Base Exchange service station since 1957. Prior to 1957, the site was a wetland and open area until 1953, when the site was used for aircraft parking. AOC H-1 includes Building 900, gas pump islands, and asphalt-covered parking areas. Areas surrounding Building 900 on all sides are paved. By 1991, all USTs were removed and replaced or abandoned in place. Excavation of contaminated soil was also performed. The RWQCB has concluded that no further action is required for these USTs (RWQCB, 2005). AOC H-1 continues to be used as a gas station and mini-market. The anticipated land use for AOC H-1 is commercial/industrial or community support purposes.

Detected contaminants at the site include SVOCs, PCBs, TPH-D, TPH-G, and metals. SVOC concentrations do not exceed screening levels. Two PCBs were detected at concentrations below the screening level for the protection of human health in a single sample. No PCBs were detected in a field duplicate sample. Metals concentrations did not exceed the screening levels for unrestricted use. However, slightly elevated levels of TPH-G and TPH-D were reported subsequent to excavation of 2,800 cubic yards of the most contaminated soil.

The estimated risk associated with metals and SVOCs in soil is 3×10^{-7} for the future adult resident. The noncarcinogenic hazard index is greater than 1 because of vanadium concentrations in soil; however, there are no known sources of vanadium present at the site, and the risk associated with vanadium may be representative of background. For additional information, see Appendix B, Section 2. No further action for soils is selected for this site.

2.4.2.3 AOC H-2

AOC H-2 is located in the northern portion of OU H, within the proposed Core Aviation/ Industrial District. The site served as an aircraft revetment, where high soil berms protected aircraft from enemy ground attack or aircraft. The site has been redeveloped and is now overlain by a parking lot adjacent to industrial buildings (Buildings 237 and 241) occupied by Northrop Grumman. Aerial photographs indicate that the revetments were in place from before 1946 and were removed before 1953, when they had been replaced by an unpaved parking area for aircraft. The anticipated land use for AOC H-2 is industrial.

Metals, TPH-D, and SVOCs have been detected at the site. Concentrations of arsenic, barium, cadmium, chromium, and selenium exceed the combined background levels. However, method SW6010, which was used to analyze the metals, is known to produce unreliable data for arsenic and cadmium. Except for one sample in which the arsenic concentration exceeded screening levels, the reported concentrations of all metals were below screening levels. Low levels of TPH-D and SVOCs were detected at the site.

No COCs were identified for this site, and a quantitative risk assessment was not performed. See Appendix B, Section 3 for more information about this site. No further action for soils is selected for this site.

2.4.2.4 AOC H-3

AOC H-3 is located in the northern portion of OU H, within the proposed Core Aviation/ Industrial District. The site was one of several former aircraft revetments. The site has been redeveloped and is currently overlain by a building (Building 237 occupied by Northrop Grumman) and the adjacent parking lot. The anticipated land use for AOC H-3 is commercial/industrial.

Metals, VOCs, and TPH were determined to be present at the site. All samples were collected from one boring; however, samples were collected from various depths. Low concentrations of TPH-D and 1,1-dicholoroethylene (1,1-DCE) were reported. However, TPH was detected in a soil extract only and not in the soil samples, and 1,1-DCE was detected in a sample at approximately 40 feet bgs and not in the sample collected at 20 feet bgs. Concentrations of arsenic, cadmium, and selenium exceed the "combined" background levels. However, method SW6010, which was used to analyze the metals, is known to produce unreliable data for arsenic and cadmium. Except for one sample in which the arsenic concentration exceeded screening levels, the reported concentrations of all metals were below screening levels.

No COCs were identified for this site, and a quantitative risk assessment was not performed. See Appendix B, Section 4 for more information about this site. No further action for soils is selected for this site.

2.4.2.5 AOC H-8

AOC H-8 is located in OU H in the East McClellan District. The site is a former POL storage and loading facility. Currently, the site is mostly covered by Buildings 910 (Base Commissary) and 911 (Base Exchange). The areas surrounding the buildings include asphalt parking lots and a landscaped area (approximately 150 feet long by 80 feet wide) west of Building 911. The area between Buildings 910 and 911 is unpaved soil and gravel. In a 1973

aerial photograph, four horizontal tanks were identified at the POL storage facility. In this photograph, a surface stain is visible. The stain is currently beneath Building 910, approximately 100 feet east of the current southwest corner of the building. By 1984, the POL storage and loading facility was no longer present at the site, and Buildings 910 and 911 and the parking area covered portions of the site (Jacobs, 1998). The anticipated land use for AOC H-8 is commercial/industrial or community support purposes.

Metals, SVOCs, and TPH were determined to be present at the site. The primary contaminants include SVOCs (primarily PAHs) and TPH-D. The most significant contaminant detections were reported in a surface soil sample from a single boring at the location of a former surface stain. Benzo(a)pyrene was detected within the perimeter of the former surface stain and is the only contaminant that exceeds the screening level for protection of human health.

The estimated risk associated with PAHs in soil is 3×10^{-6} and the noncarcinogenic hazard index is less than 1 for the residential scenario. Benzo(a)pyrene was the primary contributor to the estimated risk at the site. For additional information, see Appendix B, Section 5. No further action for soils is selected for this site.

2.4.2.6 AOC H-12

AOC H-12 is located in the east-central portion of OU H within the East McClellan District. It consists of Building 929 and the surrounding area. The site was formerly a maintenance area for weather equipment during the late 1960's through the 1980's. Building 929 has a strip of grass on all sides and is approximately 20 feet east of a lined concrete drainage ditch that drains to Second Creek, a tributary to Don Julio Creek. A concrete pad 30 feet by 15 feet is located approximately 60 feet north of the building. The intended use of this pad is unknown, but the highest concentrations of the VOCs chloroform and naphthalene in shallow soil gas were reported near this pad. Weed control around the drainage ditch, prior to the lining of the ditch in the 1960s, was historically achieved through the application of PCB-laden oil. The waste UST located east of Building 929 was removed in 1987. The RWQCB has concluded that no further action is required for the UST (RWQCB, 2000). Three floor drains were observed in the concrete floor of Building 929 located in the former paint spray booth. AOC H-12 is currently unoccupied. The anticipated land use for AOC H-12 is commercial/industrial or community support purposes.

Former dormitories that have been converted to office space exist approximately 150 feet to the east of AOC H-12 (Buildings 949 and 950). Building 948 was used as offices for the security police forces and was never used as a dormitory. Subsequent to being used as dormitories, the plumbing, lighting, and electrical systems were significantly modified in Buildings 949 and 950 to convert to the new use as office space. The use of these Buildings 948, 949, and 950 is defined in Table 8 of the McClellan Park Special Planning Area Ordinance (Sacramento County, 2002) as administrative offices, and the use of Building 929 is defined as light industrial. As part of the community support subdistrict, residential use of these lots would only be allowed if a conditional use permit was issued.

At AOC H-12, metals, SVOCs (including PCBs), and VOCs have been identified as potential contaminants. While several metals were reported at concentrations exceeding "combined" background levels (barium, cobalt, copper, mercury, and vanadium), mercury was the only

metal to exceed screening levels. Mercury contamination in soil presents a threat to surface water and human health. PCBs were detected in multiple surface soil samples at concentrations exceeding screening levels for protection of surface water and in a single sample at a concentration exceeding the unrestricted use screening level for protection of human health. Mercury and PCB contamination was detected in surface soil near a lined surface water drainage ditch. Sediment samples from the ditch also contained SVOCs, mercury, and a single detection of TPH-D. Because the ditch is lined which allows for regular maintenance activities and some sediment removal, the contaminants detected during the RI are no longer believed to be present. However, PCB and mercury contamination is still present in surface soil, and low-level PCB contamination is present beneath the concrete lined drainage ditch. In samples collected during the pre-decision sampling effort in 2007, nine VOCs were detected at concentrations exceeding unrestricted use screening levels in soil gas samples collected between 5 and 15 feet bgs. Samples were collected from 14 borings, including one boring located beneath the building slab adjacent to three floor drains. Three VOCs, including carbon tetrachloride, chloroform, and naphthalene, had concentrations greater than industrial use screening levels. Two indoor air samples were collected within Building 929, and an ambient air sample was collected just outside the building. Chloroform was detected in all three samples at concentrations greater than industrial use screening levels for indoor air indicating that the chloroform detections may be the result of laboratory contamination. Benzene exceeded industrial use screening levels in one indoor air sample and was not detected in the other.

Several VOCs were reported above screening levels in shallow soil gas samples collected east of AOC H-12, and concentrations of chloroform and naphthalene exceeded industrial screening levels. Because the industrial screening level for chloroform was exceeded in the boring adjacent to Building 948, two indoor air samples and an ambient air sample were collected just outside the building. Chloroform was not detected in any of the samples. PCE was detected in one indoor air sample, but at less than the industrial use screening level. Benzene was detected in all three samples at concentrations slightly greater than industrial use screening level for indoor air, and naphthalene was detected in one indoor air sample and a duplicate at concentrations greater than the industrial use screening level. However, the magnitude of the naphthalene concentrations (nearly equal to the concentration in shallow soil gas at 15 feet bgs) suggests that use of a household pesticide (i.e., ant spray) in the building may have caused the detections in the indoor air samples. Risks were calculated for the hypothetical residential and industrial scenarios. The carcinogenic risk is within or at the upper the end of the CERCLA risk range for all scenarios, but the noncarcinogenic risk estimate exceeded 1 for the residential scenarios and for the construction worker scenario. For additional information, see Appendix B, Section 6. The remedy selected to address the threat to surface water from mercury contamination in soil is excavation and offsite disposal. The remedy selected to address the human health risk from shallow gas is a deed covenant requiring additional sampling or mitigation for any future construction.

2.4.2.7 AOC H-13

AOC H-13 is located in the northeastern corner of OU H and is part of the East McClellan District. The site is bounded by Dudley Boulevard on the east and PRL L-001 on the north. Building 900 (AOC H-1) is located across the street from AOC H-13. The site was formerly

an auto hobby shop in the 1960s and 1970s. Aerial photographs show dark stains on the ground surface at AOC H-13, and no activity at the site previous to 1966. By 1982, the hobby shop had expanded to the south with the addition of a small storage unit or building. By 1989, the automobile hobby shop had been removed and the area had become the parking lot for Buildings 910 and 911 (Base Commissary and Exchange). This remains the current use. During 2004, ground-penetrating radar and magnetic induction surveys were conducted across the entire site to identify any underground objects associated with the former auto hobby shop. No subsurface objects or back-fills were identified by the survey. The anticipated land use for AOC H-13 is commercial/industrial or community support purposes.

Low levels of TPH-D and metals were detected at the site near the location of a former surface stain. The TPH concentrations did not exceed screening levels. Concentrations of arsenic and cadmium exceed the "combined" background levels. However, method SW6010, which was used to analyze the metals, is known to produce unreliable data for arsenic and cadmium. Except for one sample in which the arsenic concentration exceeded screening levels, the reported concentrations of all metals were below screening levels. TCE was detected in soil gas in one boring adjacent to the site at 20 and 40 feet bgs. However the source of TCE is believed to be the adjacent industrial waste line rather than the former auto hobby shop.

TCE was reported in both deep soil gas samples from a boring located at an adjacent site (the IWL, PRL L-001, near the northeast corner of AOC H-13). The likely source of the TCE is the IWL rather than the AOC H-13. The detected concentrations were 1,200 ppbv and 550 J ppbv at 20.8 and 40.8 feet bgs, respectively. No VOCs were detected in soil gas samples collected at 20 feet bgs and deeper in two borings from AOC H-13. No SSG samples were collected at the site. Soil gas samples were also collected at 20 feet bgs from borings located along the IWL approximately 150 feet southeast and 150 feet west of AOC H-13. TCE was detected in soil gas at 810 ppbv from one of the borings, but was not detected in the other. It is likely that the TCE detected in these borings along the IWL originated from the IWL rather than AOC H-13.

No COCs were identified at AOC H-13, therefore a quantitative risk evaluation was not performed. For additional information, see Appendix B, Section 7. No further action for soils is selected for this site.

2.4.2.8 AOC H-14

AOC H-14 is located in the northern portion of OU H and is part of the East McClellan District. The site was a suspected dry impoundment and is approximately 100 feet by 200 feet. Currently, the site consists of a landscaped area and an asphalt parking lot. Based on review of aerial photographs, AOC H-14 was used for aircraft parking in the 1940s and 1950s. By 1964, the area was graded and undeveloped. In the 1970s, the area adjacent to AOC H-14 on the west was used as an unpaved parking lot for automobiles. The parking lot appears to be fully paved in a 1981 photograph. In 1986, the location of the potential dry impoundment was covered by an automobile parking lot (Jacobs, 1998). The anticipated land use for AOC H-14 is commercial/industrial or community support purposes.

The contaminants detected at AOC H-14 are low levels of TPH-D and DEHP in soil, and VOCs in soil gas. While TCE was detected in 1997 at 20 feet bgs during the RI, it was not detected in shallow soil gas samples collected at the site during 2007. In 2007, only toluene was detected. Reported concentrations from all investigations were less than screening levels, and the START evaluation concluded that significant impacts to groundwater are not expected (START 1: Site Evaluations for Applicability of Soil Vapor Extraction, April 2006). Thus, no impacts to human health, surface water, or groundwater are predicted. Therefore, a quantitative risk assessment was not performed. This site was recommended for No Further Investigation for soils in the OU E-H RICS (Jacobs, 1998). For additional information, see Appendix B, Section 8. No action for soils is selected for this site.

2.4.2.9 CS S-049

CS S-049 is located in OU B in the southwest corner of IC 3 within the Core Airfield/ Industrial District. The site was used as a maintenance facility from the late 1970s until the early 1990s. Materials previously handled at the site include pesticides, herbicides, fuels, oils, and solvents. In 1990, a maintenance shed was removed from the site. During the removal, visible surface staining and contamination in surface soils was observed prompting McClellan Environmental Management staff to conduct a site investigation and subsequently excavate 190 cubic yards of contaminated soil. Currently, the site is nearly completely covered with asphalt to support parking for adjacent buildings. The anticipated land use for CS S-049 is commercial/industrial.

TPH-D, pesticides, SVOCs, metals, and VOCs have been identified as potential contaminants. TPH-D (400 milligrams per kilogram [mg/kg]) exceeded the screening level for protection of groundwater in a single sample collected during the 1991 and 1992 RI. For metals, a single detection of vanadium also exceeded the screening level for protection of human health. TCE, PCE, chloroform, and vinyl chloride were reported in screening-level soil gas samples collected at 20 feet bgs at concentrations greater than the unrestricted use screening levels for shallow soil gas, and the maximum concentrations of TCE, PCE, and vinyl chloride exceeded industrial use screening levels. Because confirmation data from the 1990 soil removal cannot be located and the limits of the excavation are unknown, pre-decision non-VOC sampling and analysis were performed during 2007. Isolated detections of dieldrin, benzo(a)pyrene, and dibenzo(a,h)anthracene exceeded unrestricted use screening levels for protection of human health, and isolated detections of copper, dieldrin, DDE, and DDT in surface soil exceeded the screening level for the protection of surface water.

The estimated cancer risk is within the CERCLA risk range for the residential scenario, and the noncarcinogenic hazard index is 2. Benzo(a)pyrene, dieldrin, and arsenic through the homegrown produce pathway are the carcinogenic risk drivers. The main contributors to the hazard indices are methylchlorophenoxyacetic acid (MCPA), 2-(2-methyl-4-chlorophenoxy)propionic acid (MCPP) and vanadium through the homegrown produce pathway. For additional information, see Appendix B, Section 9. A remedy has been selected in this ROD to address non-VOCs in shallow soil by prohibiting residential use. The remedy selected to address the human health risk from shallow gas is a deed covenant requiring additional sampling or mitigation for any future construction.

2.4.2.10 PRL S-047

PRL S-047 is located in the northeastern portion of OU H within the East McClellan District. The site consists of a portion of Building 943 (boiler room), an adjacent automobile parking area, a former boiler drainage trench (located beneath the automobile parking area), and a former storage area. The boiler was used as a backup heating source for Building 943. The waste stream from the boiler and surface runoff from the area surrounding Building 943 was discharged into the boiler drainage trench. It is unclear if the trench was lined. Approximately 300 cubic yards of contaminated soil were excavated from the trench during four field efforts between 1987 and 1990; however, specific details regarding the excavation boundaries and analytical results are not available. The location of a fuel tank that supplied the boiler is unknown. There is no record of a UST at the site. The site is currently unoccupied awaiting reuse by a future tenant through a lease arrangement with McClellan Park. The anticipated land use for PRL S-047 is commercial or community support purposes.

The primary contaminants identified during the RI at PRL S-047 are SVOCs and VOCs. Trace levels of phthalates were reported in soil at concentrations below screening levels. TPH was detected in a soil extract only and not in the soil samples. Low levels of VOCs were reported in shallow soil gas and higher levels were reported at 20 feet bgs. In addition, several metals (arsenic, mercury, and thallium) were reported in excavation samples at concentrations greater than background. However, it is unknown if the results are confirmation or waste classification samples.

A human health risk assessment was performed using data collected during the RI. The estimated noncarcinogenic risk associated with soil and soil gas was less than 1 for the residential scenario. N-hexane was the sole contributor to the estimated risk at the site. For additional information, see Appendix B, Section 10. No further action for soils is selected for this site.

2.4.2.11 SA 010

SA 010 is located in OU B in the northeast corner of IC 3 within the proposed Core Airfield/ Industrial District. The site is the location of Building 688 and Building 689. Entomology activities have occurred at the buildings since the early 1980s during which time herbicides, pesticides, and various solvents were stored in Building 688. A sump connected to the east side of Building 688 collected wastewater from the building and the adjacent washrack. Wastewater was periodically pumped from the sump for disposal; however, it is unknown if Building 688 and the sump were connected to the base IWL. The site and surrounding areas are covered with asphalt. The site is currently occupied by a private company with a similar pesticide operation. The anticipated land use for SA 010 is commercial/industrial.

At SA 010, metals and VOCs were the primary contaminants. Concentrations of arsenic, cadmium, and vanadium exceeded combined background concentrations. Arsenic analyzed by Method 7060 was the only metal to exceed screening levels for the protection of human health and the environment. Arsenic concentrations also exceeded industrial cleanup levels. The elevated detection was adjacent to a former sump. Because only screening-level shallow soil gas samples have been collected at the site there is some uncertainty regarding the magnitude of shallow soil gas contamination at the site.

Risks associated with metals contamination were estimated for the hypothetical residential and industrial scenarios. The carcinogenic risk for soil (1×10^{-4}) was at the upper end of the CERCLA risk range and the noncarcinogenic risk estimate exceeded 1 for the residential scenario. For the industrial scenario, the carcinogenic risk (7×10^{-6}) was also at the lower end of the CERCLA risk range. Arsenic is the primary risk driver at the site. For additional information, see Appendix B, Section 11. The remedy selected to address the potential human health risk from shallow gas is a deed covenant requiring additional sampling or mitigation for any future construction.

2.4.2.12 SA 015

SA 015 is located in the northwestern portion of OU B west of IC 2 within the proposed Core Aviation/Industrial District. The site includes the northern section of paved Storage Lot 10 (about 2.5 acres total). SA 015 has been used predominantly for aircraft parking and as a storage yard supporting aircraft maintenance activities, including warehousing spare parts for battle damage repair and hazardous materials. A fire occurred at the storage lot in 1970. Currently, the site is vacant. The anticipated land use for SA 015 is commercial/industrial.

At SA 015, metals, TPH, and VOCs have been identified as potential contaminants. Eight metals were reported at concentrations exceeding the combined background levels. Only the thallium concentration exceeded screening levels for protection of human health for the unrestricted use scenario. However, the elevated detection was measured using analytical method SW6010 which is known to produce unreliable results for thallium. TPH-D was only detected in one shallow soil sample; however, it did not exceed the screening level for the protection of groundwater and surface water. Because the integrity of the asphalt was reportedly not compromised, no soil samples were collected within the area impacted by the 1970 fire or beneath the asphalt. Several chlorinated and petroleum-related VOCs were detected in the screening shallow soil gas samples at concentrations exceeding the unrestricted use screening levels. However, the extent of VOCs in shallow soil gas is uncertain due to the lack of definitive soil gas data from 0 to 15 feet bgs. Vinyl chloride, TCE, and PCE were reported at 20 feet bgs at a concentration above the unrestricted use screening level for the 0- to 15-foot interval, indicating that a shallow VOC source may be present at the site.

Because of these uncertainties in the site characterization, a quantitative human health risk assessment was not performed. For additional information, see Appendix B, Section 12. The remedy selected to address the potential human health risk from shallow gas is a deed covenant requiring additional sampling or mitigation for any future construction.

A scoping level/Tier 1 evaluation of ecological risk was performed for SA 015 because of the proximity of the site to vernal pools. The risks were found to be negligible and no further ecological investigation was recommended.

2.4.2.13 SA 019

SA 019 is located in OU B in the center of IC 3 within the proposed Core Airfield/Industrial District. The site was the location of a paint spray booth (Temporary Building 690). Potential materials handled at the site were acetone, solvents, and paints. Currently, the site is inactive and covered by asphalt. The anticipated land use for SA 019 is commercial/ industrial.

Metals and VOCs have been identified as potential contaminants. Single detections of sodium and vanadium exceeded "combined" background levels. However, there is no known source of vanadium at the site and sodium is considered an essential nutrient. Therefore, neither detection is indicative of significant contamination. Low levels of chlorinated VOCs were detected in soil gas samples collected at approximately 20 feet bgs. Chloroform, PCE, and TCE exceeded the unrestricted use screening levels in the samples collected at 20 feet bgs. However, the extent of VOCs in shallow soil gas is uncertain because only screening-level shallow soil gas samples have been collected.

Because of these uncertainties in the site characterization, a quantitative human health risk assessment was not performed. For additional information, see Appendix B, Section 13. The remedy selected to address the potential human health risk from shallow gas is a deed covenant requiring additional sampling or mitigation for any future construction.

2.4.2.14 SA 105

SA 105 is located in the southwestern portion of OU A within IC 40 and resides in the South McClellan District. SA 105 consists of Building 642 and its surrounding lawn, parking lots and streets. A concrete pad, located on the east side of the building, is used as an air conditioner base and a storage area for a 55-gallon drum that contains water treatment chemicals for the air conditioner. Building 642 is not connected to an industrial waste line, but an industrial waste line running north and south is located approximately 150 feet to the west of the building (PRL L-005F). Soil gas samples collected near an identified offset industrial waste line joint detected elevated levels of VOCs, suggesting leaks in the Industrial waste line or sewer lines may have impacted soils around Building 642. Building 642 was an environmental health laboratory and is currently leased for administrative offices. The anticipated land use for SA 105 is commercial/industrial.

At SA 105, metals and VOCs have been identified as potential contaminants. Concentrations of cadmium, copper, mercury, and thallium exceeded combined background levels; however, all metals were below screening levels for the protection of human health and the environment. Arsenic concentrations analyzed by Method 6010 were elevated; however, duplicate samples analyzed by Method 7060 were less than combined background.

In 1993, VOCs were detected in three shallow soil gas samples, and concentrations of carbon tetrachloride, chloroform, and PCE exceeded industrial screening levels for protection of human health. However, in 2001, three shallow soil gas samples were collected in one boring adjacent to the 1993 VOC detection and no VOCs were detected. This contamination was likely remediated by the IC 1 SVE system which has operated since 1995. The nearest SVE wells are located in the southern portion of IC 1 approximately 450 feet from SA 105; these wells operated until 1999 and appear to have remediated soil gas at SA 105 and other sites located to the east. The large radius of influence is attributable to the fact that the IC 1 system was a very large system with a high extraction rate (over 600 SCFM) when all of the extraction wells were operating.

Risks associated with VOC contamination were calculated for the hypothetical residential and industrial scenarios using the 2001 data. No carcinogenic COCs were identified for the site. The estimated noncarcinogenic hazard index was less than 1 for both scenarios. For additional information, see Appendix B, Section 14. Because of the detections of VOCs in

1993, this site is included in the detailed analysis in the LRA IP FS #2. However, because the VOCs were not confirmed in the 2001 data, no further action is selected for this site.

2.4.2.15 Tank 783

Tank 783 was a former 1,000-gallon underground wastewater/waste fuel tank. It was located in the southwest portion of OU C in a parking lot near Building 783. The tank was installed in 1957 and removed in 1989. The tank reportedly received wastewater from Building 783 in support of a waterfall paint booth and was later used for waste petroleum, oil, and lubricant material when the waterfall paint booth operation was relocated to Building 650. The anticipated land use for Tank 783 is commercial/industrial.

Confirmation samples were collected after the tank was removed and from one RI boring in 1997. Only low levels of total recoverable hydrocarbons were detected. These data suggest that the tank did not leak. In July 1997, the RWQCB declared, based on available information, that no additional action was warranted at Tank 783.

A baseline human health risk assessment was not completed for the Tank 783 site because no contaminants were detected during the RI. For additional information, see Appendix B, Section 15. No further action for soils is selected for this site.

2.4.2.16 Tank 788

Tank 788 is an underground concrete vault that contains two separate tanks for acid neutralization and pH adjustment. It is located in the western portion of OU C in a parking lot adjacent to the southwest corner of Building 788. The system was installed in the late 1980s and neutralized rinse water received from lead-acid battery wash operations. After neutralization, the rinse water was discharged to the sanitary sewer. Discharging was terminated if the pH fell outside the range of 7 to 9.5. The system was operational until the late 1990s. Tank 788 remains in place at the site, but has been decommissioned (i.e., tanks cleaned, wastes disposed, and lines plugged). The Tank 788 site is fully paved and is located between Building 788 and Bays M and N of Building 783. The anticipated land use for Tank 788 is commercial/industrial.

The potential contaminants are metals and VOCs. Results of the RI reported no detectable soil or soil gas contamination in the Tank 788 area exceeding screening levels. Metals were detected within the range of background concentrations. Soil pH was found to be neutral, and no VOCs were detected. In July 1997, the RWQCB declared, based on available information, that no additional action was warranted at the Tank 788 site.

A baseline human health risk assessment was not completed for the Tank 788 site because no COCs were identified. For additional information, see Appendix B, Section 16. No further action for soils is selected for this site.

2.4.3 Summary of Potential Impacts to Groundwater and Surface Water

Potential impacts to water quality have been identified at three sites: AOC G-2, AOC H-12, and CS S-049. Cleanup levels used to determine the impacts to water quality are provided in Section 2.5 of this ROD.

At AOC G-2, concentrations of the non-VOC COCs, TPH-G and TPH-D, in soil exceed the cleanup level for the protection of surface water and groundwater. In addition, contaminated soil with concentrations in excess of cleanup levels protective of surface water and groundwater will also be excavated. Therefore, impacts to surface water and groundwater are possible.

At AOC H-12, concentrations of the non-VOC COCs, PCB-1260 and mercury, in soil exceed the cleanup level for the protection of surface water. Therefore, impacts to surface water are possible. However, the maximum concentrations of PCB-1260 and mercury do not exceed the cleanup goal for the protection of groundwater. Thus, there were no potential impacts to groundwater identified at this site.

At CS S-049, isolated detections of contaminants were reported above screening levels for protection of groundwater (TPH-D) and surface water (copper, dieldrin, DDT, and DDE). However, the maximum reported concentration of TPH-D (400 mg/kg) was less than the cleanup level of 3,900 mg/kg for protection of groundwater (see Section 2.5). In addition, TPH-D was not detected above screening levels in the TPH-D analyses that were performed on the other 57 soil samples collected at the site. Therefore, impacts to groundwater are not expected. Reported concentrations of dieldrin, DDT, and DDE exceeded screening levels for protection of surface water in two samples for each contaminant (and not the same two samples for each contaminant, see Appendix D). However, in each case that a field duplicate samples was also collected, the reported concentrations in field duplicate samples were less than screening levels. In addition, these contaminants were not detected above screening levels in the other 23 analyses that were performed on soil samples collected at the site. A single reported concentration of copper exceeded background and the screening level for protection of surface water. However, the detection was bound vertically and laterally, and copper was not detected above background in the other 47 samples analyzed for metals at the site. Therefore, impacts to surface water are not expected at CS S-049.

2.5 Remedial Action Objectives

RAOs for McClellan define the extent to which the sites will require cleanup to meet the objectives of protecting human health and the environment. These RAOs reflect the COC, exposure routes and receptors, and acceptable contaminant concentrations or range of concentrations for contaminants in soil and soil gas. The RAOs are as follows:

- Protect human health from exposure to contaminants in soil and soil gas with a total excess cancer risk greater than the CERCLA risk range (10^{-6} to 10^{-4}). This RAO will be attained if the concentration of each contaminant is less than or equal to the cleanup levels presented in this section for the current and anticipated future land use.
- Prevent impacts from non-VOCs to surface water and groundwater quality.

For PRL S-014, these RAOs will be attained by implementing institutional controls to prohibit unrestricted use (as described in Section 2.9.2.1). The boundary for the institutional controls encompasses an area that includes all sampling locations with detected concentrations that exceed the institutional control compliance levels for unrestricted use shown in Table 2-2 (see Figure A-1 in Appendix A). Soil with contaminant concentrations greater than the institutional control compliance levels is not suitable for unrestricted use.

TABLE 2-2
Shallow Soil Gas Institutional Control Compliance Levels
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, California

Contaminants of Concern	Compliance Level (ppbv)	Depth Interval (feet bgs)	Basis for Compliance Level
Unrestricted Use			
Benzene	9.9	0 to 15	Protection of human health*
Carbon tetrachloride	2.6	0 to 15	Protection of human health*
Chloroform	2.2	0 to 15	Protection of human health*
1,4-Dichlorobenzene	3.5	0 to 15	Protection of human health*
1,1-Dichloroethane	38	0 to 15	Protection of human health*
1,2-Dichloroethane	2.3	0 to 15	Protection of human health*
Ethylbenzene	23,000	0 to 15	Protection of human health*
Hexane	20,000	0 to 15	Protection of human health*
Methylene chloride	150	0 to 15	Protection of human health*
Naphthalene	57	0 to 15	Protection of human health*
n-Propylbenzene	2,800	0 to 15	Protection of human health*
1,1,2,2-Tetrachloroethane	0.61	0 to 15	Protection of human health*
Tetrachloroethene	5.8	0 to 15	Protection of human health*
Trichloroethene	23	0 to 15	Protection of human health*
1,2,4-Trimethylbenzene	120	0 to 15	Protection of human health*
1,3,5-Trimethylbenzene	120	0 to 15	Protection of human health*
m,p-Xylene	2,300	0 to 15	Protection of human health*
o-Xylene	2,300	0 to 15	Protection of human health*
Vinyl chloride	11	0 to 15	Protection of human health*

* Values for protection of human health for VOCs are equivalent to the lesser of the carcinogenic risk of 1E-06 or an HQ of 1 for each contaminant for exposure to soil gas through indoor air inhalation for the specified scenario.

For sites SA 010, SA 015, and SA 019, the RAOs will be attained by an institutional control (in this instance a deed covenant as described in Section 2.9.2.2) to address potential VOC contamination in shallow soil gas. The deed covenant will require mitigation measures for vapor intrusion or additional sampling to demonstrate an acceptable risk for any future construction. The boundary for the institutional control encompasses the sites and a sufficient buffer surrounding the sites to include all site-related locations with detected VOC concentrations that exceed the institutional control compliance levels provided in Table 2-2 for unrestricted use (see Figures B-11, B-12, and B-13). The resulting land use is industrial or restricted residential; however, the sites are planned for industrial use.

For site CS S-049, the RAOs will be attained by an institutional control prohibiting residential use (as described in Section 2.9.2.1) and a deed covenant to address potential VOC contamination in shallow soil gas (as described in Section 2.9.2.2). The boundary for the prohibition against residential use encompasses an area that includes all sampling locations with detected concentrations that exceed the non-VOC institutional control compliance levels for unrestricted use shown in Table 2-3 (see Figure B-9 in Appendix B). Soil with contaminant concentrations greater than the institutional control compliance levels is not suitable for unrestricted use. The boundary for the deed covenant addressing potential shallow soil gas contamination encompasses the site and a sufficient buffer surrounding the site to include all site-related locations with detected VOC concentrations that exceed the institutional control compliance levels provided in Table 2-2 for unrestricted use (see Figure B-9 in Appendix B). As explained in Section 2.4.3, impacts to groundwater or surface water are not likely to occur at this site.

For AOC G-2, these RAOs will be attained by excavating non-VOC contaminated soil with concentrations greater than acceptable for industrial land use (as described in Section 2.9.2.4) or in excess of cleanup levels for protection of surface water and groundwater. The cleanup levels for the excavation are provided in Table 2-4 (see Figure B-1 for the extent of excavation). In addition, institutional controls will be applied to prohibit unrestricted use, and a deed covenant will require mitigation measures for vapor intrusion or additional sampling to demonstrate an acceptable risk for any future construction. The boundary for the prohibition against residential use encompasses an area that includes all sampling locations with detected concentrations that exceed the non-VOC institutional control compliance levels for unrestricted use shown in Table 2-3 (see Figure B-1 in Appendix B). Soil with contaminant concentrations greater than the institutional control compliance levels is not suitable for unrestricted use. The boundary for the deed covenant addressing potential shallow soil gas contamination encompasses the site and a sufficient buffer surrounding the site to include all site-related locations with detected VOC concentrations that exceed the institutional control compliance levels provided in Table 2-2 for unrestricted use (see Figure B-1 in Appendix B).The resulting land use is industrial.

For site AOC H-12, these RAOs will be attained by excavating surface soil (0 to 1 foot bgs) contaminated with non-VOCs at concentrations that may impact surface water. In addition, if contaminants are present at depths greater than 1 foot bgs, the contaminants will be excavated to levels suitable for unrestricted use. The cleanup levels for non-VOCs at AOC H-12 are provided in Table 2-5 (see Figure B-6 for the excavation volume). In addition, to address VOC contamination, an institutional control will be implemented at AOC H-12 to require a deed covenant. The deed covenant will require mitigation measures for vapor intrusion or additional sampling to demonstrate an acceptable risk for any future construction. The boundary for the institutional control encompasses an area that includes all sampling locations with detected VOC concentrations that exceed the institutional control compliance levels for unrestricted use provided in Table 2-2 (see Figure B-6). The resulting land use is industrial or restricted residential.

TABLE 2-3
Non-VOCs in Soil Institutional Control Compliance Levels
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, California

Contaminants of Concern	Compliance Level (mg/kg)	Depth Interval (feet bgs)	Basis for Compliance Level
Unrestricted Use			
2,4-DB	23	0 to 15	Protection of human health*
2,4-Dinitrophenol	0.52	0 to 15	Protection of human health*
2-Methylnaphthalene	16	0 to 15	Protection of human health*
Acenaphthene	290	0 to 15	Protection of human health*
alpha-Chlordane	0.11	0 to 15	Protection of human health*
Aluminum	35,000	0 to 15	Protection of human health*
Anthracene	2,400	0 to 15	Protection of human health*
Arsenic	6.5	0 to 15	Background in shallow soil
Benzo(a)anthracene	0.088	0 to 15	Protection of human health*
Benzo(a)pyrene	0.017	0 to 15	Protection of human health*
Benzo(b)fluoranthene	0.11	0 to 15	Protection of human health*
Benzo(g,h,i)perylene	750	0 to 15	Protection of human health*
Benzo(k)fluoranthene	0.11	0 to 15	Protection of human health*
Benzoic acid	1,400	0 to 15	Protection of human health*
Beryllium	69	0 to 15	Protection of human health*
bis(2-ethylhexyl)phthalate	12	0 to 15	Protection of human health*
Cadmium	6.2	0 to 15	Protection of human health*
Chromium, total	2,600	0 to 15	Protection of human health*
Chrysene	0.88	0 to 15	Protection of human health*
Copper	1,400	0 to 15	Protection of human health*
delta-BHC	1.8	0 to 15	Protection of human health*
Dibenzo(a,h)anthracene	0.038	0 to 15	Protection of human health*
Dieldrin	0.0058	0 to 15	Protection of human health*
Dinoseb	3	0 to 15	Protection of human health*
Fluoranthene	490	0 to 15	Protection of human health*
Fluorene	240	0 to 15	Protection of human health*
gamma-BHC(Lindane)	0.016	0 to 15	Protection of human health*
gamma-Chlordane	0.43	0 to 15	Protection of human health*
Heptachlorepoxide	0.0076	0 to 15	Protection of human health*
Indeno(1,2,3-c,d)pyrene	0.12	0 to 15	Protection of human health*
MCPA	1	0 to 15	Protection of human health*
MCPP	1.7	0 to 15	Protection of human health*
Nickel	430	0 to 15	Protection of human health*
p,p'-DDD	0.5	0 to 15	Protection of human health*
p,p'-DDE	0.49	0 to 15	Protection of human health*
p,p'-DDT	0.47	0 to 15	Protection of human health*
Phenanthrene	270	0 to 15	Protection of human health*
Pyrene	350	0 to 15	Protection of human health*
Selenium	110	0 to 15	Protection of human health*
TPH-D	100	0 to 15	Protection of human health
TPH-G	10	0 to 15	Protection of human health
Vanadium	80.5	0 to 15	Background in shallow soil

* Values for protection of human health for non-VOCs are equivalent to the lesser of the carcinogenic risk of 1E-06 or an HQ of 1 for each contaminant for exposure to soil through direct contact, inhalation, and ingestion for the residential scenario.

TABLE 2-4
Cleanup Levels at AOC G-2 – Industrial Land Use
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, California

Contaminants of Concern	Cleanup Level (mg/kg)	Depth Interval (feet bgs)	Basis for Cleanup Level
TPH-D	3,900	1 to 30	Protection of groundwater
TPH-D	3,190	0 to 1	Protection of surface water
TPH-G	220	1 to 30	Protection of groundwater
TPH-G	160	0 to 1	Protection of surface water
Benzo(a)anthracene	0.14	0 to 1	Protection of surface water
Benzo(a)anthracene	0.88	1 to 15	Protection of human health*
Benzo(a)pyrene	0.14	0 to 15	Protection of human health* and surface water
Benzo(b)fluoranthene	0.14	0 to 1	Protection of surface water
Benzo(b)fluoranthene	0.88	1 to 15	Protection of human health*
Benzo(k)fluoranthene	0.14	0 to 1	Protection of surface water
Benzo(k)fluoranthene	0.88	1 to 15	Protection of human health*
Dibenzo(a,h)anthracene	0.14	0 to 1	Protection of surface water
Dibenzo(a,h)anthracene	0.26	1 to 15	Protection of human health*
Indeno(1,2,3-c,d)pyrene	0.14	0 to 1	Protection of surface water
Indeno(1,2,3-c,d)pyrene	0.88	1 to 15	Protection of human health*
Naphthalene	5.1	0 to 15	Protection of human health*

* Values for protection of human health for non-VOCs are equivalent to the lesser of the carcinogenic risk of 1E-06 or an HQ of 1 for each contaminant for exposure to soil through direct contact, inhalation, and ingestion for the industrial scenario.

TABLE 2-5
Cleanup Levels at AOC H-12 for Protection of Surface Water
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, California

Contaminants of Concern	Cleanup Level (mg/kg)	Depth Interval (feet bgs)	Basis for Cleanup Level
Mercury	6.6	1 to 15	Protection of human health*
Mercury	1.6	0 to 1	Protection of surface water
PCBs (-1254 and -1260)	0.063	1 to 15	Protection of human health*
PCBs (-1254 and -1260)	0.025	0 to 1	Protection of surface water (ecological receptors)

* Values for protection of human health for non-VOCs are equivalent to the lesser of the carcinogenic risk of 1E-06 or an HQ of 1 for each contaminant for exposure to soil through direct contact, inhalation, and ingestion for the unrestricted use scenario.

The institutional control compliance levels and cleanup levels for protection of human health are risk-based concentrations that correspond to the lesser of the 1×10^{-6} carcinogenic risk or a noncarcinogenic HQ of 1 for the indicated scenario (unrestricted or industrial). With the exception of the value for PCBs, the cleanup levels for protection of surface water and groundwater in Tables 2-4 and 2-5 are soil concentrations that were calculated using surface water and vadose zone models, respectively. The value for PCBs in Table 2-5 is protective of ecological health in a drainage feature (Work Plan for Interim Remedial Action at OU B1 Drainage Ditch, Weston, October 2001).

2.6 Description of Alternatives

Representative process options were screened and assembled into eight remedial alternatives that address a broad range of site conditions and non-VOC contaminants in soil and VOCs in shallow soil gas at the sites within the Initial Parcel. The assembled alternatives include the following:

- Alternative 1 – No Action (Unrestricted Land Use)
- Alternative 2 – Institutional Controls to Prohibit Residential Use (Restricted Land Use)
- Alternative 3 – Vapor Intrusion Remedy (Restricted Land Use)
- Alternative 4U – Excavation and Offsite Disposal (Unrestricted Land Use)
- Alternative 4R – Excavation and Offsite Disposal with Institutional Controls to Prohibit Residential Use (Restricted Land Use)
- Alternative 5U – Bioventing (Unrestricted Land Use)
- Alternative 5R – Bioventing (Restricted Land Use)
- Alternative 6U – SVE (Unrestricted Land Use)
- Alternative 6R – SVE (Restricted Land Use)
- Alternative 7 – Multilayer Cap (Restricted Land Use)
- Alternative 8 – Excavation/Corrective Action Management Unit (CAMU) (Restricted Land Use)

Alternatives 7 and 8 were screened out prior to the detailed analysis of alternatives in the Initial Parcel FS #2. These alternatives were screened out because each has a moderate to high capital cost. Additionally, Alternatives 7 and 8 would require long-term institutional controls to ensure that the cap or cover remains protective. Any future land use at the CAMU or capped areas would be permanently restricted to activities that would not damage the cover or cap and create exposure pathways.

Alternatives 5U and 5R are appropriate for sites contaminated with only fuel-related contaminants. Sites with only fuel-related contaminants are handled under State requirements. Under CERCLA, the No Action alternative would be considered for these sites.

2.6.1 Alternative 1 – No Action (Unrestricted Land Use)

In accordance with the NCP, the No Action alternative was evaluated for all sites to establish a basis for comparison with other alternatives. No remedial activities will take place under this alternative; therefore, contamination is not reduced. Under this alternative, the Air Force would take no further action to address soil contamination problems or to minimize further contaminant releases from the sites. Any reduction in contaminant concentrations would be a result of natural degradation.

2.6.2 Alternative 2 – Institutional Controls to Prohibit Residential Use (Restricted Land Use)

Under Alternative 2, institutional controls would be implemented to eliminate or limit exposure pathways to human receptors through non-engineering methods. Alternative 2 results in restricted land use by prohibiting residential use or other similar uses. After Alternative 2 is implemented, excavation and other site work could be allowed if environmental and worker safety control measures were implemented. Alternative 2 is potentially applicable at all sites where the risks are acceptable under the industrial use scenario. The sites for which Alternative 2 was evaluated are AOC G-2, AOC H-12, CS S-049, PRL S-014, SA 010, SA 015, and SA 019.

Under Alternative 2, institutional controls will be limited to the areas affected by contaminant concentrations exceeding the unrestricted use screening levels provided in Appendix C. A buffer may be necessary at sites with VOC contamination in shallow soil gas because VOCs may be somewhat mobile in the subsurface. Determination of a suitable buffer for sites with institutional controls will be made by extending the institutional control boundaries to encompass an area that includes all sampling locations with detected concentrations that exceed unrestricted use screening levels. In addition, the operational history of the site will be considered to ensure that the boundary of the institutional controls is sufficiently large. The smallest area over which institutional controls will be applied is approximately 2,500 square feet.

2.6.2.1 Implementation of Institutional Controls

The institutional control alternative includes enforceable use restrictions in the form of institutional controls on the use of certain properties. Specific language is included in this ROD describing the responsibility of the Air Force for implementing, monitoring, reporting on, and enforcing the institutional controls. Although the Air Force is transferring responsibilities to the transferee and its successors by provisions to be included in the deed(s) transferring title to the property and may contractually arrange for third parties to perform any and all of the actions associated with the institutional controls, the Air Force is ultimately responsible for the remedy (including institutional controls) before and after property transfer. The Air Force will exercise this responsibility in accordance with CERCLA and the NCP. Therefore, compliance with the terms of this ROD will be protective of human health and the environment. Because the restrictions are specifically described below and the means for implementing the restrictions are detailed herein, it is not necessary for the Air Force to submit any new post-ROD, institutional control implementation documents, such as a Land Use Control Implementation Plan, new operation and maintenance plans, or remedial action work plan.

Meeting the RAOs shall be the primary and fundamental indicator of institutional control performance, the ultimate aim of which is to protect human health and the environment. Performance measures for the institutional controls are the RAOs plus the actions necessary to achieve those objectives. It is anticipated that successful implementation, operation, maintenance, and completion of these measures will achieve protection of human health and the environment and compliance with all legal requirements.

The Air Force may contractually arrange for third parties to perform any and all of the actions associated with the institutional controls, although the Air Force is ultimately responsible under CERCLA for the successful implementation of institutional controls, including monitoring, maintenance, and review of the institutional controls. Maintenance, monitoring, and other controls as established in accordance with the ROD and the appropriate transfer documents will be continued until the institutional controls are no longer necessary. Institutional controls shall be maintained until the concentration of hazardous substances in the soil and groundwater are at such levels as to allow for unrestricted use and exposure.

The sites for which institutional controls are being selected are currently leased by the Air Force. During the time between the adoption of this ROD and deeding of the property, equivalent restrictions will be implemented pursuant to the terms of the existing lease which requires the approval of the Air Force for any construction or soil disturbance activity. The lease restrictions are in place and operational and will remain in place until the property is transferred by deed. At the time of deed transfer, lease restrictions will be superseded by equivalent use restrictions to be included in the federal deed and the SLUC as described in this ROD.

Deed Restriction and Reservation of Access. The Federal deed(s) for any property including [the site] will include a description of the residual contamination on the property, consistent with the Air Force's obligations under CERCLA section 120(h) and the specific restrictions set forth in this Section. The Federal deeds may require additional specific restrictions from RODs addressing other residual contamination on the property. Institutional controls, in the form of deed restrictions, are "environmental restrictions" under California Civil Code Section 1471 (Section 1471). The deeds will include legal description of the property to which the institutional controls apply and will contain the provisions required by Section 1471 to qualify the institutional controls as "environmental restrictions" so that they run with the land.

The Air Force and regulatory agencies may conduct inspections of the institutional controls and the affected property. The deeds or associated transaction documents will also contain a reservation of access to the property for the Air Force, the EPA, and the State of California, and their respective officials, agents, employees, contractors, and subcontractors for purposes consistent with the Air Force Installation Restoration Program or the Federal Facilities Agreement. The Air Force will provide such access to regulatory agencies prior to transfer.

The environmental restrictions are the basis for part of the CERCLA 120(h)(3) covenant that the United States is required to include in the deed for any property that has had hazardous substances stored for one year or more or known to have been released or disposed of on the property.

For any deed (non-Federal entity) or letter of transfer (Federal entity) transferring all or part of any parcel including [the sites], institutional controls, in the form of land use restrictions, will be incorporated in the deed as a grantee covenant, in substantially the following language:

- Grantee covenants and agrees that it will not use the Site for residential purposes, hospitals for human care, public or private schools for persons under 18 years of age, or day-care centers for children.

Notice of Institutional Controls. The Air Force will include the specific deed restriction language set forth in this ROD in the deed for any parcel including [the site], and will provide a copy of the deed or other transfer documentation containing the use restrictions to the regulatory agencies as soon as practicable after transfer of fee title. The Air Force will inform the property owner(s) of the necessary institutional controls in the draft deed. The signed deed and/or transfer document(s) legally binding between the Air Force and the transferee will include the specific land use restrictions as well as a condition that the transferee execute and record an SLUC, within 10 days of transfer, to address any State obligations pursuant to State law, including 22 CCR, Section 67391.1. Any letter of transfer (to a federal entity) will include a condition that future deeds to a non-federal entity include this requirement. The Air Force will ensure that the transferee has met this condition. Concurrent with the transfer of fee title from the Air Force to the transferee, the Finding of Suitability for Early Transfer and the location of the Administrative Record file will be communicated in writing to the property owners and to appropriate state and local agencies (with a copy to EPA) with authority regarding any of the activities or entities addressed in the controls to ensure that such agencies can factor the information into their oversight, approval, and decision-making activities regarding the property.

Prior to conveyance of any Air Force property including [the site], EPA and DTSC representatives will be given reasonable opportunity to review and comment on the applicable deed language described in this section and associated rights of entry for purposes of institutional control oversight and enforcement.

The Air Force will provide notice to EPA and DTSC at least six (6) months prior to any transfer or sale of property. If it is not possible for the facility to notify EPA and DTSC at least six months prior to any transfer or sale, then the facility will notify EPA and DTSC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to institutional controls. Additionally, the Air Force further agrees to provide EPA and DTSC with similar notice, within the same time frames, as to federal-to-federal transfers of property.

Annual Evaluations/Monitoring. Prior to property transfer, the Air Force will conduct annual monitoring, provide annual reports describing whether property use has conformed to institutional controls or use restrictions, and undertake prompt action to address activity that is inconsistent with the institutional control objectives or use restrictions, or any action that may interfere with the effectiveness of the institutional controls. The monitoring results will be included in a separate report or as a section of another environmental report, if appropriate,-and provided to the EPA and DTSC. The annual monitoring reports will be used in preparation of the Five Year Review to evaluate the effectiveness of the remedy. Prior to transfer, the annual monitoring report submitted to the regulatory agencies by the

Air Force will evaluate the status of the institutional controls and how any institutional control deficiencies or inconsistent uses have been addressed.

Upon the effective date of property conveyance, the transferee (or other entity accepting such obligations [which may include, without limitation, subsequent transferees] or subsequent property owner(s) will conduct annual physical inspections of property including [the site] to confirm continued compliance with all institutional control objectives unless and until the institutional controls at the site are terminated. The transferee or subsequent property owner(s) will provide to the Air Force, the EPA, and DTSC an annual monitoring report on the status of the institutional controls and how any institutional control deficiency or inconsistent uses have been addressed, whether use restrictions and controls were communicated in the deed(s) for any property transferred in the reporting period, and whether use of the property encompassing the area subject to institutional controls has conformed to such restrictions and controls. The Air Force will place these transferee obligations in the deed or other transfer documentation.

If a transferee fails to provide an annual monitoring report as described above to the Air Force, the Air Force will notify EPA and DTSC as soon as practicable. If EPA or DTSC does not receive the annual monitoring report from the transferee, it will notify the Air Force as soon as practicable. Within 30 days of the report's due date, the Air Force will take steps to determine whether institutional controls are effective and remain in place and advise the regulators of its efforts. In any event, within 90 days of the report's due date, the Air Force shall determine the status of institutional controls and provide its written findings, with supporting evidence sufficient to confirm the reported status, based on the use restrictions/ institutional controls and site conditions, to EPA and DTSC unless either EPA or DTSC, in its sole discretion, acts to confirm the status of the institutional controls independently.

The five-year reviews conducted by the Air Force will also address whether the institutional controls in the ROD were inserted in the deed, if property was transferred during the period covered; whether the owners and State and local agencies were notified of the institutional controls affecting the property, and whether use of the property has conformed to such institutional controls. Five-year reviews will make recommendations on the continuation, modification, or elimination of annual reports and institutional control monitoring frequencies. Five-year reviews are submitted by the Air Force to the regulatory agencies for review and comment.

Although the Air Force is transferring procedural responsibilities to the transferee and its successors by provisions to be included in the deed(s) transferring title to the property including [the site] and may contractually arrange for third parties to perform any and all of the actions associated with the institutional controls, the Air Force is ultimately responsible for the remedy.

Response to Violations. Prior to property transfer, the Air Force will notify EPA and the DTSC as soon as practicable but no longer than 10 days after discovery of any activity that is inconsistent with the institutional control objectives or use restrictions, or any other action that my interfere with the effectiveness of the institutional controls. The Air Force will notify the EPA and DTSC regarding how the Air Force has addressed or will address the breach within 10 days of sending EPA and DTSC notification of the breach.

The deed will require that post transfer, the transferee will notify the Air Force, the EPA, and DTSC of any activity that is inconsistent with the institutional control objectives or use restrictions, or any other action that may interfere with the effectiveness of the institutional controls, and will address such activity or condition as soon as practicable, but in no case will the process be initiated later than 10 days after the transferee becomes aware of the breach. Post-transfer, if the transferee fails to satisfy its obligations pursuant to the SLUC, DTSC may enforce such obligations against the transferee. If there is failure of the selected remedy or a violation of selected remedy obligations (for example, an activity inconsistent with institutional control objectives or use restrictions, or any action that may interfere with the effectiveness of the institutional controls), the DTSC will notify the Air Force and EPA in writing of such failure as soon as practicable (but no longer than 14 days) upon discovery of the inconsistent activity or action that interferes with the effectiveness of the institutional control, and initially seek corrective action or other recourse from the transferee. If, after diligent efforts, DTSC is unable to enforce the obligations of the SLUC or remedy obligations against the transferee, within 21 days following the DTSC's notification, the parties shall confer to discuss re-implementation of the selected remedy or other necessary remedial actions to address the breach of the institutional control. Once the DTSC reports that the transferee is unwilling or unable to undertake the remedial actions, the Air Force will within 10 days inform the other Parties of measures it will take to address the breach.

Approval of Land Use Modification. Prior to transfer, the Air Force shall not modify or terminate institutional controls or implementation actions, or modify use restrictions that are part of the selected remedy without approval by EPA and DTSC. The Air Force shall seek prior concurrence before any anticipated action that may disrupt the effectiveness of the institutional controls or any action that may alter or negate the need for institutional controls.

Any grantee of property constrained by the institutional controls imposed through their transfer document(s) may request modification or termination of an institutional control. Modification or termination of an institutional control, except the SLUC (discussed below), requires Air Force, EPA, and DTSC approval.

State Land Use Covenant Modification. Any modification or termination of the SLUC must be undertaken in accordance with State law; and will be the responsibility of the transferee or then-current owner or operator.

2.6.3 Alternative 3 – Vapor Intrusion Remedy (Restricted Land Use)

Under Alternative 3, there would be a grantee covenant in the deed requiring either mitigation for potential vapor intrusion or sampling and analysis to demonstrate acceptable risk for future construction. Alternative 3 is potentially applicable for sites at which current risks associated with VOCs exceed those acceptable for industrial use or there is uncertainty regarding the current magnitude of VOC contamination. Alternative 3 results in restricted land use; however, residential land use would be possible if the landowner either shows that there is not an unacceptable risk for the vapor intrusion pathway or installs a vapor intrusion barrier, gas collection system, or other mitigation measure that eliminates or limits the exposure pathway to human receptors. The sites for which Alternative 3 was evaluated are AOC G-2, AOC H-12, CS S-049, PRL S-014, SA 010, SA 015, and SA 019. If a prohibition of residential use is needed, Alternative 3 could be combined with Alternative 2.

Under Alternative 3, all provisions relating to the implementation of institutional controls are the same as described in Section 2.6.2.1 except that the grantee deed covenant identified in the last paragraph of the Deed Restriction and Reservation of Access subsection would be substantially in the following form:

- With respect to risks that may be posed via indoor air contaminated by chemicals volatilizing from shallow soil gas (vapor intrusion), the Grantee covenants, for [site names], either to (a) design and construct structures intended for occupancy within the [describe area or reference map] in a manner that would mitigate unacceptable risk under CERCLA and the NCP (for example, through installation of a vapor intrusion barrier or gas collection system); or (b) evaluate the potential for unacceptable risk prior to the erection of any new occupied structure in the same area, and include mitigation of the vapor intrusion in the design/construction of the structure prior to occupancy if an unacceptable risk is posed under CERCLA and the NCP. The Grantee will coordinate any and all evaluation and potential mitigation measures with EPA Region IX and DTSC.

2.6.4 Alternative 4U – Excavation and Offsite Disposal (Unrestricted Land Use) and Alternative 4R – Excavation and Offsite Disposal with Institutional Controls to Prohibit Residential Use (Restricted Land Use)

Under Alternatives 4U and 4R, soil at Initial Parcel sites contaminated with non-VOCs, metals, or TPH that exceed cleanup levels will be excavated and the soil/debris transported to an offsite landfill for permanent disposal. The offsite disposal may be at a Class I or Class II landfill as appropriate. However, for most sites within the Initial Parcel, disposal at a Class II landfill will be acceptable

Under Alternative 4U, all soil with contaminant concentrations exceeding the unrestricted use cleanup levels is excavated, and the resulting land use is unrestricted. Under Alternative 4R, only soil with contaminant concentrations exceeding levels acceptable for industrial use are excavated, and the resulting land use is restricted. Under Alternative 4U, interim institutional controls in the form of the Air Force Environmental Encroachment Permit would be implemented until the remedial action is completed. The Environmental Encroachment Permit is a tool used by the Air Force to review planned actions such as excavation of utility lines that may result in contact with contaminated soils. The Encroachment Permit process is outlined in the *McClellan Soils Management Manual* (AFRPA, 2003). Under Alternative 4R, the same institutional controls described under Alternative 2 would be implemented before, during, and after the remedial action to prohibit residential land use.

Excavation would be conducted using conventional earthmoving equipment. The type and quantity of equipment used would largely depend on the depth, areal extent, and volume of soil contamination. In areas where the extent of the target volume is uncertain, field screening and/or onsite laboratory analysis might be used to guide the excavation.

Waste stream profile sampling of the excavated materials would be conducted to determine if the material meets the waste acceptance criteria at the receiving landfill.

Site controls, such as fencing, signage, and security, would be implemented as necessary during the remedial action to prevent public access to the excavation. Following initial excavation, confirmation sampling would be conducted to verify that cleanup levels have been achieved. If the analytical results indicate that contamination has been adequately removed, then the excavation void would be backfilled with clean, compacted imported soil or clean soil from McClellan's clean soils holding area. Otherwise, excavation would continue until cleanup levels are satisfied.

Alternative 4U is potentially applicable for sites at which risks associated with non-VOC contamination exceed levels acceptable for unrestricted use, and Alternative 4R is potentially applicable for sites at which risks associated with non-VOC contamination exceed levels acceptable for industrial use. These alternatives are also potentially applicable at sites with potential contaminant impacts to groundwater or surface water. Alternative 4U was evaluated for AOC G-2, AOC H-12, SA 010, and SA 015. Alternative 4R was evaluated for AOC G-2.

2.6.5 Alternative 5U – Bioventing (Unrestricted Land Use) and Alternative 5R – Bioventing (Restricted Land Use)

Under Alternatives 5U and 5R, bioventing would be implemented at Initial Parcel sites contaminated with TPH or non-halogenated VOCs. Because Alternative 5U and 5R are applicable at sites with only fuel-related contamination and these sites are excluded from CERCLA, these alternatives are not discussed further in this ROD. A detailed description of these alternatives is provided in the FS.

2.6.6 Alternative 6U – SVE (Unrestricted Land Use) and Alternative 6R – SVE (Restricted Land Use)

Under Alternatives 6U and 6R, SVE would be implemented at sites containing VOCs in shallow soils. This process would reduce the mobility and volume of the contamination in the subsurface by physically extracting VOCs from the soils and creating reduced pressure in the subsurface, thereby limiting migration of soil gas to indoor air. This action would not directly affect contaminant toxicity. Extracted vapors would either undergo further treatment (i.e., granular activated carbon adsorption followed by thermal destruction upon regeneration) or would be vented to the atmosphere where they would degrade in the atmosphere. Appropriate measures would be taken to confirm that on- and near-site receptors would not be exposed to unsafe levels of vented VOCs.

Site controls, such as fencing, signage, and security, would be implemented as necessary during the remedial action to protect the SVE system. Interim institutional controls and monitoring to verify the effectiveness of the SVE system would be required during operation. The time required to remediate a site using SVE would depend on the specific soil and chemical properties of the contaminated media. Under Alternative 6U, when results of shallow soil gas monitoring indicate that the contamination has been adequately removed to below unrestricted use cleanup levels, the system would enter the SVE closeout process and be decommissioned, after which the site would be available for unrestricted land use. Under Alternative 6R, the site would be cleaned up to levels below the industrial cleanup levels, but above the unrestricted use cleanup levels. Therefore, long-term institutional controls would be implemented.

Alternative 6U is potentially applicable for sites at which risks associated with VOC contamination exceed levels acceptable for unrestricted use, and Alternative 6R is potentially applicable for sites at which risks associated with VOC contamination exceed levels acceptable for industrial use. These alternatives are also potentially applicable at sites where there is uncertainty regarding the current magnitude of VOC contamination. Alternative 6U was evaluated for AOC G-2, AOC H-12, CS S-049, PRL S-014, SA 010, SA 015, and SA 019. Alternative 6R was evaluated for these same sites except PRL S-014.

2.6.7 Alternative 7 – Multilayer Cap (Restricted Land Use)

Under Alternative 7, an individual Initial Parcel site with contaminated soil will be covered with an engineered multilayer cap to eliminate human and ecological receptor exposure pathways, reduce infiltration of precipitation, and minimize potential leaching of contaminants to groundwater. Construction of a cap will also require implementation of institutional controls and restricted land use to prevent uncontrolled excavation or other activities that could damage the cap and create exposure pathways to human and ecological receptors. Site controls, such as fencing, signage, and security, will be implemented as necessary to restrict access to the cap. Long-term inspection and maintenance will be required to verify the cap's continued effectiveness at containing the contamination. If a threat to groundwater remains at the site (i.e., a designated waste is present), then groundwater monitoring will be required. Many other Title 27 requirements could apply depending on the type of cap and other site-specific details.

Construction of a multilayer cap may also include biotic barriers and erosion-control measures. Subsurface completions may be possible at some Initial Parcel sites to reduce restrictions on land use. Other cap types that may be effective include clay, soil, and synthetic membrane. Asphalt and concrete caps may be appropriate for sites with surface-soil contamination only.

2.6.8 Alternative 8 – Excavation/CAMU (Restricted Land Use)

Alternative 8 consists of individual site excavation and subsequent consolidation of contaminated soil from multiple sites into a designated CAMU for permanent consolidation. A CAMU is a designated area of land where remediation of RCRA hazardous waste can take place and land disposal restrictions and minimum technology requirements for disposal facilities can be relaxed. A CAMU is appropriate for long-term land-based treatment activities, long-term storage, or permanent disposal of hazardous remediation waste, including soil, debris, and sludge.

After a site excavation is completed and the void backfilled with clean soil, the site would be cleaned up to levels supportive of unrestricted use if attainable. However, institutional controls would be required at the CAMU and future land use would be restricted at that location. Engineered controls, such as signs, fences, and alarms, would be used to restrict access to the CAMU. Long-term monitoring would be required to verify the continued effectiveness of the CAMU at containing the contamination. If unrestricted use cleanup levels are not attained, long-term institutional controls would be implemented at the sites.

2.6.9 Common Elements and Distinguishing Features of Each Alternative

These alternatives include common elements as well as distinguishing features. As previously noted, Alternatives 7 and 8 were not evaluated in the detailed analysis, and Alternatives 5U and 5R are not discussed further in this ROD. Therefore, the following discussion summarizes the common elements and distinguishing features of Alternatives 1, 2, 3, 4U, 4R, 6U, and 6R:

- Alternative 1 is the No Action alternative that is potentially applicable at all sites.
- Alternative 2 is Institutional Controls Only to prohibit residential use. Institutional controls will be required in perpetuity for Alternative 2 because residual contamination remains above levels for unrestricted use unless risk is deemed acceptable under applicable law. Similarly, the resulting land use is restricted for Alternatives 4R and 6R. Such restrictions would remain until they are removed in accordance with Section 2.9.2 herein.
- Alternative 3 also uses institutional controls. The deed covenant addresses shallow soil gas contamination by requiring mitigation or additional sampling and analysis to demonstrate acceptable risk. While the resulting land use is restricted because of the deed covenant, residential use is not prohibited.
- The resulting land use is unrestricted for Alternatives 1, 4U, and 6U.
- Alternatives 4U, 4R, 6U and 6R include active remediation of contaminants either through excavation and off site disposal (for 4U and 4R) or through SVE (for 6U and 6R). Alternatives 2 and 3 are only institutional controls and do not require remediation of the contaminants.

Innovative technologies and presumptive remedies were not incorporated as part of the remedies. Therefore, these are neither common elements nor distinguishing features and are not addressed in this section.

2.7 Summary of Comparative Analysis of Alternatives

In accordance with the NCP, the remedial alternatives are evaluated against the nine EPA criteria (Section 300.430 (f)(5)(i)). These criteria are categorized into the following three groups:

1. Threshold criteria
2. Primary balancing criteria
3. Modifying criteria

Threshold criteria are requirements that each alternative must meet to be eligible for selection as the preferred alternative. The criteria include overall protection of human health and the environment and compliance with ARARs. Primary balancing criteria are used to weigh effectiveness and cost tradeoffs among alternatives. The balancing criteria include long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost. The primary balancing criteria represent the main technical criteria upon which the alternative evaluation is based. Modifying criteria include State acceptance and community acceptance, and may be used to

modify aspects of the preferred alternative when preparing this ROD. Following is a brief description of what each of the evaluation criteria addresses followed by the comparative analysis of the alternatives.

2.7.1 Description of Evaluation Criteria

Criterion 1: Overall Protection of Human Health and the Environment—Addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Criterion 2: Compliance with ARARs—Section 121(d) of CERCLA and NCP 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites attain ARARs, unless such ARARs are waived under CERCLA Section 121(d)4.

Criterion 3: Long-term Effectiveness and Permanence—Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Criterion 4: Reduction of Toxicity, Mobility, or Volume through Treatment—Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Criterion 5: Short-Term Effectiveness—Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during construction and operation of the remedy until cleanup levels are achieved.

Criterion 6: Implementability—Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other government entities are also considered.

Criterion 7: Cost—The cost of an alternative addresses all engineering, construction, and O&M costs incurred over the life of the project. The assessment against this criterion is based on the estimated present worth of these costs for each alternative. Present worth is used to estimate expenditures that occur over different lengths of time.

Criterion 8: State Acceptance—This assessment evaluates the technical and administrative issues, concerns, and preferences the State may have regarding each of the alternatives.

Criterion 9: Community Acceptance—This assessment evaluates the issues, concerns, and preferences the public may have regarding each of the alternatives.

2.7.2 Comparative Analysis of Alternatives

The advantages and disadvantages of the alternatives relative to one another based on the nine evaluation criteria are summarized in this section. Site-specific details were considered when comparing the performance of each alternative. However, not all of the alternatives

are evaluated for each site because not all alternatives are appropriate at every site. For example, Alternatives 6U and 6R could only be used at sites with VOC contamination because SVE is ineffective in treating metals and most other non-VOCs. As discussed in Section 2.6, Alternatives 5U, 5R, 7, and 8 were not retained for detailed analysis in the FS. The following alternatives are compared in this section:

- Alternative 1 – No Action (Unrestricted Land Use)
- Alternative 2 – Institutional Controls Only to Prohibit Residential Use (Restricted Land Use)
- Alternative 3 – Vapor Intrusion Remedy (Restricted Land Use)
- Alternative 4U – Excavation/Landfill (Unrestricted Land Use)
- Alternative 4R – Excavation/Landfill with Institutional Controls (Restricted Land Use)
- Alternative 6U – SVE (Unrestricted Land Use)
- Alternative 6R – SVE (Restricted Land Use)

The comparative analysis is organized into two sets of sites with similar contaminant types: (1) non-VOCs and VOCs and (2) VOCs only). Site-specific information is included in the text and tables provided for each set of sites. The results of the comparative analysis are summarized below for the 7 sites at which CERCLA contaminants in soil were identified as COCs and a remedy is required. The sites were organized by type of COC as follows:

- AOC G-2, AOC H-12, CS S-049, SA 010, and SA 015 with non-VOC and VOC contaminants.

- PRL S-014 and SA 019 with VOC contaminants only.

The comparative analysis has been updated to reflect data collected during 2007 per the Phase 1 LRA IP Pre-Decision Work Plan #2 at AOC G-2, AOC H-12, and CS S-049 (AFRPA, 2007b). In the LRA IP FS #2, AOC G-2 was evaluated for non-VOC contaminants. Although VOCs are also present at the site, evaluation of potential impacts to human health from VOCs in shallow soil gas was deferred because the site was influenced by the adjacent PRL T-044 SVE system. Because SVE may be complete at PRL T-044 and additional shallow soil gas data were collected during 2007 while the SVE system was in rebound, it is now possible to include VOCs in the comparative analysis of alternatives summarized in this section.

Three sites (AOC H-8, PRL S-047, and SA 105) were included in the detailed analysis of alternatives in LRA IP FS #2. However, based on the results of the analysis, it has been determined that no further action is required under CERCLA. The rationale for selection of No Action at these three sites is provided in Section 2.9.1. Therefore, the three sites are not discussed further in this summary of the comparative analysis.

As discussed in Section 2.4, CERCLA contaminants are not present in soil at levels of concern at the remaining 13 sites. Therefore, these sites were not included in the detailed or comparative analyses of alternatives and are not discussed in this section. These sites are as follows:

- AOC H-1, AOC H-2, AOC H-3, AOC H-13, AOC H-14, PRL S-033, PRL S-040, SA 003, SA 035, SA 041, SA 091, Tank 783, and Tank 788

2.7.2.1 Shallow Soil Gas and Non-VOC Sites: AOC G-2, AOC H-12, CS S-049, SA 010, and SA 015

These sites are grouped because each site has known or suspected non-VOC contamination in soil and VOC contamination in shallow soil gas. The COCs for each of the sites are listed below with any uncertainties in the characterization data.

- At AOC G-2 (Former Tank Farm 7), the COCs are TPH-G and TPH-D for protection of groundwater and surface water, and PAHs and VOCs for protection of human health.
- At AOC H-12 (Former Weather Squadron Maintenance), mercury and PCBs are COCs for protection of surface water and human health, and VOCs are COCs for protection of human health.
- At CS S-049 (Former Maintenance Shed), non-VOCs are present at low levels adjacent to the previous excavation. Concentrations of dieldrin, benzo(a)pyrene, and dibenzo(a,h)anthracene exceeded unrestricted use screening levels for protection of human health, and isolated detections of copper, dieldrin, DDE, and DDT exceed screening levels for protection of surface water. In addition, based on the site conceptual model and limited soil gas data, VOCs in shallow soil gas are potential COCs for protection of human health.
- At SA 010 (Entomology Shop), arsenic is a potential COC for protection of human health. In addition, there are uncertainties regarding the extent of arsenic and the presence or absence of pesticides in surface soil (for the unrestricted use scenario only). In addition, based on the site conceptual model and limited soil gas data, VOCs in shallow soil gas are potential COCs for protection of human health.
- At SA 015 (Lot 10 Storage), the magnitude and extent of metals and PAH contamination is uncertain. In addition, based on the site conceptual model and limited soil gas data, VOCs in shallow soil gas are potential COCs for protection of human health.

With one exception, each of the sites was evaluated for Alternatives 1, 2, 3, 4U, 6U, and 6R. CS S-049 was not evaluated for Alternative 4U because only isolated contaminant concentrations exceeded screening levels for unrestricted use. Alternative 1 (No Action) does not meet the threshold criteria and was not considered further because impacts to human health and the environment are possible. Only AOC G-2 was evaluated for Alternative 4R, because this is the only site with non-VOCs present at concentrations exceeding those acceptable under an industrial use scenario. A summary of the comparative analysis for the sites is presented in Table 2-6.

Based on the comparative analysis, for SA 010 and SA 015, Alternative 2 would attain the greatest benefit at the least cost. Alternative 3 is more effective for the vapor inhalation pathway if elevated concentrations are present. Alternatives 4U and 6U would require the implementation of more than one alternative to address all COCs at the sites. Alternative 6R is effective and addresses VOCs with SVE and non-VOCs with institutional controls to prohibit residential use.

At AOC G-2, AOC H-12 and CS S-049, the known or suspected concentrations of VOCs exceed levels acceptable for industrial use. For non-VOCs at AOC H-12, only Alternative 4U is protective of surface water quality; and similarly for AOC G-2, only Alternatives 4U or 4R would be protective of groundwater quality. For CS S-049, based on data collected during

2007, Alternatives 2 and 4Uwould be protective for risks associated with non-VOCs. However, for all three sites, a second alternative would be required to protect human health via the vapor inhalation pathway. Of the alternatives that address the vapor inhalation pathway, Alternative 3 is the most cost effective. However, Alternative 6U or 6R is more effective when shallow soil gas concentrations significantly exceed levels acceptable for industrial use.

Protection of Human Health and the Environment. Alternative 1 would not reduce the risk to human health or the environment. All of the remaining alternatives reduce risk and are protective of human health and the environment to varying degrees. Because both VOCs and non-VOCs are present at these sites, in some cases more than one alternative may need to be implemented to be protective for all pathways.

In general, Alternatives 2 and 3 would be more protective than Alternative 1 and less protective of human health than Alternatives 4U (and 4R for AOC G-2), 6U, and 6R, because untreated contaminants would remain in place. Alternative 2 would not provide protection of human health for shallow soil gas contamination if the contaminant concentrations at the site exceed levels acceptable for industrial use under applicable law.

For VOCs, Alternative 3 would be more protective of human health than Alternative 2 because it would provide protection for VOCs in shallow soil gas. Under Alternative 3, protection of human health would be achieved and maintained by preventing exposure to contaminants through institutional controls and mitigation measures such as vapor barriers and gas collection systems that would limit or eliminate the vapor inhalation pathway as necessary for future construction. As with Alternative 2, Alternative 3 would reduce the overall potential risk to human health, but impacts to surface water and groundwater quality would not be prevented.

Alternatives 4U (and 4R for AOC G-2) would provide a high level of protection of human health and the environment because the non-VOC contaminants would be physically removed from the site. However, Alternatives 4U and 4R would not be protective of human health for VOCs in shallow soil gas unless the shallow soil gas target volume was of limited extent and could be removed during the excavation. At AOC G-2, Alternative 4R would be slightly less protective than Alternative 4U because residual contamination left at the site would be above unrestricted use levels. Alternative 4R would use institutional controls to protect human health from residual contamination at the site after the excavation.

Alternatives 6U and 6R would be protective of human health through the physical removal of VOC contaminants by vapor extraction, but would not be protective of human health for non-VOC contamination except that institutional controls to prohibit residential use are applied under Alternative 6R. Until unrestricted use cleanup levels are achieved under Alternative 6U, institutional controls would be implemented to provide further protection of human health. Alternative 6U would be more protective of human health than Alternative 6R, because under Alternative 6R, the residual contamination left in place would be above unrestricted use cleanup levels.

TABLE 2-6
Comparative Analysis Summary for AOC G-2, AOC H-12, CS S-049, SA 010, and SA 015
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, California

Criteria	Alternative 1: No Action All Sites Unrestricted Land Use	Alternative 2: Institutional Controls Only All Sites Restricted Land Use	Alternative 3: Vapor Intrusion Remedy All Sites Restricted Land Use	Alternative 4U: Excavation/Landfill All Sites Unrestricted Land Use	Alternative 4R: Excavation/Landfill with Institutional Controls AOC G-2 Only Restricted Land Use	Alternative 6U: SVE All Sites Unrestricted Land Use	Alternative 6R: SVE All Sites Restricted Land Use
Threshold Criteria							
Protection of Human Health and Environment	Impacts would be possible to human health (all sites), surface water (AOC G-2, AOC H-12, and CS S-049), and groundwater (AOC G-2).	Yes for non-VOCs; uncertain for VOCs in shallow soil gas. Potential shallow soil gas impacts on human health. Potential impacts on surface water at AOC H-12, CS S-049, and AOC G-2). Impacts to groundwater at AOC G-2.	Yes. Additional sampling to demonstrate acceptable risk or mitigation to limit or eliminate vapor intrusion.	Yes for non-VOCs; no for VOCs. Non-VOC contaminants would be physically removed from the site for offsite disposal. Unrestricted use cleanup levels would be achieved. Interim institutional controls would prevent impacts to human heath in the short term. VOCs are not addressed.	Yes for non-VOCs; no for VOCs. Non-VOC contaminants would be physically removed from the site for offsite disposal. Institutional controls would prevent impacts to human health in the short and long term. VOCs would not be addressed.	Yes for VOCs; no for non-VOCs. Unrestricted use cleanup levels would be attained. Institutional controls would prevent impacts to human health in the short term.	Yes for VOCs and non-VOCs. Industrial cleanup levels would be attained for shallow soil gas. Institutional controls prevent impacts to human health in the short and long term.
Compliance with ARARs	No. Impacts to human health, surface water, and groundwater would be possible to varying degrees.	Yes for non-VOCs; uncertain for VOCs in shallow soil gas.	Yes for VOCs.	Yes for non-VOCs; no for VOCs.	Yes for non-VOCs; no for VOCs.	Yes for VOCs; no for non-VOCs.	Yes for VOCs and non-VOCs.
Primary Balancing Criteria							
Long-term Effectiveness and Permanence	Impacts would be possible to human health (all sites), surface water (AOC G-2, AOC H-12, and CS S-049), and groundwater (AOC G-2).	Institutional controls protect human health and surface water. However, protection for vapor intrusion would not be provided beyond preventing unrestricted use. TPH-G impacts to groundwater at AOC G-2.	Yes for VOCs. Exposure pathways would be incomplete.	Yes for non-VOCs; no for VOCs. The unrestricted use cleanup levels for non-VOCs could likely be achieved. Interim land use controls would prevent impacts to human health.	Yes for non-VOCs; no for VOCs. The industrial cleanup levels for non-VOCs could likely be achieved. Long-term institutional controls would prevent impacts to human health.	Yes for VOCs; no for non-VOCs. The unrestricted use cleanup levels could likely be achieved. Interim institutional controls would prevent impacts to human health.	Yes for VOCs and non-VOCs. The industrial cleanup levels could likely be achieved. Long-term institutional controls would prevent impacts to human health.
Reduction in Toxicity, Mobility, and Volume through Treatment	No. Reduction by natural degradation processes only.	No. Reduction by natural degradation processes only.	Yes, if treatment is included in mitigation measures for vapor intrusion.	No treatment would be performed.	No treatment would be performed. However, toxicity, mobility, and volume would be reduced at the site upon excavation.	Yes, if extracted soil gas is treated. Significant volume and mobility reduction in situ because VOC contaminants would be extracted.	Yes, if extracted soil gas is treated. Significant volume and mobility reduction in situ because VOC contaminants would be extracted.
Short-term Effectiveness	Not applicable for No Action.	Contaminated soil would not be disturbed. Institutional controls would provide immediate protection of human health and probably surface water.	Mitigation measures would limit migration of contaminants.	Short-term risks during excavation and transport could be managed.	Short-term risks during excavation and transport could be managed.	Short-term risks to workers during SVE system construction could be managed.	Short-term risks to workers during SVE system construction could be managed.
Implementability	Not applicable for No Action.	Implementable with coordination between parties. Coordination with remedial activities for VOCs in shallow soil gas would also be required.	Implementable with coordination between parties.	Readily implementable. Coordination with potential remedial actions for shallow soil gas required.	Readily implementable. Coordination with potential remedial actions for shallow soil gas would be required.	Readily implementable. Coordinate remedy with potential remedial actions for non-VOCs.	Readily implementable. Coordinate remedy with potential remedial actions for non-VOCs.
AOC G-2 Total Cost	$0	$215,000	$329,000	$288,000*	$313,000*	$485,000	$579,000
AOC G-2 PW_{30}	$0	$156,000	$270,000	$278,000*	$245,000*	$474,000	$511,000
AOC H-12 Total Cost	$0	$215,000	$279,000	$219,000*	Not Applicable	$485,000	$579,000
AOC H-12 PW_{30}	$0	$156,000	$220,000	$212,000*	Not Applicable	$474,000	$511,000
CS S-049 Total Cost	$0	$215,000	$266,000	Not Applicable*	Not Applicable*	$485,000	$579,000
CS S-049 PW_{30}	$0	$156,000	$207,000	Not Applicable*	Not Applicable*	$474,000	$511,000
SA 010 Total Cost	$0	$170,000*	$259,000	$166,000	Not Applicable	$485,000	$579,000
SA 010 PW_{30}	$0	$111,000*	$200,000	$160,000	Not Applicable	$474,000	$511,000
SA 015 Total Cost	$0	$170,000*	$317,000	$161,000	Not Applicable	$485,000	$579,000
SA 015 PW_{30}	$0	$111,000*	$258,000	$156,000	Not Applicable	$474,000	$511,000

* Costs for SA 010 and SA 015 were revised subsequent to completion of IP FS #2 and the Proposed Plan to delete the costs for additional sampling and analysis. The Air Force in coordination with the regulatory agencies determined that there was sufficient historical data at the sites in combination with knowledge of the operational history to determine boundaries for the institutional controls. Costs for AOC G-2, CS S-047, and AOC H-12 were revised subsequent to completion of IP FS #2 and the Proposed Plan to reflect results of sampling and analysis performed during 2007. Based on the 2007 data, no target volume was identified for CS S-049, so Alternatives 4U and 4R were not evaluated for this site.

Only AOC G-2 was evaluated for Alternative 4R, because this is the only site with contaminant concentrations not acceptable for the industrial-use scenario. Alternatives 5R, 5U, 7, and 8 (Bioventing – Restricted Land Use, Multilayer Cap, and Excavation/CAMU) were not retained for detailed analysis at any sites.

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Compliance with Applicable or Relevant and Appropriate Requirements. ARARs requiring cleanup or management of contamination that poses a risk to human health and the environment are not met for Alternative 1. Alternative 2 would comply with ARARs for non-VOCs but would not provide protection for the vapor inhalation pathway if shallow soil gas concentrations exceed levels acceptable for unrestricted use. Alternative 6R would comply with ARARs for both VOCs in shallow soil gas and non-VOCs in soil. However, Alternatives 4U (and 4R for AOC G-2) would only comply with ARARs for non-VOCs, and Alternatives 3 and 6U would only comply with ARARs for VOCs.

Long-term Effectiveness and Permanence. No actions would be implemented to manage contamination that would remain at the sites under Alternative 1; therefore the criterion for long-term effectiveness and permanence would not be met.

If VOC concentrations in shallow soil gas do not exceed levels acceptable for industrial use, Alternative 2 would be effective and permanent to the extent that the institutional controls are maintained. The long-term effectiveness and permanence of Alternative 3 would be increased relative to Alternative 2 for VOCs with mitigation measures or sampling required for future construction, which would either control migration of soil gas into indoor air or demonstrate that the risk is within an acceptable range.

The long-term effectiveness and permanence of Alternative 4U would be very good for non-VOC contamination. At AOC G-2, Alternative 4U, which results in levels acceptable for unrestricted use, would be more effective than Alternative 4R. Unless the VOC contamination is of very limited extent, Alternatives 4U and 4R would not effectively address VOC contamination in soil gas. Excavation and offbase disposal would be reliable and verifiable.

The long-term effectiveness and permanence of Alternatives 6U and 6R would be very good for VOCs in shallow soil gas. Under Alternative 6R, because unrestricted use cleanup levels would not be achieved, long-term monitoring and enforcement of institutional controls would be required. Alternatives 6U and 6R would not address potential non-VOC contaminants, except that institutional controls are applied under Alternative 6R, which would restrict potential exposures.

Reduction of Toxicity, Mobility, or Volume through Treatment. Alternatives 1, 2, 4U and 4R do not reduce the toxicity, mobility, or volume of contamination through treatment. Under Alternative 3, if a future owner were to implement mitigation measures, such measures would prevent or minimize migration of shallow soil gas contamination into buildings, thereby providing reductions in the mobility of contamination. If gas collection was used, the toxicity of VOCs would not be directly reduced until the VOCs degrade in the atmosphere (for atmospheric discharge). If the owner showed through sampling that there was no unacceptable risk, then reducing the toxicity, mobility, or volume of the VOC contamination would be unnecessary.

Alternatives 6U and 6R would extract contaminant vapors from the vadose zone for either direct atmospheric discharge or further treatment. Alternatives 6U and 6R would significantly reduce the mobility and volume of VOCs through physical removal. The toxicity of VOCs would not be directly reduced until the VOCs degrade in the atmosphere (for atmospheric discharge) or would be destroyed during regeneration of the carbon (for treatment). SVE would provide irreversible reduction in VOC concentrations, thereby meeting the statutory preference for treatment.

Short-term Effectiveness. All of the alternatives, except Alternative 1, would achieve varying degrees of short-term effectiveness. The more aggressive alternatives (Alternatives 4U, 4R, 6U, and 6R), those that involve disturbance of the contaminated soil, would result in potentially more short-term risks to the community and workers during remedial action. Correspondingly, the more passive alternatives (Alternatives 1, 2, and 3) would have fewer potential impacts because less disruption of the site would be required to implement these actions.

Of the alternatives evaluated, Alternatives 2 and 3 would typically require the least amount of time to implement (a few months). Human health risks during the implementation of engineered controls would be minimal, because of limited disruption of shallow soils.

Alternative 4U (and 4R for AOC G-2) would require excavation of contaminated soils, which could temporarily disrupt existing land use and require transport of contaminated soils that could potentially expose the community and workers to noise, odors, dust, and spills on the roadway. Controls would be implemented to minimize the potential impacts. The RAOs would be attained approximately 12 months after the ROD is completed when the excavation is backfilled.

Alternatives 6U and 6R could require soil excavation for trenching during construction, which would result in potential short-term risks to the community or to workers. However, these risks could be managed. Under Alternatives 6U and 6R, approximately 12 months after the ROD is completed, the SVE system would provide migration control of contaminated soil vapors. The RAOs would be attained after approximately 2 to 3 years of operation for Alternatives 6R and 6U, respectively.

Implementability. For each alternative, the technologies could be constructed and operated, and materials, equipment, vendors, and services would be readily available. There would be no impediments to implementing future remedial actions for any of the alternatives.

For Alternatives 2, 3, 4R, and 6R, land reuse might be constrained by the institutional controls. Because it is unlikely that all the VOC contamination would be excavated under Alternative 4U (and 4R for AOC G-2), another alternative, such as Alternatives 3, 6U, or 6R, would likely need to be implemented to address VOCs in shallow soil gas.

All alternatives would require coordination with other remedial programs that are addressing groundwater contamination and shallow soil gas contamination. Although the groundwater pathway for VOCs is not evaluated in this ROD, the sites have been screened for potential threats to groundwater. For CS S-049 and SA 015, an SVE system may be required to protect groundwater. An official determination will be made using the START process.

Cost. The estimated costs for implementing the alternatives at these sites are summarized in Table 2-6. Alternative 1 does not have any costs associated with it. Detailed cost calculations are presented in the IP FS #2, Appendix E. Total costs and present-worth costs are provided.

State Acceptance. DTSC and the RWQCB (the "State") had an opportunity to review and comment on the Initial Parcel ROD #2. In addition to the remedies described herein, DTSC has indicated that it will work with the future owner/user to implement a State Land Use Covenant (SLUC) (pursuant to 22 California Code of Regulations [CCR] Section 67391.1,

California Health and Safety Code Section 25202.5 and California Civil Code Section 1471), if necessary, for all the sites in this ROD, or alternately, to obtain more data to assure compatible reuse. With these additional measures, State concerns will be addressed.

Community Acceptance. A public comment period on the Proposed Plan was held from August 1, through August 31, 2005, and a public meeting was held on August 15, 2005. Public comments were received (see the Responsiveness Summary in Section 3). Two public comments specifically opposed the Air Force's proposed remedy for AOC G-2 and AOC H-12, and one comment generally supported the Air Force's proposed remedies for all of the sites.

2.7.2.2 Shallow Soil Gas-only Sites: PRL S-014 and SA 019

The shallow soil gas only sites (PRL S-014 and SA 019) were evaluated for Alternatives 1, 2, 3, 6U, and 6R. These sites were not evaluated for Alternatives 4U and 4R because there are no non-VOC COCs requiring action at these sites. The characterization of each site is summarized briefly as follows:

- The COC at PRL S-014 is carbon tetrachloride, and no data gaps exist at the site for extent of shallow soil gas contamination.
- The COCs are VOCs in shallow soil gas at SA 019 although the magnitude and extent are uncertain. Previous investigations at SA 019 did identify several chlorinated solvents in deep soil gas.

A summary of the comparative analysis of alternatives for these sites is presented in Table 2-7. Based on the comparative analysis, Alternative 2 would provide the greatest benefit at the least cost for PRL S-014 and SA 019.

Protection of Human Health and the Environment. Alternative 1 is not acceptable for SA 019 because of uncertainties in the site characterization and for PRL S-014 because of potential significant impacts to human health.

Alternatives 2 and 3 would be more protective of human health than Alternative 1 but less protective than Alternatives 6U and 6R for VOCs because untreated contaminants would remain in place. Alternative 2 would not provide protection of human health for potential shallow soil gas contamination if shallow soil gas concentrations exceeded levels acceptable for industrial use. For VOCs, Alternative 3 would be more protective of human health than Alternative 2 because it would provide protection for VOCs in shallow soil gas. Under Alternative 3, protection of human health would be achieved and maintained by preventing exposure to contaminants through institutional controls and mitigation measures as necessary for future construction.

Compliance with ARARs. Alternative 1 would not comply with ARARs for PRL S-014 and SA 019 because of elevated VOC concentrations (at PRL S-014) and uncertainties in the site characterization (at SA 019). Alternative 2 would comply with ARARs for PRL S-014. Alternatives 3, 6U, and 6R would protect human health and the environment and would comply with all action-, location-, and chemical-specific ARARs.

Long-term Effectiveness and Permanence. No actions would be implemented to manage contamination that would remain at the sites for Alternative 1; therefore, the criterion for long-term effectiveness and permanence would not be met for PRL S-014 or SA 019.

If VOC concentrations in shallow soil gas do not exceed levels acceptable for industrial use, Alternative 2 would be effective and permanent to the extent that the institutional controls are maintained. The long-term effectiveness and permanence of Alternative 3 would be increased relative to Alternative 2 with mitigation measures or sampling required for future construction, which would either control migration of soil gas into indoor air or demonstrate that the risk is within an acceptable range.

The long-term effectiveness and permanence of Alternatives 6U and 6R would be very good for VOCs in shallow soil gas. Under Alternative 6R, because unrestricted use cleanup levels would not be achieved, long-term monitoring and enforcement of institutional controls would be required.

Alternatives 6U and 6R would be protective of human health through the physical removal of VOC contaminants by vapor extraction. Alternative 6U would be more protective of human health than Alternative 6R, because under Alternative 6R, the residual contamination left in place would be above unrestricted use cleanup levels.

Reduction of Toxicity, Mobility, or Volume through Treatment. Alternatives 1 and 2 do not reduce the toxicity, mobility, and volume of the contamination through treatment. Under Alternative 3, if a future owner were to implement mitigation measures, such measures would prevent or minimize migration of shallow soil gas contamination into buildings, thereby providing reductions in the mobility of contamination. For gas collection, the toxicity of VOCs would not be directly reduced until the VOCs degrade in the atmosphere (for atmospheric discharge). If the owner showed through sampling that there was no unacceptable risk, then reducing the toxicity, mobility, or volume of the VOC contamination would be unnecessary.

Alternatives 6U and 6R would extract contaminant vapors from the vadose zone for either direct atmospheric discharge or further treatment. Alternatives 6U and 6R would significantly reduce the mobility and volume of VOCs through physical removal. The toxicity of VOCs would not be directly reduced until the VOCs degrade in the atmosphere (for atmospheric discharge) or would be destroyed during regeneration of the carbon (for treatment). SVE would provide irreversible reduction in contaminant concentrations, thereby meeting the statutory preference for treatment.

Short-term Effectiveness. All of the alternatives, except Alternative 1, would achieve varying degrees of short-term effectiveness. The more aggressive alternatives (Alternatives 6U and 6R), those that would involve disturbance of the contaminated soil, would result in potentially more short-term risks (i.e., noise, odors) to the community and workers during remedial action. Correspondingly, the more passive alternatives (Alternatives 1, 2, and 3) would have fewer potential impacts because less disruption of the site would be required to implement these actions.

Of the alternatives evaluated, Alternatives 2 and 3 would typically require the least amount of time to implement (a few months). Human health risks during the implementation of engineered controls would be minimal, because of limited disruption of shallow soils.

TABLE 2-7
Comparative Analysis Summary for Shallow Soil Gas-only Sites (PRL S-014 and SA 019)
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, California

Criteria	Alternative 1: No Action Unrestricted Land Use	Alternative 2: Institutional Controls Only Restricted Land Use	Alternative 3: Vapor Intrusion Remedy Restricted Land Use	Alternative 6U: SVE Unrestricted Land Use	Alternative 6R: SVE Restricted Land Use
Threshold Criteria					
Protection of Human Health and Environment	Uncertain for SA 019 because of potential future impacts to human health from shallow soil gas. No for PRL S-014.	Yes at PRL L-014 and uncertain for SA 019. Exposure pathways for human health would be limited if institutional controls were successfully implemented, although the vapor inhalation pathway would not be addressed.	Yes. Vapor barriers and gas collection systems would provide further protection of human health as necessary.	Yes. SVE would physically remove contaminants from soil to below unrestricted use cleanup levels. Interim institutional controls would prevent impacts to human health in the short term.	Yes. SVE would physically remove contaminants from soil. Institutional controls would prevent impacts to human health in the short term and long term.
Compliance with ARARs	No for SA 019 and PRL S-014.	Yes for PRL S-014. According to existing data, the residual risk to human health under the industrial scenario would be less than 1E-04. Uncertain for SA 019.	Yes.	Yes.	Yes.
Primary Balancing Criteria					
Long-term Effectiveness and Permanence	PRL S-014: Excess carcinogenic risk and hazard indices of 2E-4 and 7E-6, and 2 and 0.05, for the residential use and industrial scenarios, respectively. However, the risk at this site is largely driven by arsenic (not a COC). SA 019: Available data indicate that the potential would exist for VOCs in shallow soil gas at concentrations greater than cleanup levels.	Yes. For PRL S-014, risks are acceptable for industrial use. Uncertain for SA 019 because current concentrations are unknown.	Yes. Human health via the vapor inhalation pathway would be protected.	Yes. The unrestricted use cleanup levels for shallow soil gas could likely be achieved. Interim institutional controls would prevent impacts to human health.	Yes. The industrial cleanup levels for shallow soil gas could likely be achieved. Long-term institutional controls would prevent impacts to human health.
Reduction in Toxicity, Mobility, and Volume through Treatment	No. Reduction by natural degradation processes only.	No. Reduction by natural degradation processes only.	Mobility and volume of VOCs in shallow soil gas would be reduced with the implementation of a vapor barrier and gas collection and venting system.	Significant volume and mobility reduction would occur for VOCs in situ because contaminants are extracted.	Significant volume and mobility reduction would occur for VOCs in situ because contaminants are extracted
Short-term Effectiveness	Not applicable for No Action.	Contaminated soil is not disturbed. Vapor intrusion pathway is potentially complete.	Implementation of mitigation measures would limit migration of contaminants into indoor air for future construction. Contaminated soil would not be disturbed.	Short-term risks to workers during SVE system construction could be managed.	Short-term risks to workers during SVE system construction could be managed.
Implementability	Not applicable for No Action.	Implementable. Coordination between EPA, State, Sacramento County, and AFRPA would be required.	Implementable. Coordination between EPA, State, Sacramento County, and AFRPA would be required.	Readily implementable.	Readily implementable.
PRL S-014 Total Cost	$0	$170,000	$222,000	$440,000	Not Applicable
PRL S-014 PW_{30}	$0	$111,000	$164,000	$429,000	Not Applicable
SA 019 Total Cost	$0	$170,000*	$258,000	$485,000	$579,000
SA 019 PW_{30}	$0	$111,000*	$199,000	$474,000	$511,000

* Costs for SA 019 were revised subsequent to completion of IP FS #2 and the Proposed Plan to delete the costs for additional sampling and analysis. The Air Force in coordination with the regulatory agencies determined that there was sufficient historical data at the site in combination with knowledge of the operational history to determine boundaries for the institutional controls.

Note:

Sites PRL S-014 and SA 019 were not evaluated for Alternatives 4U (Excavation/Disposal – Unrestricted Land Use), 4R (Excavation/Disposal – Restricted Land Use), and 5U (Bioventing – Unrestricted Land Use) because there are no non-VOC contaminants at these sites requiring further remedial action. Alternatives 5R, 7, and 8 (Bioventing – Restricted Land Use, Multilayer Cap, and Excavation/Corrective Action Management Unit [CAMU]) were not retained for detailed analysis at any sites.

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Alternatives 6U and 6R could require soil excavation for trenching during construction, which would result in potential short-term risks to the community or to workers. However, these risks could be managed. Under Alternatives 6U and 6R, approximately 12 months after the ROD is completed, the SVE system would provide migration control of contaminated soil vapors. The RAOs would be attained after approximately 2 to 3 years of operation for Alternatives 6R and 6U, respectively.

Implementability. For each alternative, the technologies could be constructed and operated, and materials, equipment, vendors, and services would be readily available. There would be no impediments to implementing future remedial actions for any of the alternatives.

For Alternatives 2, 3, and 6R, land reuse might be constrained by the institutional controls. All alternatives would require coordination with other remedial programs that are addressing groundwater contamination and shallow soil gas contamination. Although the groundwater pathway for VOCs is not evaluated in this ROD, the sites have been screened for potential threats to groundwater. For PRL S-014, an SVE system may be required to protect groundwater. An official determination will be made using the START process.

Cost. The estimated costs for implementing the alternatives at PRL S-014 and SA 019 are summarized in Table 2-7. Alternative 1 does not have any costs associated with it. Detailed cost calculations are presented in IP FS #2, Appendix E. Total costs and present-worth costs are provided.

State Acceptance. DTSC and the RWQCB (the "State") had an opportunity to review and comment on the Initial Parcel ROD #2. In addition to the remedies described herein, DTSC has indicated that it will work with the future owner/user to implement a State Land Use Covenant (pursuant to 22 CCR Section 67391.1, California Health and Safety Code Section 25202.5 and California Civil Code Section 1471), if necessary, for all the sites in this ROD, or alternately, to obtain more data to assure compatible reuse. With these additional measures, State concerns will be addressed.

Community Acceptance. A public comment period on the Proposed Plan was held from August 1, through August 31, 2005, and a public meeting was held on August 15, 2005. Public comments were received (see the Responsiveness Summary in Section 3). No public comments were received specifically opposing the Air Force's proposed remedy for these sites, but one comment generally supported the Air Force's proposed remedies for all of the sites.

2.8 Principal Threat Wastes

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable. The principal threat concept applies to source materials that are highly mobile or highly toxic and cannot be reliably controlled in place, or would present a significant risk to human health or the environment should exposure occur. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure.

Contaminants in soil and soil gas at AOC G-2, AOC H-12, CS S-049, PRL S-014, SA 010, SA 015, and SA 019 have been determined through risk assessments to pose a threat to human health. However, the contaminants at these sites would not be considered a principal threat waste because the contamination is not highly mobile and toxicity is moderate.

2.9 Selected Remedy

In the following sections, the rationale for the selection of the remedy, a detailed description of the remedy, the estimated costs, and the expected outcomes of the remedy are provided by site. The rationale for selection of the remedy is provided in Section 2.9.1, a description of each remedy is provided in Section 2.9.2, the estimated costs are presented in Section 2.9.3, and the expected outcomes of the selected remedies are presented in Section 2.9.4.

2.9.1 Summary of the Rationale for the Selected Remedy

Details regarding the selected remedies are provided in Section 2.9.2. Following are the principal factors upon which the remedy selection was based for the seven sites requiring a remedial action:

- AOC G-2 – The selected remedy is Alternative 4R (Excavation and Offsite Disposal with Institutional Controls to prohibit residential use) combined with Alternative 3 to address shallow soil gas contamination. The remedy satisfies the ARARs. Commingled TPH is a COC for protection of surface water and groundwater at the location of the former AST. Excavation is required to remove commingled TPH-contaminated soil that presents a threat to surface water and groundwater quality, and the institutional controls will be implemented to protect human health from residual levels of contamination after the excavation is completed. The Air Force will excavate contaminated soil with concentrations greater than industrial cleanup levels (Table 2-4) to facilitate industrial use. Use of that portion of AOC G-2 for residential purposes, hospitals for human care, public or private schools for persons under 18 years of age, or daycare centers for children will be prohibited. The boundary of the prohibition of residential use will encompass the area surrounding the former AST where contaminant concentrations were reported exceeding the institutional control compliance levels shown in Table 2-3. In addition, VOCs will be addressed by a Grantee covenant requiring the Grantee to implement mitigation measures or conduct sampling to show acceptable risk levels under applicable law from vapor intrusion prior to construction of any new structure on the sites that is designed for occupancy. If mitigation measures are chosen, they would prevent or minimize potential soil gas vapors from entering the structure. Under the selected alternative, the time to clean up is approximately 1 year. Although the alternative does not fulfill the preference for treatment, other aspects of the cleanup for soil and groundwater at McClellan do incorporate treatment as a principal element, including the previous use of bioventing at AOC G-2 and SVE at adjacent site PRL T-044 that also impacted AOC G-2.)

- AOC H-12 – The selected remedy is the combination of Alternatives 3 (Deed Covenant Requiring Mitigation or Sampling for Shallow Soil Gas) and 4U (Excavation and Offsite Disposal). Mercury, PCBs, and VOCs were identified as COCs at this site. The remedy is primarily necessary because the mercury and PCB contamination present a threat to

surface water. In addition, VOC contamination, and to a lesser extent mercury and PCB contamination, present a threat to human health. Therefore, the Air Force will excavate the soil contaminated with mercury and PCBs. The selected cleanup levels for non-VOCs are lower than necessary to protect human health so that surface water is protected (Table 2-3). The time to remediate the non-VOCs is approximately 1 year. VOCs will be addressed by a Grantee covenant requiring the Grantee to implement mitigation measures or conduct sampling to show acceptable risk levels under applicable law from vapor intrusion prior to construction of any new structure on the sites that is designed for occupancy. If mitigation measures are chosen, they would prevent or minimize potential soil gas vapors from entering the structure. The site would then be available for industrial or restricted residential use. The boundary for the deed covenant requirement includes all areas where contaminant concentrations were reported exceeding the institutional control compliance levels shown in Table 2-2. As discussed in Section 2.4.2.6, indoor air samples were collected within Buildings 929 and 948, and ambient air samples were collected just outside each building. For the industrial reuse of the existing Buildings 929 and 948, mitigation of shallow soil gas contamination is not necessary because the VOCs concentrations related to soil gas contamination are within an acceptable risk range. Additionally, active remediation of the shallow soil gas contamination is not feasible since a discrete source was not identified. The combination of Alternatives 3 and 4U attains ARARs.

- PRL S-014 – The selected remedy is Alternative 2 (Institutional Controls to prohibit residential use). VOCs were identified as COCs requiring remedial action. Institutional controls will be applied to maintain commercial and industrial use of the site and thereby protect human health from VOCs in soil gas. Use of PRL S-014 for residential purposes, hospitals for human care, public or private schools for persons under 18 years of age, or daycare centers for children is prohibited. The boundary of the institutional controls encompasses all locations with contaminant concentrations exceeding the institutional control compliance levels shown in Table 2-2. Under the selected alternative, the remedy will be implemented upon signature of the ROD. The selected alternative attains ARARs.

- SA 010, SA 015, and SA 019 – The selected remedy for these sites is Alternative 3 (Vapor Intrusion Remedy). VOCs were identified as potential COCs at each site. Potential VOCs will be addressed by a Grantee covenant requiring the Grantee to implement mitigation measures or conduct sampling to show acceptable risk levels under applicable law from vapor intrusion prior to construction of any new structure on the sites that is designed for occupancy. If mitigation measures are chosen, they would prevent or minimize potential soil gas vapors from entering the structure. The boundary of the institutional controls encompasses all locations with contaminant concentrations exceeding the deed covenant compliance levels shown in Table 2-2. The sites are planned for industrial reuse. Under the selected alternative, the remedy will be implemented upon signature of the ROD. The selected alternative attains ARARs.

- CS S-049 – The selected remedy for these sites is a combination of Alternative 2 (Institutional Control Prohibiting Residential Use) and Alternative 3 (Vapor Intrusion Remedy). Non-VOCs (PAHs) in shallow soil and potential VOCs in shallow soil gas were identified as COCs. Non-VOCs will be addressed by an institutional control

prohibiting residential use of the site, and potential VOCs will be addressed by a Grantee covenant requiring the Grantee to implement mitigation measures or conduct sampling to show acceptable risk levels under applicable law from vapor intrusion prior to construction of any new structure on the sites that is designed for occupancy. If mitigation measures are chosen, they would prevent or minimize potential soil gas vapors from entering the structure. The boundary of the institutional controls encompasses all locations with contaminant concentrations exceeding the deed covenant compliance levels shown in Table 2-2. The site is planned for industrial reuse. Under the selected alternative, the remedy will be implemented upon signature of the ROD. The selected alternative attains ARARs.

Following are the principal factors upon which the No Action determination was based for 16 sites:

- AOC H-2, AOC H-3, AOC H-13, AOC H-14, PRL S-033, SA 041, Tank 783, and Tank 788 – The selected alternative for each of these sites is No Action. No COCs were identified at the sites.

- AOC H-1 – The selected alternative is No Action. Only TPH and a very low-level detection of PCBs were reported at the site. The single reported PCB concentration is less than unrestricted use cleanup levels. Risk assessment results (0.3 in 1,000,000) showed that the single PCB detection in soil does not pose a threat to human health. The noncancer risk for the future adult and child residential scenarios are greater than 1 for both receptors. However, the potential COC that contributes to the hazard indices greater than 1 is vanadium through the homegrown produce and incidental soil ingestion pathways. Vanadium is likely present at concentrations representative of background. TPH-contaminated soil was removed from the site in 1991 when the original four underground fuel tanks were replaced. The State has closed the tank site but will require institutional controls be implemented.

- AOC H-8 – The selected remedy is No Action. A single detection of the PAH, benzo(a)pyrene, was reported in surface soil at a concentration below the industrial cleanup level. Although risk assessment results (3 in 1,000,000) showed that the reported detection presents a potential risk, risks at the site were considered acceptable. Risk to occupational workers was also considered acceptable (0.3 in 1,000,000). The majority of the site has been redeveloped and is now principally overlain by the Base Commissary (Building 910).

- PRL S-040 – The selected alternative is No Action. The fuels-related VOC contamination at PRL S-040 presents a threat to human health; however, because fuels-only contamination is exempt from CERCLA, the contaminants are being addressed under State requirements with the installation of a bioventing system during May 2005. Therefore, no further action is warranted under CERCLA.

- PRL S-047 – The selected remedy is No Action. Metals and VOCs were identified as COCs. Contaminated soil was excavated from the site four times between 1987 and 1990, but additional low-level contamination is present in and adjacent to the drainage ditch. The drainage ditch is now beneath a parking lot, and potential impacts to human health and the environment are minimal.

- SA 003 – The selected alternative is No Action. Non-VOC contaminants at the site have been excavated as part of the remedial action for the LRA Initial Parcel ROD #1. VOCs were at elevated concentrations in only a single sample. The VOCs were coincident with non-VOC contaminants that were recently excavated. Because the excavation also removed the highest concentrations of VOCs present at the site, no further action is proposed. Post-excavation sampling confirmed that contaminants had been removed (EQM, 2006).
- SA 035 – The selected alternative is No Action. VOCs were reported at the site at concentrations significantly below the screening level for protection of human health. VOCs were not identified as COCs because the reported VOC concentrations were low. The Air Force evaluated non-VOC contaminants at the site previously and single detections of bis2CEE and arsenic were found to be elevated. However, the Air Force performed limited excavation while further characterizing the site in 2003. Bis2CEE was not detected in the confirmation samples and arsenic was present at background levels.
- SA 091 – The selected alternative is No Action. VOCs were reported sporadically at the site. All reported VOCs were below screening levels for protection of human health. Therefore, VOCs were not identified as COCs. In addition, soil gas in the northeast corner of SA 091 is influenced by the adjacent IC 42 SVE system. At the appropriate time, a STOP analysis will be performed for IC 42 to include SA 091 that will demonstrate that VOCs have been remediated to levels protective of human health and the environment to the extent feasible as defined by the STOP process.
- SA 105 – The selected remedy is No Action. VOCs were identified as COCs. While carbon tetrachloride and other VOC contamination was reported at SA 105 and surrounding sites during the early phases of the RI, more recent sampling has shown that this contamination is present at only low levels. This contamination was likely remediated by the IC 1 SVE system. Excluding the earlier data, there are no carcinogenic COCs for calculating risks for the indoor air pathway (see Appendix B, Section B14.4.3).

2.9.2 Description of the Selected Remedy

The selected remedy under CERCLA is described below.

2.9.2.1 PRL S-014

The selected remedy for PRL S-014 is Alternative 2 (Institutional Controls to Prohibit Residential Use). Institutional Controls are non-engineering, non-technical mechanisms used to reduce or prevent human exposure to contaminants. The institutional control objective is to prohibit development and use of the property for residential housing, hospitals for human care, public or private schools for persons under 18 years of age, or daycare centers for children. A map showing the boundary for the institutional controls is presented in Appendix A (Figure A-1). All provisions relating to the implementation of institutional controls are the same as described in Section 2.6.2. The deed covenant to prohibit residential land use would be substantially in the following form:

> Grantee covenants and agrees that it will not use PRL S-014 for residential purposes, hospitals for human care, public or private schools for persons under 18 years of age, or day-care centers for children.

2.9.2.2 SA 010, SA 015, and SA 019

The selected remedy for SA 010, SA 015, and SA 019 (Alternative 3) is implementation of a deed covenant requiring mitigation measures or additional sampling to show acceptable risk levels for vapor intrusion for any future construction. Maps showing the boundaries for the institutional controls are presented in Appendix B for the sites. The boundary of the institutional controls encompasses all locations with contaminant concentrations exceeding the institutional control compliance levels shown in Table 2-2. All provisions relating to the implementation of institutional controls are the same as described in Section 2.6.2. The deed covenant will contain substantially the following language:

- With respect to risks that may be posed via indoor air contaminated by chemicals volatilizing from shallow soil gas (vapor intrusion), the Grantee covenants, for SA 010, SA 015, and SA 019, either to (a) design and construct structures intended for occupancy within the boundaries shown on Figures B-11, B-12, and B-13, respectively, in a manner that would mitigate unacceptable risk under CERCLA and the NCP (for example, through installation of a vapor intrusion barrier or gas collection system); or (b) evaluate the potential for unacceptable risk prior to the erection of any new occupied structure in the same area, and include mitigation of the vapor intrusion in the design/construction of the structure prior to occupancy if an unacceptable risk is posed under CERCLA and the NCP. The Grantee will coordinate any and all evaluation and potential mitigation measures with EPA Region IX and DTSC.

2.9.2.3 CS S-049

The selected remedy for CS S-049 (combination of Alternatives 2 and 3) is implementation of an institutional control prohibiting residential use of the site and a deed covenant requiring mitigation measures or additional sampling to show acceptable risk levels for vapor intrusion for any future construction. The deed covenants will contain substantially the same language as provided in Sections 2.9.2.1 and 2.9.2.2. Maps showing the boundaries for the institutional controls are presented in Appendix B for the site (Figure B-9). The boundary of the institutional controls encompasses all locations with contaminant concentrations exceeding the institutional control compliance levels shown in Tables 2-2 and 2-3. All provisions relating to the implementation of institutional controls are the same as described in Section 2.6.2.1.

2.9.2.4 AOC G-2

The selected remedy for AOC G-2 is Alternative 4R (Excavation with Institutional Controls to Prohibit Residential Use) and Alternative 3 (Vapor Intrusion Remedy). The selected remedy will be implemented as follows:

- Excavation-related equipment will be mobilized to each site.
- Site controls, such as signage, fencing, and security, will be implemented during the remedial action to prevent public access to the excavation.
- Approximate volume of soil to be removed is 1,500 cubic yards at AOC G-2.
- Post-excavation sampling and analysis will be performed to confirm that industrial cleanup levels (Table 2-4) have been achieved. The cleanup levels for non-VOCs support continued industrial use of the property.

- Excavated soils will be characterized and disposed of at either a Class I or Class II landfill depending on measured contaminant levels.
- Clean fill soil will be procured and placed as backfill, and equipment will be demobilized from the site.
- Because of residual non-VOC contamination at the site under Alternative 4R, long-term institutional controls will be implemented to prohibit development and use of the property for residential housing, hospitals for human care, public or private schools for persons under 18 years of age, or daycare centers for children as described in Section 2.6.2. In addition, to address shallow soil gas contamination under Alternative 3, a deed covenant will require mitigation measures or additional sampling to show acceptable risk levels for vapor intrusion for any future construction as described in Section 2.9.2.2. All provisions relating to the implementation of institutional controls are the same as described in Section 2.6.2. Maps showing the boundaries for the institutional controls are presented in Appendix B (Figure B-1). The boundaries of the institutional controls encompasses all locations with contaminant concentrations exceeding the institutional control compliance levels shown in Tables 2-2 and 2-3.

2.9.2.5 AOC H-12

The selected remedy for AOC H-12 is the excavation of non-VOC-contaminated soil with concentrations exceeding cleanup levels shown in Table 2-5 (Alternative 4U), and for VOCs in shallow soil gas, the implementation of a deed covenant requiring mitigation measures or additional sampling to show acceptable risk levels for vapor intrusion for any future construction. As a result, the site will be available for industrial or restricted residential uses. The selected remedy will be implemented as follows:

- Excavation-related equipment will be mobilized and demobilized to each site.
- Site controls, such as signage, fencing, and security, will be implemented during the remedial action to prevent public access to the excavation.
- Approximate volume of soil to be removed is 360 cubic yards.
- Post-excavation sampling and analysis will be performed to confirm that cleanup levels for non-VOCs listed in Table 2-5 have been achieved.
- Excavated soils will be characterized and disposed of at either a Class I or Class II landfill depending on measured contaminant levels.
- Clean fill soil will be procured and placed as backfill.
- A deed covenant will require mitigation measures or additional sampling to show acceptable risk levels for vapor intrusion of VOCs from shallow soil gas for any future construction as described in Section 2.9.2.2. All provisions relating to the implementation of institutional controls are the same as described in Section 2.6.2. A map showing the boundary for the institutional control is presented in Appendix B (Figure B-6). The boundary of the institutional controls encompasses all locations with contaminant concentrations exceeding the institutional control compliance levels shown in Table 2-2.

2.9.2.6 No Action Sites

In addition, as discussed in Section 2.9.1, the No Action Alternative has been selected for 16 sites: **AOC H-1, AOC H-2, AOC H-3, AOC H-8, AOC H-13, AOC H-14, PRL S-033, PRL S-040, PRL S-047, SA 003, SA 035, SA 041, SA 091, SA 105, Tank 783, and Tank 788.**

2.9.3 Summary of Estimated Remedy Costs

At PRL S-014 for Alternative 2 (Institutional Controls to Prohibit Residential Use), the annual costs for institutional controls would be $4,800 per site. The annual institutional control costs include State and EPA oversight and implementation of the SLUC. The total cost and present-worth cost for 30 years are $170,000 and $111,000, respectively.

At CS S-049, SA 010, SA 015, and SA 019, for Alternative 3 (Vapor Intrusion Remedy), the total cost and present-worth cost for 30 years range from $258,000 to $317,000 and $199,000 to $258,000, respectively, depending on the size of the site (see Tables 2-6 and 2-7). The cost components included institutional controls ($4,800 per year). If a future owner chooses to implement mitigation measures for vapor intrusion instead of sampling for residential construction, estimated installation costs range from $100 to $2,700 for the gas collection system or $3,000 to $59,000 for the vapor intrusion barrier. The annual O&M cost for the gas collection system is estimated as $200. For the vapor barrier, an annual O&M cost has been included in the annual cost associated with maintaining the institutional controls. At AOC G-2, for the Excavation and Offsite Disposal with Institutional Controls (Alternative 4R), the total cost and present-worth cost for 30 years are $313,000 and $245,000, respectively. The cost components included are institutional controls ($4,800 per year), reports ($76,000), excavation and offsite disposal ($33,000), and groundwater monitoring ($320 per year). The costs for excavation, dust control, imported backfill (including the material, acceptance sampling, hauling, and dumping), and excavation backfilling depend on the volume of soil excavated. Unit costs for hauling and disposing of contaminated soils assume hauling to a Class II landfill for disposal. Based on a review of the site characterization data, it was assumed that upon excavation, the soil would not be classified as California or RCRA hazardous waste. Therefore, disposal at a Class II facility is appropriate. If a future owner chooses to implement mitigation measures for vapor intrusion instead of sampling for residential construction, estimated installation costs are $3,300 for the gas collection system or $71,000 for the vapor barrier. The annual O&M cost for the gas collection system is estimated as $200. For the vapor barrier, an annual O&M cost has been included in the annual cost associated with maintaining the institutional controls.

At AOC H-12, the remedy includes Excavation and Offsite Disposal and a Deed Covenant Requiring Mitigation or Sampling for Shallow Soil Gas (combination of Alternatives 3 and 4U). The total cost and present-worth cost for 30 years are $459,000 and $394,000, respectively. The cost components included are institutional controls ($4,800 per year), reports ($76,000), excavation and offsite disposal ($54,000), and groundwater monitoring ($320 per year). If a future owner chooses to implement mitigation measures for vapor intrusion instead of sampling for residential construction, estimated installation costs are $1,000 for the gas collection system or $23,000 for the vapor intrusion barrier. The annual O&M cost for the gas collection system is estimated as $200. For the vapor barrier, an annual O&M cost has been included in the annual cost associated with maintaining the institutional controls.

The cost estimates are based on the best available information regarding the anticipated scope of the remedial alternative. A detailed cost analysis for the selected remedies for these sites is presented in the Initial Parcel FS #2, Appendix E. Costs were estimated in accordance with EPA guidelines (*A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, OSWER 9355.0-75, July 2000). Per the guidelines, the discount rate used for the calculations was 3.5 percent and was taken from Appendix C of the Office of Management and Budget Circular A-94 (February 2004) for real discount rates over a 30-year period. Costs for mobilization, demobilization, engineering design, and construction oversight, as well as a 15 percent contingency, are included in the cost estimate.

Changes in the cost elements are likely to occur as a result of new information during the engineering design of the remedial alternative. Actual costs for implementation of the alternatives are expected to be within 70 to 150 percent of the cost estimates. Major changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Difference, or a ROD amendment.

Sixteen No Action sites have zero cost associated with the chosen No Action remedy. There are no remediation, institutional control, or O&M costs associated with the No Action remedy.

2.9.4 Expected Outcomes of Selected Remedy

The cleanup levels as specified in Tables 2-2 through 2-5 in Section 2.5 are protective of human health, surface water, and groundwater. For non-VOCs, the pathways considered for human health were direct contact, inhalation, and ingestion of soil. For VOCs, the vapor inhalation, direct contact, and ingestion pathways were considered, but only the vapor inhalation pathway was found to be of significance. The cleanup levels for protection of human health are equivalent to the lesser of the carcinogenic risk of 1E-06 or an HQ of one for each contaminant for the stated land use. For contaminants where the cleanup levels for protection of surface water or groundwater are lower than those for protection of human health, those values are identified.

For PRL S-014 and CS S-049, residential use of the sites will be prohibited. The compliance levels for the institutional control boundary are specified in Tables 2-2 and 2-3, respectively. For CS S-049, SA 010, SA 015, and SA 019, for VOCs, the contaminants remain in place but the exposure pathway to indoor air will either be determined to create acceptable risk or will be limited or eliminated by mitigation measures for future construction. SA 010, SA 015, and SA 019 would then be available for industrial or restricted residential use. The deed covenant compliance levels for the institutional control boundary are specified in Table 2-2.

For AOC G-2, the resulting land use will be industrial/commercial upon achieving the non-VOC cleanup levels specified in Table 2-4. The cleanup levels correspond to 1×10^{-6} risk for the industrial scenario at a reasonable maximum exposure. Because the excavation will be backfilled with clean soil, the resulting risk at the site associated with the fuels contamination in soil will likely be below 1×10^{-6} for the industrial scenario. Under the residential scenario with the excavation completed, this corresponds to a risk within the acceptable risk range (approximately 8×10^{-6}). However, residential use of the area of fuel contamination will be prohibited.

For AOC H-12, non-VOCs are excavated to protect surface water. For VOCs, however, the contaminants remain in place for both sites but the exposure pathway to indoor air will either be determined to create acceptable risk or will be limited or eliminated by mitigation measures for future construction. AOC H-12 would then be available for industrial or restricted residential use. The cleanup levels for non-VOCs at AOC H-12 are indicated in Table 2-5.

For each site, the time frame to implement the selected remedies and achieve the cleanup levels is provided in Section 2.9.1. Risk-based screening levels for other potential COCs are also provided in Appendix C to facilitate reuse of the sites. For AOC G-2 and AOC H-12, these potential COCs may be detected during confirmation sampling based on their presence at the sites during the RI at concentrations less than screening levels or based on historical analytical results from similar sites. As appropriate, these analytes will be included for sampling and analysis during the post-excavation confirmation sampling.

2.10 Statutory Determinations

Under CERCLA 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as a principal element and bias against offsite disposal of untreated wastes.

The following sections provide a brief description of how the selected remedies satisfy the statutory requirements of CERCLA 121 and an explanation of the five-year requirements for the sites.

2.10.1 Protection of Human Health and the Environment

Under the Selected Remedy for PRL S-014 (Alternative 2), CS S-049 (Alternatives 2 and 3), and SA 010, SA 015, and SA 019 (Alternative 3), untreated contaminants would be left in place and protection of human health would be achieved and maintained by preventing exposure to contaminants through institutional controls.

The selected remedy for AOC H-12, a combination of Alternative 3 for VOCs and Alternative 4U for non-VOCs, is protective of human health and surface water quality. Under Alternative 3 for VOCs, protection of human health would be achieved and maintained by preventing exposure to contaminants through institutional controls (deed covenant requiring mitigation measures or additional sampling prior to new construction). Under Alternative 4U, the non-VOC-contaminated soil would be excavated and disposed of offsite, thereby eliminating the threat of exposure to humans by direct contact or inhalation and eliminating the potential for migration to surface water.

The selected remedy for AOC G-2 is Alternative 4R (Excavation with Institutional Controls Prohibiting Residential Use) and Alternative 3 (Vapor Intrusion Remedy) and is protective of human health and surface water and groundwater quality. Under Alternative 4R, soil with non-VOC contaminants exceeding industrial cleanup levels would be removed from

the site, thereby reducing the threat of exposure to humans by direct contact or inhalation and eliminating the potential for migration to surface water or groundwater. For VOCs, protection of human health would be achieved and maintained by preventing exposure to contaminants through institutional controls (deed covenant requiring mitigation measures or additional sampling prior to new construction).

2.10.2 Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA states that remedial actions on CERCLA sites must attain (or justify the waiver of) any Federal or more stringent State environmental standards, requirements, criteria, or limitations that are determined to be ARARs. Applicable requirements are those cleanup standards, criteria, or limitations promulgated under Federal or State law that specifically extend to the situation at a CERCLA site. A requirement is applicable if the jurisdictional prerequisites of the environmental standard show a direct correspondence when objectively compared with the conditions at the site. The Selected Remedies for these sites comply with all ARARs. The ARARs that are relevant to the sites and the Selected Remedies are presented in Tables 2-8 through 2-10.

Air Force Position

It is the position of the Air Force that California State Water Resources Control Board Resolutions 68-18 and 92-49 and Basin Plan policies do not meet the National Contingency Plan (NCP) criteria for potential applicable or relevant and appropriate requirements (ARARs) and thus are not ARARs for establishing cleanup standards for soil at McClellan AFB. The State has not demonstrated that these resolutions and policies, as defined by the State in the context of this cleanup, meet the NCP criteria of enforceability and general applicability.

State Position

The State has identified State Water Resources Control Board Resolutions 68-16 and 92-49 and the "Policy for Investigation and Cleanup of Contaminated Sites" contained in the Central Valley Regional Water Quality Control Board's Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins as proposed Applicable or Relevant and Appropriate Requirements (ARARs) for determining cleanup levels for VOCs and non-VOCs in the vadose zone at McClellan AFB. The USAF and State disagree about whether those State requirements are ARARs for this cleanup.

With respect to Resolution 68-16, the State asserts that discharges subject to the Resolution include the continuing migration of in-situ contamination from the vadose zone to groundwater. Under Resolution 68-16 some degradation may be allowed so long as the cleanup action applies best practicable treatment or control to prevent further migration of waste to waters of the State at levels that exceed the water quality objectives or impact beneficial uses. With respect to Resolution 92-49, the State asserts that the Resolution is an applicable requirement for remedial actions of the vadose zone where the waste either discharges to or threatens to discharge to water for the State. In such a case, Resolution 92-49 requires remediation of the vadose zone to the lowest concentration levels of constituents technically and economically feasible, which must at least protect the beneficial uses of groundwater

TABLE 2-8
Chemical-specific ARARs
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, Sacramento, California

Source	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
California Hazardous Waste Control Law Hazardous Waste Determination	22 CCR, Division 4.5, Chapter 11, 66261.21, 66261.22(a)(1), 66261.22(a)(2), 66261.23, and 66261.24(a)(1) or Article 4, Chapter 11.	Applicable	A solid waste is considered a hazardous waste if it exhibits any of the characteristics of ignitability, corrosivity, reactivity, or toxicity, if it is listed as a hazardous waste	The selected remedy will use Toxicity Characteristic Leaching Procedure limits to verify if excavated soil is hazardous. Pertains to sites AOC G-2 and AOC H-12.
California Hazardous Waste Determination	22 CCR 66261.24(a)(2)	Applicable	Wastes can be classified as non-RCRA, State-only hazardous wastes if they exceed the soluble threshold limit concentration or total threshold limit concentration values. California hazardous wastes previously released into the environment are considered hazardous substances (COCs) under California law. New California hazardous wastes generated in the course of the response action must be properly managed as hazardous wastes, including manifesting, storage, treatment, and/or disposal.	The selected remedy will use the soluble threshold limit concentration and total threshold limit concentration to verify if excavated soil is hazardous. Pertains to sites AOC G-2 and AOC H-12.

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TABLE 2-8
Chemical-specific ARARs
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, Sacramento, California

Source	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
Land Disposal Restrictions	22 CCR 66268.48	Applicable	Contaminated soil determined to be hazardous waste in accordance with State and Federal regulations may be subject to land disposal restrictions (LDR) if placed on land in a waste management unit following excavation. Toxicity characteristic waste needs to be treated so that it (1) no longer exhibits the characteristic of toxicity, and (2) is treated to 10 times the universal treatment standard or achieves 90 percent reduction, whichever is higher.	The selected remedy will use universal treatment standards (times 10) to verify if excavated soil is subject to land disposal restrictions. Pertains to sites AOC G-2 and AOC H-12.
National Drinking Water Standards	40 CFR 141	Relevant and Appropriate	Establishes national primary drinking water standards, Maximum Contaminant Levels (MCL) to protect the quality of water in public water systems. MCLs represent the maximum concentrations of contaminants permissible in a water system delivered to the public. MCLs are generally relevant and appropriate when determining acceptable exposure limits for groundwater that is a current or potential source of drinking water.	Standards were used to establish soil cleanup levels protective of groundwater for site AOC G-2.

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TABLE 2-8
Chemical-specific ARARs
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, Sacramento, California

Source	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
Designated Level Methodology	Designated Level Methodology for Waste Classification and Cleanup Level Determination Staff Report of the RWQCB, CVR	To be Considered	Provides guidance on how to classify wastes according to Title 27, CCR, Division 2, Subdiv. 1/Title 23, CCR, Division 3, Chapter 15, Article 10.	Site AOC G-2 likely contains designated waste.
California Drinking Water Standards MCLs	California Safe Drinking Water Standards	Relevant and Appropriate (State believes this is an applicable requirement)	Establishes MCLs for contaminants that cannot be exceeded in public water systems. In some cases, the California MCLs are more stringent than the Federal MCLs.	Standards were used to establish soil cleanup levels protective of groundwater for site AOC G-2.
Response Action Criteria mandated by California Law	Health and Safety Code Section 25356.1.5(a)	Relevant and Appropriate (State believes this is an applicable requirement)	Approval of hazardous substance response actions shall be no less stringent than: 1) NCP requirements; 2) applicable plans and policies for water quality control adopted by State and Regional Boards under the Porter-Cologne Act; and/or requirements of Chapter 6.8 of Division 20 of the Health and Safety Code.	State law mandates adoption of response action that is most stringent under either the NCP, Porter-Cologne Act, or Chapter 6.8 (HSAA). Requirement was used to establish soil cleanup levels protective of groundwater for site AOC G-2.
Minimum Standards for Health and Ecological Risk Assessments	Health and Safety Code Section 25356.1.5(b)	Relevant and Appropriate (State believes this is an applicable requirement)	Risk assessments for remedy selection must not only meet NCP requirements, but also must also include most current sound scientific methods, knowledge and practices of public health and environmental professionals.	Risk assessments must meet statutory standards to be usable as basis for remedy selection decision.

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TABLE 2-8
Chemical-specific ARARs
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, Sacramento, California

Source	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
State Water Resources Control Board Resolution 92-49	State Water Resources Control Board Resolution 92-49	The parties are in partial agreement regarding 92-49's status as an ARAR. With respect to ground water contamination, the parties have agreed that Section III.G. provides, in part, an ARAR pertinent to ground water cleanups at McClellan AFB. Specifically, in dispute resolution, the parties have agreed: "The parties recognize Section III.G of State Board Resolution 92-49 and the narrative toxicity objective for groundwater in Chapter III of the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins as ARARs for the McClellan VOC Record of Decision." With respect to soil contamination, the parties have not reached consensus regarding the status of Resolution 92-49, but have derived a process, the McClellan START/STOP process, for evaluating whether a VOC provides a threat to groundwater requiring response. While in disagreement over the status of Resolution 92-49, the parties agree that selected remedies meets appropriate remedial action objectives.	Section III.G of this Resolution states in part that dischargers are required to clean up and abate the effects of discharges in a manner that promotes attainment of background water quality, or the best water quality which is reasonable if background levels cannot be restored.	Where groundwater is impacted, the parties have agreed that Section III.G of State Board Resolution 92-49 and the narrative toxicity objective for groundwater in Chapter III of the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins are ARARs at McClellan. The parties have "agreed to disagree" regarding the status of State Board Resolution 92-49 with respect to soils. The parties are in agreement that where, in this ROD, potential impact to groundwater must be evaluated, the selected remedy meets applicable or relevant and appropriate requirements, although they do not agree on whether those requirements include State Board Resolution 92-49.

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TABLE 2-8
Chemical-specific ARARs
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, Sacramento, California

Source	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
Water Quality Control Plan (Basin Plan) for the Sacramento and San Joaquin River Basins	Chapter III, Water Quality Objectives, Water Quality Objectives for Groundwater, Toxicity	Relevant and Appropriate (State believes this is an applicable requirement)	The narrative toxicity objective for groundwater states as a policy that ground waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial uses.	Remedial alternatives evaluated must maintain groundwater free of concentrations of toxic substances that will produce detrimental responses. Used to establish soil cleanup levels protective of groundwater for AOC G-2.

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TABLE 2-9
State and Federal Location-specific ARARs
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, Sacramento, California

Location	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
There are no State or Federal Location-specific ARARs for this ROD.				

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TABLE 2-10
Federal and State Action-specific ARARs
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, Sacramento, California

Action	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
Treatment, Storage, or disposal of PCB wastes	40 CFR Part 761.60 to 761.79	Applicable	PCB wastes (exceeding 50 parts per million) must be disposed of within 1 year after being placed in storage. Storage areas are required to be constructed to meet PCB storage requirements. If PCB wastes are stored in a manner that does not comply with the PCB storage requirements, the containers can be stored temporarily for 30 days from the date of removal.	Applicable to PCB wastes that may be generated during remediation. Pertains to site AOC H-12.
Clean up of spilled PCB wastes	40 CFR 761.120-761.139	Relevant and Appropriate	Applies to spills that occurred after May 4, 1987. The spill policy established requirements for cleanup of spills containing 50 parts per million of PCBs or greater.	The PCB spill policy is not applicable to McClellan AFB because the policy applies only to more recent spills. However, the policy is considered relevant and appropriate because it presents health-based cleanup levels for PCBs spilled into soil. Pertains to site AOC H-12.
Waste Characterization and Disposal	27 CCR 20200(a)(2), (c), 23 CCR 2520, 2521	Applicable to disposal	Requires that wastes must be characterized and if identified as hazardous (23 CCR) or identified as designated nonhazardous, or inert solid waste (27 CCR 20210, 20220, 20230) be allowed only at waste management units that have been approved and classified.	Applies to wastes that are excavated and disposed of onsite. If the wastes are taken offsite they must be disposed at a waste management facility that is permitted to receive the type of waste. Pertains to sites AOC G-2 and AOC H-12.

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TABLE 2-10
Federal and State Action-specific ARARs
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, Sacramento, California

Action	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
	27 CCR 20210	Applicable to disposal.	Requires that designated waste be discharged to Class I or Class II waste management units.	Applicable to designated waste (nonhazardous waste that could cause degradation of surface water or groundwater) disposed of onsite. If the wastes are taken offsite they must be disposed of at a waste management facility that is permitted to receive the type of waste. Sites AOC G-2 and AOC H-12may contain designated waste.
Waste Management Unit Closure	27 CCR 20950(a)(2)(B)	Relevant and Appropriate (State believes this is an applicable requirement)	(a)(2) Performance Standards – The performance standards applicable to closure of a unit and, for units that are not clean-closed, to post-closure maintenance at the unit are as follows: (B) Unit Clean-Closed – for units that are clean-closed, the goal of closure is to physically remove all waste and contaminated materials from the unit and from its underlying and surrounding environs, such that the waste in the unit no longer poses a threat to water quality. Successful completion of clean closure eliminates the need for any post-closure maintenance period and removes the unit from being subject to the State Water Resources Control Board-promulgated requirements of this subdivision.	Applicable to excavated soil to determine partial or final closure of waste management units. Pertains to AOC G-2 and AOC H-12.
Groundwater Monitoring	27 CCR 20385	Relevant and Appropriate (State believes this is an applicable requirement)	Requires groundwater monitoring of authorized waste management units and unauthorized discharges of wastes.	Applicable to all areas in which waste has been discharged to land to determine the threat to water quality. Pertains to sites AOC G-2, AOC H-12, SA 010, SA 019, and SA 015.

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TABLE 2-10
Federal and State Action-specific ARARs
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, Sacramento, California

Action	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
Control of Air Emissions	Rule 403, Fugitive Dusts	Applicable	Limits visible particulate emissions to the property line.	Applicable to remedial actions that may result in the production of fugitive dust. Pertains to Alternatives 4U and 4R (excavation and disposal), which are the remedies at sites AOC G-2 and AOC H-12.
Container Storage	22 CCR 66264.171, 172, 173, 174	Applicable	Containers of RCRA hazardous waste must be as follows: • Maintained in good condition • Compatible with hazardous waste to be stored • Closed during storage except to add or remove waste • Have adequate secondary containment when stored onsite	These requirements are applicable to hazardous wastes that are generated and stored temporarily in containers at the site prior to offsite disposal and may include wastes such as soil, debris, or treatment residuals (water, sludge, filters). Pertains to sites AOC G-2 and AOC H-12.
	22 CCR 66264.175 (a) and (b)	Applicable	Place containers on a sloped, crack-free base, and protect from contact with accumulated liquid. Provide a containment system with a capacity of 10 percent of the volume of containers with liquids. Remove spilled or leaked waste in a timely manner to prevent overflow of containment system.	These requirements are applicable to hazardous wastes that are generated and stored temporarily in containers at the site prior to offsite disposal. Pertains to sites AOC G-2 and AOC H-12.
	22 CCR 66262.30 through 66262.33	Applicable (used to establish soil cleanup levels protective of groundwater for AOC G-2 and AOC H-12,).	Prior to transportation, containers would be packaged, labeled, marked, and placarded in accordance with RCRA and Department of Transportation requirements.	These are applicable requirements for containers that are used to contain hazardous wastes that are sent offsite for disposal. Pertains to sites AOCG-2 and AOC H-12.

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TABLE 2-10
Federal and State Action-specific ARARs
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, Sacramento, California

Action	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
Hazardous Waste Accumulation	22 CCR 66262.34	Applicable	Accumulation of hazardous wastes onsite for longer than 90 days would be subject to RCRA requirements for storage facilities.	These requirements are applicable to hazardous waste that is stored temporarily onsite in containers prior to offsite disposal. Pertains to sites AOC G-2 and AOC H-12.
Excavation	22 CCR 66268.40	Applicable	Movement of excavated materials characterized as hazardous to new location or placement in or on land will trigger LDRs for the excavated material.	Applicable if excavated soil and waste characterized as hazardous waste is placed on land (e.g., accumulation of soil prior to disposal) or transported off site for disposal. Pertains to AOC G-2 and AOC H-12.
Identify the Point of Compliance	27 CCR 20405 23 CCR 2550.5	Applicable	Requires the identification of the point of compliance, hydraulically down gradient of the area where waste was discharged to land.	Applicable to all areas in which waste has been discharged to land to determine the threat to water quality. Pertains to sites where waste will remain in place, such as AOC G-2, AOC H-12, CS S-049, PRL S-014, SA 010, SA 015, and SA 019.
Disposal	22 CCR 66268	Applicable	Compliance with LDR treatment standards is required if hazardous waste (e.g., contaminated soil) is placed on land. Soil treatability variance may be invoked according to 40 CFR 268.44 (h)(3) and (4).	LDRs must be met for hazardous wastes excavated and then placed in an area outside of a CAMU, treatment unit, or staging pile. This includes waste shipped off site for disposal. Pertains to AOC G-2 and AOC H-12.

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TABLE 2-10
Federal and State Action-specific ARARs
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, Sacramento, California

Action	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description	Comment
Surface Water and Groundwater Cleanup	40 CFR Parts 122, 123, 124, National Pollution Discharge Elimination System, implemented by State Water Resources Control Board Order 92-08 DWQ	Applicable	Regulates pollutants in discharge of stormwater associated with construction activity (clearing, grading, or excavation) involving the disturbance of 1 acre or more. Requirements to ensure stormwater discharges do not contribute to a violation of surface water quality standards.	Relevant to discharge of stormwater from areas where excavation or stockpiling of soils may occur. Applies to AOC G-2 and AOC H-12 during excavation activities and during storage of soils onsite prior to shipment for offsite disposal.
Land Use Covenant	California Health and Safety Code Section 25202.5 and CCR Title 22, Section 67391.1(a, d, and e)	Relevant and Appropriate	An appropriate land use covenant must be recorded when hazardous materials, waste, constituents or substances remain at the property at levels which are not suitable for unrestricted land use.	Pertains to sites AOC G-2, AOC H-12, CS S-049, PRL S-014, SA 010, SA 015, and SA 019.
	California Civil Code Section 1471(a)	Relevant and Appropriate	Environmental covenants must contain specified elements if they are to run with the land.	Pertains to sites AOC G-2, AOC H-12, CS S-049, PRL S-014, SA 010, SA 015, and SA 019.

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and surface water, but need not be more stringent than is necessary to achieve background levels of the constituents in surface water and groundwater. With respect to the Basin Plan, the Regional Water Board asserts that the Cleanup Policy applies to determining the appropriate cleanup level in the vadose zone that will comply with Resolution 68-16 and Resolution 92-49 and will meet the water quality objectives in the Basin Plan and protect the beneficial uses.

The State supports the numeric cleanup levels for non-VOCs in the vadose zone set forth in this ROD. These cleanup levels are consistent with state law and regulations. At this time, therefore, the State agrees not to dispute the ROD for failure to identify State Water Board Resolutions 68-16 and 92-49 and the Basin Plan's Cleanup Policy as ARARs for establishing vadose zone cleanup levels for non-VOCs. In the event that the remedial action does not attain these cleanup levels, the State reserves the right to apply and assert State Water Board Resolutions 68-16 and 92-49 and the Basin Plan's Cleanup Policy in any future decision to revise the cleanup levels or any dispute regarding cleanup.

2.10.3 Cost Effectiveness

In the lead agency's judgment, the Selected Remedies for AOC G-2, AOC H-12, CS S-049, PRL S-014, SA 010, SA 015, and SA 019 are cost-effective and represent a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (NCP 300.430(f)(1)(ii)(D)). This was accomplished by evaluating the "overall effectiveness," of those alternatives that satisfied the threshold criteria (i.e., protective of human health and the environment and ARAR compliant). Overall effectiveness was further evaluated by assessing the balancing criteria (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; short-term effectiveness; and implementability). Overall effectiveness was then compared to costs to determine cost-effectiveness.

Costs for the Selected Remedies are provided in Section 2.9.3. In addition, Tables 2-6 and 2-7 summarize the costs and provide the information needed to evaluate the cost effectiveness of the Selected Remedy for each site. For each alternative, information is presented on the threshold and balancing criteria.

2.10.4 Use of Permanent Solutions and Preference for Treatment as a Principal Element

For sites AOC G-2 and AOC H-12, excavation with offsite disposal is a component of the Selected Remedies for non-VOCs. The remedy is permanent but does not satisfy the preference for treatment. The institutional controls remedies at PRL S-014, CS S-049, SA 010, SA 015, and SA 019 are neither permanent (if the institutional controls fail) nor satisfy the preference for treatment. However, the Air Force and EPA have determined that the Selected Remedies represent the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at these sites. The Selected Remedies provide the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against offsite treatment and disposal and considering State and community acceptance. Overall, contaminant concentrations are relatively low and the contaminated soil and soil gas at these sites do not constitute principal threat wastes as discussed in Section 2.8.

2.10.5 Five-year Review Requirements

A 5-year review will be required for the seven remedial action sites because the selected remedy for these sites will result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure.

2.11 Documentation of Significant Changes

Based on IP ROD #1 (2004) and IP Remedial Action Work Plan #1 (2005), remedial actions were implemented at three sites during 2005. At PRL S-040, bioventing operations began in May 2005; PCB-contaminated soil at PRL S-014 was excavated in 2005 and 2006; and, contaminated soil at SA 003 was excavated to unrestricted use in November 2005.

Subsequent to completing the IP FS #2, the risks associated with VOC detections at SA 105 were re-evaluated. The greatest risks were associated with VOCs detected in shallow soil gas samples from SA105SG07 in 1993. Subsequently, two shallow soil gas samples and one deeper sample were collected from SA105SB003 in 2001 to confirm the detections in SA105SG07; however, no VOCs were detected in the three samples. The results from SA105SG07 were included in the risk assessment results for the RICS and the FS. However, because these data were not confirmed in boring SA105SB03, they have not been included in the risk calculation presented in the ROD. Excluding these results, VOCs in shallow soil gas at SA 105 present a low but acceptable risk. Arsenic, which was not detected above background in any samples, was also excluded from the risk calculations. Given these revised risk values, No Action is an acceptable alternative for the site.

Costs for SA 010, SA 015, and SA 019 were revised subsequent to completion of IP FS #2 and the Proposed Plan to delete the costs for additional sampling and analysis. The Air Force in coordination with the regulatory agencies determined that there was sufficient historical data at the sites in combination with knowledge of the operational history to determine boundaries for the institutional controls.

In July 2006, EPA initiated an informal dispute with the Air Force regarding the methodology for evaluation of risk for the vapor intrusion pathway and associated remedy selections for this ROD. EPA acknowledged that the Air Force had developed the site specific vapor intrusion compliance levels using EPA's guidance. However, EPA had additional recent concerns based on empirical data from Superfund sites across the country. Subsequently, the Air Force developed revised screening and cleanup levels for the vapor intrusion pathway. The Air Force presented these revised levels to the regulatory agencies and reviewed the characterization data in a series of meetings during 2007. To support remedy selection at three sites (AOC G-2, AOC H-12, and CS S-049), the Air Force collected additional data at these sites in late 2007. The data collection included shallow soil gas sampling and analysis for AOC G-2 and AOC H-12. Results are presented in Appendix D. The remedies selected in this ROD have been revised as appropriate based on the new cleanup levels and the additional data collection.

2.12 Works Cited

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SECTION 3

Responsiveness Summary

The Proposed Plan for Soil Cleanup at 23 Sites (Proposed Plan) (AFRPA, 2005) was available for review during a 30-day public comment period from August 1, through August 31, 2005. A public notice announced the start of the public comment period. The Proposed Plan was available for review at the McClellan Information Repository, on the AFRPA website, and the North Highlands/Antelope public library. A fact sheet that summarized the information in the Proposed Plan was also sent to the McClellan mailing list. In addition, a public meeting was held on August 15, 2005 to explain the Proposed Plan, and to solicit comments from the public. The public was encouraged to review the document and provide comments orally at the meeting, in writing, or via email, about the cleanup alternatives presented in the Proposed Plan.

A proposed plan and public comment period is a key part of the decision-making process because the Air Force uses community input when making a cleanup decision.

The Air Force received comments from three members of the public during the comment period. One person made an oral comment at the public meeting and two provided written comments. These comments and the Air Force responses are provided below.

I. Comments Received from August 15, 2005 Public Meeting:

KATHY BRODERICK: (for clarity of presentation and Air Force response, the comments have been separated and given a letter designation [a-j])**.** Sacramento County is committed to working together with all of the McClellan headquarters to promote property transfer and appropriate reuse of McClellan while ensuring protection of human health and the environment.

a. When McClellan was heading for closure, the County collaborated with the Air Force, regulatory agencies and the community to develop strategies for McClellan's future. These efforts resulted in the McClellan Base Reuse Plan and Special Planning Area (SPA) document and a commitment from the Air Force to clean up environmental contamination to a level consistent with future redevelopment and investment strategies. Although Sacramento County is in agreement with 21 of the 23 sites, the Air Force's preferred remediation alternative at two critical sites in the east McClellan District would severely restrict future redevelopment efforts. These sites, AOC G-2 and AOC H-12, are surrounded by dorms, high-traffic walking paths, recreational training areas, hotel conference facilities, and residential housing – areas planned for smart growth and creative mixed land use.

b. The Air Force proposes remediating the two sites to an industrial use level, which could severely limit the business and commerce opportunity there. In addition, the Air Force's proposed remediation efforts conflict with the Base Reuse Plan and the SPA that identified the areas for potential residential and/or commercial uses.

c. In general, the proposed cleanup alternatives presented rely heavily on land use restrictions and Institutional Control. Long term monitoring enforcement problems as well as property devaluation impacts of such control are difficult to calculate. These undefined costs should not fall to the County or to the developer.

d. In addition, the Air Force has communicated a desire to pass along many of their land use restrictions and monitoring responsibilities to subsequent owners. The responsibilities for institutional control special restrictions, such as engineered institutional controls, including Vapor Barrier and gas collection systems should remain with the Air Force and not with subsequent owners or users of the property.

e. However, to encourage property transfer and reuse at McClellan, the County has conceptually agreed to administer a portion of the Air Force's land use restrictions and responsibilities with the appropriate Air Force funding. Specifically at AOC G-2, located west of Wherry Housing, the residential and commercial uses including child care centers are permitted according to the SPA documents. The Air Force's proposed cleanup to an industrial use level in this area is in direct conflict with this plan and would inhibit reuse of this parcel. The same is true with AOC H-12. The Air Force proposes implementing a remedial alternative that would restrict this site to industrial use unless additional environmental investigations were conducted and/or protective measures are taken.

f. Since the Reuse Plan and the SPA identify this district as an area allowed for residential reuse, including senior centers, the Air Force needs to remove both the VOCs and non-VOC contaminates from the soil and support unrestricted land use.

g. The Air Force's Proposed Plan of conveying the responsibilities and costs associated with left behind waste, engineered institutional controls and land use restrictions to future property owners would greatly undermine the success at McClellan.

h. The County cannot and should not assume additional financial costs or assist in the contamination it did not cause.

i. The Air Force needs to either retain its institutional control responsibilities or provide compensation for assigning these obligations to other entities.

j. Therefore, Sacramento County requests that the Air Force reconsider their proposed remedial alternative to reflect unrestricted land use at both AOC H-12 and AOC G-2.

The Sacramento County Office of Economic Development appreciates the opportunity to provide comment.

Air Force Response:

a. The Air Force does not feel that the proposed alternatives at sites AOC G-2 and AOC H-12 restrict future development at these two sites. At site AOC G-2, the Air Force has already agreed to craft the institutional control language and boundaries such that the eastern most portion of the site (outside of the bermed area) is in the East McClellan District, in agreement with the County's SPA document. Based on the nature and extent of the contamination within the bermed area, there is no migration potential that would

impact residential use in the East McClellan District. Upon property transfer, no restrictions on residential use are anticipated for the East McClellan District in this area.

At site AOC H-12, the proposed remedy supports current and probable future occupational and commercial reuse of the site. The remedy is protective of reuse of the site, including this high pedestrian traffic area, which is surrounded by housing, retail, recreational training areas, hotel conference facilities, and offices. The proposed alternative (covenant requiring either further sampling or mitigation issues) would support restricted residential use, including uses such as dormitories or even childcare facilities if mitigation measures were included in any new residential construction built over the isolated soil gas contamination.

b. The term "industrial reuse" is a general term, which includes business and commercial reuse. With the flexibility this allows, the Air Force does not feel that future business and commercial opportunities would be severely limited. As explained in response a, based on previous discussions with the County and the Developer, the proposed remedy is in agreement with the County's SPA for site AOC G-2 and allows enough flexibility to meet the mixed use requirements of the Base Reuse Plan.

c. The Air Force disagrees with the characterization that the proposed cleanup alternatives rely heavily on land use restrictions and institutional controls. Sixteen of the 23 sites are proposed for No Action and have no restrictions. Four of the remaining 7 sites are located in the Base Reuse Plan's Core Aviation/Industrial corridor where the proposed industrial land use restriction is in step with both the current and probable future land use. For the remaining three sites (including AOC G-2 and AOC H-12 addressed in response a), the Air Force believes sufficient flexibility is provided in the remedy to meet both current and probable future land use. Who has responsibility for the long-term cost of monitoring and enforcement of institutional controls, while included in the Air Force's long-term O&M costs, is better addressed by negotiation between the Air Force and property recipients.

d. The Air Force is negotiating with the County to determine if and when a hand-off of long-term management of institutional controls would occur. In most cases, the restriction would be the deed itself, in which case the monitoring would be to ensure the land use is consistent with deed restrictions. Because the installation of mitigation measures is triggered only by new construction over an isolated portion of the site, there is no action for the Air Force to take, since it is unknown when construction would occur over that portion of the site.

e. As discussed in response **a**, an agreement has already been reached that clears the way at property transfer for the eastern portion of site AOC G-2 to allow for potential residential uses as part of the East McClellan District, which is in agreement with the SPA document. As discussed in response a, the remedy at AOC H-12 does currently allow for commercial reuse and if at some time in the future new housing or a daycare facility is to be constructed over the area of soil gas, it can be accomplished by sampling to show an acceptable risk or installing mitigation measures beneath the new building foundation.

f. The Air Force does intend to remove the existing non-VOC contaminants to unrestricted use levels. For VOCs in soil gas, as discussed in responses **a** and **e**, the proposed remedy allows enough flexibility to accommodate future development, including residential reuse and senior centers.

g. As discussed in responses **c** and **d**, most sites in this Record of Decision will have no restrictions, and those that do are either well matched for current and probable future land use, or (in the case of AOC G-2 and AOC H-12) have enough flexibility to present minimal impact to the redevelopment success at McClellan.

h. As discussed in response **c**, the Air Force included the cost of monitoring and enforcement of institutional controls in its analysis. Responsibility for such costs is subject to negotiation, particularly because the costs are not significant and depend upon future development not in the Air Force's control. The Air Force is not asking the County to assume significant additional financial costs.

i. As discussed in response **d**, the Air Force is still negotiating with the County over the long-term management of institutional controls.

j. Based on the explanations provided above, the Air Force believes the current remedies for sites AOC G-2 and AOC H-12 are appropriate for the current and probable future land use and does not intend to change the proposed remedy to unrestricted land use.

II. Comments submitted in writing to AFRPA during the comment period:

KATHY COOPER: I strongly recommend that sites AOC H-12 and AOC G-2 be designated as parcels to be cleaned up to RESIDENTIAL level. The land use at these two sites are used heavily by area citizens and should be cleaned up to the safest possible category. The Special Planning Area zoning document permits residential and child care centers. I strongly suggest these sites be readied by the Air Force for such use. At the very least, I believe the Air Force should compensate the county, or whoever does the appropriate cleanup, as the Air Force is the organization that caused the contamination.

Air Force Response: The Air Force does not feel that the proposed alternatives at sites AOC G-2 and AOC H-12 restrict future development at these two sites. At site AOC G-2, the Air Force has already agreed to craft the Institutional Control language and boundaries such that the easternmost portion of the site (outside of the bermed area) is in the East McClellan District, in agreement with the County's SPA document. Based on the nature and extent of the contamination within the bermed area, there is no migration potential that would impact residential use in the East McClellan District. Upon property transfer, we do not anticipate any prohibition on residential use for the East McClellan District in this area.

At site AOC H-12, the proposed remedy supports current and probable future occupational and commercial reuse of the site. The remedy is protective of reuse of the site, including this high pedestrian traffic area, which is surrounded by housing, retail, recreational training areas, hotel conference facilities, and offices. The proposed alternative would not prevent residential use, including uses such as dormitories or even childcare facilities. The Air Force believes it is reasonable to expect the developer to contribute the minimal construction cost of a vapor intrusion barrier, since the developer would be reaping the benefit of the revenue

stream coming from the new construction, and the developer controls the size, location, and nature of the development.

GARY COLLIER: In a perfect world, it would be expected to expect the areas to be cleaned up to residential standards, however I have difficulty in finding sufficient justification of spending Federal monies to achieve that level of cleanup in the cases cited in this collection of sites that are proposed for institutional control with Industrial usage. While it is potentially possible to see residential in the future at these sites, I believe that the remedies are sufficient to meet the Air Force obligation. If a future owner of record obtains title to the land, then they could expend the additional monies to fulfill the necessary cleanup to residential standards. There are a number of creative financial means for which a future owner could avail himself of to make such a project viable using private as well as State tax revenue.

I would also like to reiterate prior comments regarding the need and desire to see an institutional control that would incorporate a vapor barrier under any building built in the future on the former base. This is the only sure way of protecting future tenants or residents from adverse health effects of the known or unknown pollutants which may be lurking on the former base. I fail to see why an institutional control that is required on condition of sale should be so costly prohibitive to delay sale or require the Federal Government to pay for future building additions. To require the Federal Government to pay for caps or barriers in perpetuity is economic folly. Let the Developer pay, and let that be reflected in the negotiated sale price of the property.

Air Force Response: The Air Force agrees with Mr. Collier's recommendation of cleaning up these sites to "like-use" conditions that may, in some cases, include long-term institutional controls for industrial usage. Industrial usage institutional controls do permit commercial and office usage. As suggested, should future development at these sites change to include residential homes, it is reasonable to expect the developer to shoulder some of the costs since they will be reaping the financial benefits.

The suggestion of including a blanket institutional control that would require a vapor intrusion barrier to be installed under any new buildings constructed on the base is a conservative insurance policy that does have some merit, since there are still data gaps remaining on the base, there are areas of concern that could become Installation Restoration Program (IRP) sites, and ongoing investigations and remedial design work could potentially reveal more sites that would require remediation under CERCLA. However under CERCLA, only those IRP sites where a significant risk to indoor air is present would be considered for an institutional control requirement of deed covenant for additional sampling or mitigation measures for new construction. Large portions of McClellan acreage are situated outside of IRP site boundaries. Development in these areas would not be governed by CERCLA RODs, but by County building codes. It is recommended that this suggestion be brought to the attention of the Sacramento County Building Department, because the Air Force has no jurisdiction or influence over building codes for non-IRP-impacted property at McClellan.

SECTION 4

Administrative Record Index

A site-specific Administrative Record Index listing follows. This listing includes all stored documents associated with the specific site. A list is provided for each of the following sites:

- AOC G-2
- AOC H-1
- AOC H-2
- AOC H-3
- AOC H-8
- AOC H-12
- AOC H-13
- AOC H-14
- CS S-049
- PRL S-014
- PRL S-033
- PRL S-040
- PRL S-047
- SA 003
- SA 010
- SA 015
- SA 019
- SA 035
- SA 041
- SA 091
- SA 105
- Tank 783
- Tank 788

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Document Date	Subject or Title	Author/Corporate Affil	File Name
1/24/1995	Preliminary Assessment Report Operable Units E though H Part 1: Summary and Overview	Louie, Stacy A./ Sparks, George C./ Radian Corp.	MCCLN_AR_5485.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.1.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.2.pdf
10/1/1998	Final Site Characterization, FSP, Vol. I of IV, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_899.1.pdf
10/1/1998	Final Site Characterization, FSP, Vol. I of IV, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_899.2.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. II of IV, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_900.1.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. II of IV, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_900.2.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. III of IV, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_901.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. IV of IV, Appendix C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_902.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. I of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3837.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. II of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3838.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.1.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VI of VIII, Appendix C1, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3842.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VIII of VIII, Appendix D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3844.pdf
11/1/2002	Former McClellan Air Force Base Field Sampling Plan for Petroleum, Oils, and Lubricants (POL) and Shallow Soil Gas (SSG) at Selected Sites 5.	URS	MCCLN_AR_5058.pdf
7/16/2003	Revised Final Bioventing Vapor Monitoring Point Report for Five Sites (DSR# 856-1)	Parsons	MCCLN_AR_4944.pdf
6/14/2004	Former McClellan Air Force Base Interim Basewide Remedial Investigation Report, Operable Units A, B, C, and G — Group 1 POL/SSG Remedial Investigation Characterization Summaries Addenda for Selected Sites	Titus, Edward R./ Benedict, Stephanie K.	MCCLN_AR_5494.pdf
11/30/2004	Soil Vapor Extraction Removal Action Quarterly Vadose Zone Monitoring Report July – September 2004	URS	MCCLN_AR_5651.pdf MCCLN_AR_5651.1.pdf
1/1/2005	Final Biovent Decommission Work Plan, Davis Global Communication Site, Tank Farm 2, and Tank Farm 7	BEM Systems, Inc., Tetra Tech, Inc.	MCCLN_AR_5666.pdf
1/1/2005	Final Local Reuse Authority Initial Parcel Remedial Action Work Plan #1 (3 sites) at the former McClellan AFB, Sacramento County, California	Environmental Quality Management, Inc.	MCCLN_AR_5664.pdf
2/28/2005	Soil Vapor Extraction Removal Action Quarterly Vadose Zone Monitoring Report October – December 2004	URS	MCCLN_AR_5652.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
5/31/2005	Soil Vapor Extraction Removal Action Quarterly Vadose Zone Monitoring Report January – March 2005	URS	MCCLN_AR_5653.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf
8/31/2005	Soil Vapor Extraction Removal Action Quarterly Vadose Zone Monitoring Report April – June 2005	URS	MCCLN_AR_5657.pdf
9/6/2005	RE: Integration Of Soil Gas Actions Into IP ROD Group #2, IP ROD Group #3 And Focused Strategic Sites ROD	Kistner, Glenn/USEPA	MCCLN_AR_5910.pdf
9/22/2005	Former McClellan AFB Interim Basewide Remedial Investigation Report, Part 1, General Framework Revision 2, Final (DSR# 381-7)	Mitretek Systems, Inc.	MCCLN_AR_5934pdf
11/30/2005	SVE Removal Action Quarterly Vadose Zone Monitoring Report July through Sep 2005	URS	MCCLN_AR_6220.pdf
12/19/2005	USEPA Comments on Draft LRA Initial Parcel Record of Decision #2	Glenn Kistner/ USEPA Region IX	MCCLN_AR_6371.pdf
12/28/2005	DTSC Comments on The Draft Local Reuse Authority (LRA) Initial Parcel Record of Decision 2 (IP #2 ROD)	Tami Trearse/DTSC	MCCLN_AR_6368.pdf
3/2/2006	SVE Removal Action Quarterly Vadose Zone Monitoring Report Oct through Dec 2005	URS	MCCLN_AR_6019pdf
3/24/2006	Comments on Draft Final LRA Initial Parcel ROD #2	Joseph B. Healy/ USEPA, Region IX	MCCLN_AR_6179.pdf
4/10/2006	Review of Draft Final Local Redevelopment Authority Initial parcel Record of Decision #2, 23 sites	James Taylor/RWQCB	MCCLN_AR_6178.pdf
5/15/2006	Comments on the Draft Final Local Reuse Authority Initial Parcel Record of Decision #2.	Kevin Depies/DTSC	MCCLN_AR_6177.pdf
5/30/2006	SVE Vadose Zone Quarterly Monitoring Report, Jan-Mar 2006 (First quarter 2006)	URS	MCCLN_AR_6124.pdf
6/1/2006	Biovent System at PRL S-040, Soil Initial Parcel Remedial Action, Quarterly Operations Report, 1 Jan 2006 - 31 Mar 2006	Environmental Quality Management, Inc.	MCCLN_AR_6232.pdf
7/1/2006	Quarterly Operations Report Biovent System at PRL S-040, Soil Initial Parcel Remedial Action	Environmental Quality Management, Inc.	MCCLN_AR_6123.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
7/5/2006	RWQCB Comments on Draft Final Local Redevelopment Authority Initial Parcel Record of Decision #2 (23 Sites)	James Taylor/RWQCB	MCCLN_AR_6433.pdf
7/11/2006	USEPA Comments on Draft Final Phase 1 LRA RAWP #2	Joseph B. Healy/ USEPA, Region IX	MCCLN_AR_6221.pdf
7/24/2006	RWQCB Comments on Draft Final Phase 1 LRA Local Reuse Authority Initial Parcel #2 Remedial Action Work Plan	James Taylor/RWQCB	MCCLN_AR_6220.pdf
7/31/2006	Draft Final Local Reuse Authority Initial Parcel Record of Decision #2	Kathleen Johnson/ USEPA Region IX	MCCLN_AR_6344.pdf
8/16/2006	DTSC Comments on Draft Final Phase 1 Initial parcel #2 Remedial Action Work Plan	Kevin Depies/DTSC	MCCLN_AR_6431.pdf
8/30/2006	Soil Vapor Extraction Removal Action Quarterly Vadose Zone Monitoring Report April - June 2006	URS	MCCLN_AR_6119.pdf
10/18/2006	Local Reuse Authority Initial Parcel #1 Remedial Action Completion Report	EQM	MCCLN_AR_6250.pdf
11/30/2006	Soil Vapor Extraction Removal Action Quarterly Vadose Zone Monitoring Report, Jul - Sep 2006	URS	MCCLN_AR_6241.pdf
3/2/2007	Soil Vapor Extraction Removal Action Annual Vadose Zone Monitoring Report, Jan - Dec 2006	URS	MCCLN_AR_6421.pdf
3/15/2007	Extension of Time to Invoke Formal Dispute Resolution Relating to Initial Parcel ROD #2 and AFRPA Feb 16 2007 ltr	Kathleen Johnson/ USEPA Region IX	MCCLN_AR_6274.pdf
4/4/2007	Extention of Time to Invoke Formal Dispute Resolution Relating to Initial Parcel ROD #2	Dexter Cochnauer/ AFRPA	MCCLN_AR_6277.pdf
5/30/2007	Soil Vapor Extraction Removal Action Quarterly Vadose Zone Monitoring Report, Jan - Mar 2007	URS	MCCLN_AR_6440.pdf
8/2007	Phase 1 Local Reuse Authority Initial Parcel #2 Pre-Decision Work Plan	CH2M HILL	MCCLN_AR_6508.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
4/22/1987	Tank Testing	American Environmental Management Corp.	MCCLN_AR_5646.pdf
4/26/1991	UST Building 900 AAFES Gas Station	Brandt-Robuck, EMR	MCCLN_AR_5659.pdf
5/13/1991	Building 900 AAFES Gas Station USTs	Brand-Robuck, EMR	MCCLN_AR_5642.pdf
5/17/1991	UST Project Building 900 AAFES Gas Station Briefing	Brandt-Robuck, EMR	MCCLN_AR_5641.pdf
5/30/1991	Building 900 Water Infiltration Investigation Report	Subtronic Corp.	MCCLN_AR_5640.pdf
7/9/1991	Project Review, Contaminated Soil Management, Funding Adjustment Request	Brunner, Paul/EMR	MCCLN_AR_5639.pdf
1/9/1992	Building 900 UST Removal Project Report	Allen, John SM-ALC/EMR	MCCLN_AR_5643.pdf
1/24/1995	Preliminary Assessment Report Operable Units E though H Part 1: Summary and Overview	Louie, Stacy A.; Sparks, George C./ Radian Corp.	MCCLN_AR_5485.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.1.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.2.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
10/1/1998	Final Site Characterization, FSP, Vol. I of IV, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_899.1.pdf
10/1/1998	Final Site Characterization, FSP, Vol. I of IV, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_899.2.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. II of IV, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_900.1.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. II of IV, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_900.2.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. III of IV, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_901.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. IV of IV, Appendix C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_902.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. I of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3837.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. II of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3838.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VI of VIII, Appendix C1, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3842.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VIII of VIII, Appendix D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3844.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.2.pdf
8/1/2000	Point Paper for Building 900	Air Force	MCCLN_AR_5650.pdf
2/15/2002	Underground Storage Tank Closure Report Building 900 (DSR# 686-3)	Brunner, Paul	MCCLN_AR_4496.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf
4/5/2006	Installation Restoration Program Start 1: Site Evaluations For Applicability of Soil Vapor Extraction (SVE)	Graff, Paul; Benedict, Stephanie K./URS	MCCLN_AR_5663.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
9/1/1994	PA/SI, Final Technical Summary Report	Radian Corp.	MCCLN_AR_2427.pdf
1/24/1995	Preliminary Assessment Report Operable Units E though H Part 1: Summary and Overview	Louie, Stacy A.; Sparks, George C./Radian Corp.	MCCLN_AR_5485.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.1.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.2.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. I of V, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_903.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. II of V, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_904.1.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. II of V, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_904.2.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. III of V, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_905.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. IV of V, Appendix C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_906.1.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. IV of V, Appendix C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_906.2.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. V of V, Appendix D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_907.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. I of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3837.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. II of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3838.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VI of VIII, Appendix C1, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3842.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VIII of VIII, Appendix D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3844.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.2.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf

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9/1/1994	PA/SI, Final Technical Summary Report	Radian Corp.	MCCLN_AR_2427.pdf
1/24/1995	Preliminary Assessment Report Operable Units E though H Part 1: Summary and Overview	Louie, Stacy A.; Sparks, George C./Radian Corp.	MCCLN_AR_5485.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.1.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.2.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. I of V, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_903.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. II of V, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_904.1.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. II of V, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_904.2.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. III of V, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_905.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. IV of V, Appendix C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_906.1.pdf
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6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. I of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3837.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. II of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3838.pdf

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6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.1.pdf
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6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VI of VIII, Appendix C1, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3842.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VIII of VIII, Appendix D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3844.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.2.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf

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1/24/1995	Preliminary Assessment Report Operable Units E though H Part 1: Summary and Overview	Louie, Stacy A.; Sparks, George C./Radian Corp.	MCCLN_AR_5485.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.1.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.2.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. I of V, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_903.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. II of V, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_904.1.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. II of V, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_904.2.pdf
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10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. IV of V, Appendix C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_906.1.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. IV of V, Appendix C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_906.2.pdf
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5/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Group 3	Radian Corp.	MCCLN_AR_3824.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
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5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
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8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf

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9/1/1994	PA/SI, Final Technical Summary Report	Radian Corp.	MCCLN_AR_2427.pdf
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10/1/1998	Final Site Characterization Summary, FSP, Vol. II of IV, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_900.1.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. II of IV, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_900.2.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. III of IV, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_901.pdf
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6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. I of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3837.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. II of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3838.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.2.pdf
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6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.2.pdf
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6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VIII of VIII, Appendix D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3844.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.2.pdf
7/2/2001	Initial Parcel FS Meeting Minutes, 11 Jun 01	CH2M HILL	MCCLN_AR_4219.pdf
10/31/2001	RA, Work Plan, Drainage Ditch, OU-B, OU-B1	Weston, Inc.	MCCLN_AR_4308.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf
8/2007	Final Phase 1 Local Reuse Authority Initial Parcel #2 Pre-Decision Work Plan	CH2M HILL	MCCLN_AR_6508.pdf

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9/1/1994	PA/SI, Final Technical Summary Report	Radian Corp.	MCCLN_AR_2427.pdf
1/24/1995	Preliminary Assessment Report Operable Units E though H Part 1: Summary and Overview	Louie, Stacy A.; Sparks, George C./Radian Corp.	MCCLN_AR_5485.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.1.pdf
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6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
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10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. I of V, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_903.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. II of V, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_904.1.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. II of V, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_904.2.pdf
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10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. IV of V, Appendix C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_906.1.pdf
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6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. II of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3838.pdf

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6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.2.pdf
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6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.1.pdf
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8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.2.pdf
12/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Vol. I of II, Group 6	URS Greiner Woodward Clyde, Inc.	MCCLN_AR_3963.pdf
4/8/2004	Geophysical Survey Findings for AOC H-13 Located at the former McClellan AFB	Dolver Company, Inc.	MCCLN_AR_5644.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf
4/5/2006	Installation Restoration Program Start 1: Site Evaluations For Applicability of Soil Vapor Extraction (SVE)	Graff, Paul; Benedict, Stephanie K./URS	MCCLN_AR_5663.pdf

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9/1/1994	PA/SI, Final Technical Summary Report	Radian Corp.	MCCLN_AR_2427.pdf
1/24/1995	Preliminary Assessment Report Operable Units E though H Part 1: Summary and Overview	Louie, Stacy A.; Sparks, George C./Radian Corp.	MCCLN_AR_5485.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.1.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.2.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. I of V, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_903.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. II of V, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_904.1.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. II of V, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_904.2.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. III of V, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_905.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. IV of V, Appendix C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_906.1.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. IV of V, Appendix C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_906.2.pdf
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, Vol. V of V, Appendix D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_907.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. I of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3837.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. II of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3838.pdf

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6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VI of VIII, Appendix C1, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3842.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VIII of VIII, Appendix D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3844.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.2.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf

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4/5/2006	Installation Restoration Program Start 1: Site Evaluations For Applicability of Soil Vapor Extraction (SVE)	Graff, Paul; Benedict, Stephanie K./URS	MCCLN_AR_5663.pdf
8/2007	Final Phase 1 Local Reuse Authority Initial Parcel #2 Pre-Decision Work Plan	CH2M HILL	MCCLN_AR_6508.pdf

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11/1/1991	RI, Stage 7, Final SAP, OU-B	Radian Corp.	MCCLN_AR_2989.pdf
5/1/1993	Installation Restoration Program (IRP) Operable Unit B Sampling & Analysis Plan Addendum Field Sampling Plans For McClellan AFB	Radian Corp.	MCCLN_AR_4986.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. I of IX, OU-B	Radian Corp.	MCCLN_AR_2826.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. II of IX, OU-B	Radian Corp.	MCCLN_AR_2827.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. III of IX, Appendix A, OU-B	Radian Corp.	MCCLN_AR_2828.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. IV of IX, Appendix A, OU-B	Radian Corp.	MCCLN_AR_2829.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. V of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2830.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VI of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2831.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VII of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2832.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VIII of IX, Appendix C, OU-B	Radian Corp.	MCCLN_AR_2833.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. IX of IX, Appendix D, OU-B	Radian Corp.	MCCLN_AR_2834.pdf
12/1/1995	Basewide Ecological Risk Assessment, Technical Memorandum, Final Scoping Summary Status Report, OU-A, OU-B, OU-C, OU-D	Jacobs Engineering Group, Inc.	MCCLN_AR_2838.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf

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4/5/2006	Installation Restoration Program Start 1: Site Evaluations For Applicability of Soil Vapor Extraction (SVE)	Graff, Paul; Benedict, Stephanie K./URS	MCCLN_AR_5663.pdf
8/2007	Final Phase 1 Local Reuse Authority Initial Parcel #2 Pre-Decision Work Plan	CH2M HILL	MCCLN_AR_6508.pdf

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7/1/1981	Records Search Report	CH2M HILL	MCCLN_AR_41.pdf
12/1/1986	Final Basewide Report on Contamination	McLaren Environmental Engineering	MCCLN_AR_1080.pdf
12/1/1986	FS, RA Plan, Final Basewide Source Control Report	McLaren Environmental Engineering	MCCLN_AR_1081.pdf
2/1/1991	Installation Restoration Program (IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume 1: Text and Plates	Radian Corp.	MCCLN_AR_4987.pdf
2/1/1991	Installation Restoration Program(IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume II: Appendix A and Appendix B (Part 1)	Radian Corp.	MCCLN_AR_4988.pdf
2/1/1991	Installation Restoration Program (IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume III: Appendix B (Part 2)	Radian Corp.	MCCLN_AR_4989.pdf
2/1/1991	Installation Restoration Program (IRP) Stage # Operable Unit A Preliminary Assessment Summary Report Volume IV: Appendix B (Part 3) and Appendices C,D,and E.	Radian Corp.	MCCLN_AR_4990.pdf
9/1/1992	RI, Final SAP, Vol. I, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_1883.pdf
7/1/1994	Working Draft Technical Memorandum, UST Closure Certification	Radian Corp.	MCCLN_AR_2367.pdf
10/13/1994	CRWQCB Letter to Base Concerning Draft UST Closure Certification Report	MacDonald, Alexander M/CRWQCB	MCCLN_AR_2463.pdf
10/1/1994	Basewide Ecological Risk Assessment Final Scoping Report, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2472.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. I of VI, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2795.1.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. I of VI, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2795.2.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. II of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2796.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. III of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2797.1.pdf

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11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. III of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2797.2.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. IV of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2798.1.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. IV of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2798.2.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. V of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2799.1.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. V of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2799.2.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. V of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2799.3.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. VI of VI, Appendices B-D, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2800.1.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. VI of VI, Appendices B-D, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2800.2.pdf
5/7/1997	Base Letter to Regulators Concerning Appropriate Modeling to Determine Potential Water Quality Impacts From Metals Contaminated Soil	Anderson, Elaine S/ AFEMR	MCCLN_AR_3339.pdf
5/14/1997	USEPA Letter to Base Concerning Letter on Appropriate Modeling to Determine Potential Water Quality Impacts From Metals Contaminated Soil	Healy, Joseph B, Jr/USEPA Region IX	MCCLN_AR_3342.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
3/1/1999	Update Pages, Final Basewide Data Gap, FSP 3	Jacobs Engineering Group, Inc.	MCCLN_AR_929.pdf
3/1/1999	Final Basewide Data Gap FSP 3, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_3609.1.pdf
3/1/1999	Final Basewide Data Gap FSP 3, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_3609.2.pdf

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8/25/2000	CRWQCB Letter to Base Concerning No Further Action, UST, Bldg 22	Macdonald, Alexander/CRWQCB	MCCLN_AR_5645.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.2.pdf
9/19/2000	CRWQCB Memo Concerning Beneficial Use, Protective Water Quality Limits, Petroleum-Based Fuels	Marshack, Jon B/CRWQCB	MCCLN_AR_4248.pdf
12/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Vol. I of II, Group 6	URS Greiner Woodward Clyde, Inc.	MCCLN_AR_3963.pdf
12/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Vol. II of II, Appendices A-F, Group 6	URS Greiner Woodward Clyde, Inc.	MCCLN_AR_3964.1.pdf
12/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Vol. II of II, Appendices A-F, Group 6	URS Greiner Woodward Clyde, Inc.	MCCLN_AR_3964.2.pdf
1/1/2001	Supplemental FOSL, Group 6 Facilities	Lowas, Albert F, Jr/Air Force Base Conversion Agency	MCCLN_AR_4334.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. I of XIV, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4262.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. II of XIV, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4263.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. III of XIV, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4264.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. IV of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4265.1.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. IV of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4265.2.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. V of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4266.1.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. V of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4266.2.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. VI of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4267.1.pdf

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9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. VI of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4267.2.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. VII of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4268.1.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. VII of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4268.2.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. VIII of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4269.1.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. VIII of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4269.2.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. IX of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4270.1.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. IX of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4270.2.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. X of XIV, Appendix B, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4271.1.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. X of XIV, Appendix B, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4271.2.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XI of XIV, Appendix C1-C10, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4272.1.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XI of XIV, Appendix C1-C10, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4272.2.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XI of XIV, Appendix C1-C10, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4272.3.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XII of XIV, Appendix D1-D4, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4273.1.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XII of XIV, Appendix D1-D4, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4273.2.pdf

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9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XIV of XIV, Appendix D6-D7, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4275.pdf
5/20/2002	Final Initial Parcel Data Gaps FSP and HSP	CH2M HILL	MCCLN_AR_4450.pdf
6/19/2002	McClellan Air Force Base Operable Unit A Remedial Investigation Characterization Summaries Addendum Final	Jacobs Engineering Group, Inc.	MCCLN_AR_4970.pdf
6/19/2002	McClellan Air Force Base Operable Unit A Remedial Investigation Characterization Summaries Addendum Final	Jacobs Engineering Group, Inc.	MCCLN_AR_4970.1.pdf
6/19/2002	McClellan Air Force Base Operable Unit A Remedial Investigation Characterization Summaries Addendum Final	Jacobs Engineering Group, Inc.	MCCLN_AR_4971.pdf
6/19/2002	McClellan Air Force Base Operable Unit A Remedial Investigation Characterization Summaries Addendum Final	Jacobs Engineering Group, Inc.	MCCLN_AR_4971.1.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1(7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2M HILL	MCCLN_AR_4942.1.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1(7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2M HILL	MCCLN_AR_4942.2.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1(7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2M HILL	MCCLN_AR_4942.pdf
9/11/2003	Final Local Redevelopment Authority (LRA) Initial Parcel Proposed Plan #1(7 Sites) (DSR #510-5)	Brunner, Paul/AFRPA	MCCLN_AR_4875.pdf
9/30/2003	Initial Parcel Proposed Plan Public Meeting Reporter's Transcript	Hale, Jacqueline/AFRPA	MCCLN_AR_5157.pdf
6/30/2004	LRA Initial Parcel Record of Decision #1 (7 Sites) For Soil at PRL S-014, PRL S-033, PRL S-040, SA 003, SA 035, SA 041, SA 091	CH2M HILL	MCCLN_AR_5488.pdf
1/1/2005	LRA Initial Parcel Remedial Action Work Plan #1	Environmental Quality Management	MCCLN_AR_5664.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf

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8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf
4/5/2006	Installation Restoration Program Start 1: Site Evaluations For Applicability of Soil Vapor Extraction (SVE)	Graff, Paul; Benedict, Stephanie K./URS	MCCLN_AR_5663.pdf
10/2006	Final Local Reuse Authority Initial Parcel #1 Remedial Action Completion Report	EQM, Inc.	MCCLN AR 6520.pdf
8/2007	Final Phase 1 Local Reuse Authority Initial Parcel #2 Pre-Decision Work Plan	CH2M HILL	MCCLN_AR_6508.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
2/1/1991	Stage 3, EA, EE/CA, Final Report, Disposal and Reuse, OU-B	Radian Corp.	MCCLN_AR_1654.1.pdf
2/1/1991	Stage 3, EA, EE/CA, Final Report, Disposal and Reuse, OU-B	Radian Corp.	MCCLN_AR_1654.2.pdf
2/1/1991	Installation Restoration Program Stage 7 Operable Unit B Soil Gas Investigation Data Summary 2, Draft	Radian Corp.	MCCLN_AR_5655.pdf
4/1/1991	Stage 3, Final Action Memorandum, OU-B	Radian Corp.	MCCLN_AR_1693.pdf
4/1/1991	Stage 3, FONSI, EE/CA, EA and Removal Action Final Report, Disposal and Reuse, OU-B	Radian Corp.	MCCLN_AR_1697.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. I of III, OU-B	Radian Corp.	MCCLN_AR_1793.1.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. I of III, OU-B	Radian Corp.	MCCLN_AR_1793.2.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. II of III, OU-B	Radian Corp.	MCCLN_AR_1794.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. III of III, OU-B	Radian Corp.	MCCLN_AR_1795.pdf
11/1/1991	RI, Stage 7, Final SAP, OU-B	Radian Corp.	MCCLN_AR_2989.pdf
8/1/1994	Basewide Ecological Risk Assessment Final Scoping Report, OU-B, OU-D	Jacobs Engineering Group, Inc.	MCCLN_AR_2398.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. I of IX, OU-B	Radian Corp.	MCCLN_AR_2826.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. II of IX, OU-B	Radian Corp.	MCCLN_AR_2827.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. III of IX, Appendix A, OU-B	Radian Corp.	MCCLN_AR_2828.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. IV of IX, Appendix A, OU-B	Radian Corp.	MCCLN_AR_2829.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. V of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2830.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VI of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2831.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VII of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2832.pdf

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12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VIII of IX, Appendix C, OU-B	Radian Corp.	MCCLN_AR_2833.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. IX of IX, Appendix D, OU-B	Radian Corp.	MCCLN_AR_2834.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
9/1/1998	Final Data Gap FSP 2	Radian Corp.	MCCLN_AR_898.1.pdf
9/1/1998	Final Data Gap FSP 2	Radian Corp.	MCCLN_AR_898.2.pdf
9/1/1998	Final Data Gap FSP 2	Radian Corp.	MCCLN_AR_898.3.pdf
9/1/1998	Final Data Gap FSP 2	Radian Corp.	MCCLN_AR_898.4.pdf
12/1/1999	FS, Report, Final Basewide VOC, Vol. I of III	CH2M HILL	MCCLN_AR_3721.pdf
12/1/1999	FS, Report, Final Basewide VOC, Vol. II of III	CH2M HILL	MCCLN_AR_3722.pdf
12/1/1999	FS, Report, Final Basewide VOC, Vol. III of III	CH2M HILL	MCCLN_AR_3723.pdf
5/1/2000	Final Work Implementation Plan, OU-B	Radian Corp.	MCCLN_AR_3823.pdf
6/1/2000	Press Release, Public Notice, Base Plans Continued Short Term, Permitted Storage Facility for Hazardous Waste, SS-118	SM-ALC/EM	MCCLN_AR_3845.pdf
6/2/2000	Final EE/CA and Work Plan, Non-VOC, PRL S-033, SS-118	CH2M HILL	MCCLN_AR_3847.pdf
11/6/2000	Decision Document, Action Memorandum, PRL S-033, SS-118	Lowas, Albert F, Jr/ Air Force Base Conversion Agency	MCCLN_AR_4073.pdf
2/1/2001	Final Work Implementation Plan, Ex Situ Wet Oxidation Treatability Study, Revision 0	URS, Corp.	MCCLN_AR_4121.pdf
2/26/2001	RA, Final Work Plan, PRL S-033	Roy F. Weston, Inc.	MCCLN_AR_4134.pdf
6/28/2001	CDTSC Letter to Base Concerning Approval of RA Memorandum and Final SVE, EE/CA, PRL S-033, IC-25, IC-41, IC-42, IC-43	Malinowski, Mark/DTSC	MCCLN_AR_4212.pdf
7/2/2001	Initial Parcel FS Meeting Minutes, 11 Jun 01	CH2M HILL	MCCLN_AR_4219.pdf
10/1/2001	Final Surface Water and Sediment Sampling Report, PRL S-033, SS-118	TechLaw, Inc.	MCCLN_AR_4338.pdf
1/1/2002	Final Work Implementation Plan, Soil Washing and Solidification/Stabilization, Revision 1	URS, Corp.	MCCLN_AR_4477.pdf
5/1/2002	Final Technology Application Analysis Report, Ex Situ Thermal Desorption Treatability Study, Revision 0	URS Group, Inc.	MCCLN_AR_4449.pdf

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4/11/2003	Final Removal Action Report PRL S-033	Weston, Inc. and Kleinfelder, Inc.	MCCLN_AR_4685.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2M HILL	MCCLN_AR_4942.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2M HILL	MCCLN_AR_4942.1.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2M HILL	MCCLN_AR_4942.2.pdf
9/11/2003	Final Local Redevelopment Authority (LRA) Initial Parcel Proposed Plan #1(7 Sites) (DSR #510-5)	Brunner, Paul	MCCLN_AR_4875.pdf
9/30/2003	Initial Parcel Proposed Plan Public Meeting Reporter's Transcript	Hale, Jacqueline/AFRPA	MCCLN_AR_5157.pdf
4/2/2004	Interm Basewide Remedial Investigation Report Part 2B - Operable Unit B Remedial Investigation Characterization Summaries and Addenda Volume 1 of 6	Rogalla, Joy; Benedict, Stephanie/URS	MCCLN_AR_5478.pdf
4/2/2004	Interm Basewide Remedial Investigation Report Part 2B - Operable Unit B Remedial Investigation Characterization Summaries and Addenda Volume 2 of 6	Rogalla, Joy; Benedict, Stephanie/URS	MCCLN_AR_5479.pdf
4/2/2004	Interm Basewide Remedial Investigation Report Part 2B - Operable Unit B Remedial Investigation Characterization Summaries and Addenda Volume 3 of 6	Rogalla, Joy; Benedict, Stephanie/URS	MCCLN_AR_5480.pdf
4/2/2004	Interm Basewide Remedial Investigation Report Part 2B - Operable Unit B Remedial Investigation Characterization Summaries and Addenda Volume 4 of 6	Rogalla, Joy; Benedict, Stephanie/URS	MCCLN_AR_5481.pdf
4/2/2004	Interm Basewide Remedial Investigation Report Part 2B - Operable Unit B Remedial Investigation Characterization Summaries and Addenda Volume 5 of 6	Rogalla, Joy; Benedict, Stephanie/URS	MCCLN_AR_5482.pdf
4/2/2004	Interm Basewide Remedial Investigation Report Part 2B - Operable Unit B Remedial Investigation Characterization Summaries and Addenda Volume 6 of 6	Rogalla, Joy; Benedict, Stephanie/URS	MCCLN_AR_5483.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
6/30/2004	LRA Initial Parcel Record of Decision #1 (7 Sites) For Soil at PRL S-014, PRL S-033, PRL S-040, SA 003, SA 035, SA 041, SA 091	CH2M HILL	MCCLN_AR_5488.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf
4/5/2006	Installation Restoration Program Start 1: Site Evaluations For Applicability of Soil Vapor Extraction (SVE)	Graff, Paul; Benedict, Stephanie/URS	MCCLN_AR_5663.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
9/1/1994	PA/SI, Final Technical Summary Report	Radian Corp.	MCCLN_AR_2427.pdf
1/24/1995	Preliminary Assessment Report Operable Units E though H Part 1: Summary and Overview	Louie, Stacy A.; Sparks, George C./Radian Corp.	MCCLN_AR_5485.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.1.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.2.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
10/1/1998	Final Site Characterization, FSP, Vol. I of IV, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_899.1.pdf
10/1/1998	Final Site Characterization, FSP, Vol. I of IV, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_899.2.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. II of IV, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_900.1.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. II of IV, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_900.2.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. III of IV, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_901.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. IV of IV, Appendix C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_902.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. I of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3837.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. II of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3838.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.1.pdf

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6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VI of VIII, Appendix C1, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3842.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VIII of VIII, Appendix D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3844.pdf
7/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Group 4	Radian Corp.	MCCLN_AR_3866.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2M HILL	MCCLN_AR_4942.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2M HILL	MCCLN_AR_4942.1.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2M HILL	MCCLN_AR_4942.2.pdf
9/11/2003	Final Local Redevelopment Authority (LRA) Initial Parcel Proposed Plan #1(7 Sites) (DSR #510-5)	Brunner, Paul/AFRPA	MCCLN_AR_4875.pdf
9/30/2003	Initial Parcel Proposed Plan Public Meeting Reporter's Transcript	Hale, Jacqueline/AFRPA	MCCLN_AR_5157.pdf

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6/30/2004	LRA Initial Parcel Record of Decision #1 (7 Sites) For Soil at PRL S-014, PRL S-033, PRL S-040, SA 003, SA 035, SA 041, SA 091	CH2M HILL	MCCLN_AR_5488.pdf
1/1/2005	LRA Initial Parcel Remedial Action Work Plan #1	Environmental Quality Management	MCCLN_AR_5664.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf
10/2006	Final Local Reuse Authority Initial Parcel #1 Remedial Action Completion Report	EQM, Inc.	MCCLN AR 6250.pdf
11/2007	Biovent O&M and VMP Report, 4Q07/ Annual 2007	EQM, Inc.	MCCLN_AR_6509.pdf

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7/25/1989	Recommendations for EM's Fifty-six (56) New Potential Release Locations	Gouge, Jack D/ Radian Corp.	MCCLN_AR_5079.pdf
1/24/1995	Preliminary Assessment Report Operable Units E though H Part 1: Summary and Overview	Louie, Stacy A.; Sparks, George C./Radian Corp.	MCCLN_AR_5485.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.1.pdf
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	MCCLN_AR_3313.2.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
10/1/1998	Final Site Characterization, FSP, Vol. I of IV, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_899.1.pdf
10/1/1998	Final Site Characterization, FSP, Vol. I of IV, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_899.2.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. II of IV, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_900.1.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. II of IV, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_900.2.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. III of IV, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_901.pdf
10/1/1998	Final Site Characterization Summary, FSP, Vol. IV of IV, Appendix C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_902.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. I of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3837.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. II of VIII, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3838.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. III of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3839.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.1.pdf

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6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. IV of VIII, Appendix A, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3840.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. V of VIII, Appendix B, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3841.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VI of VIII, Appendix C1, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3842.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.1.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VII of VIII, Appendix C1, C2-8, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3843.2.pdf
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. VIII of VIII, Appendix D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	MCCLN_AR_3844.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf

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3/1/1983	Annual Report to CRWQCB	2852 ABG/CEV	MCCLN_AR_53.pdf
3/1/1985	Base Level Report, Site Characterization, OU-A, OU-B, OU-C, OU-D	McLaren Environmental Engineering	MCCLN_AR_570.pdf
2/1/1986	Technical Memorandum Report, Shallow Investigation Program, Part I, OU-A, OU-B, OU-C	McLaren Environmental Engineering	MCCLN_AR_704.1.pdf
2/1/1986	Technical Memorandum Report, Shallow Investigation Program, Part I, OU-A, OU-B, OU-C	McLaren Environmental Engineering	MCCLN_AR_704.2.pdf
2/1/1986	Technical Memorandum Report, Shallow Investigation Program, Part II, OU-A, OU-B, OU-C	McLaren Environmental Engineering	MCCLN_AR_705.pdf
2/1/1986	Technical Memorandum Report, Shallow Investigation Program, Part III, OU-A, OU-B, OU-C	McLaren Environmental Engineering	MCCLN_AR_706.pdf
5/1/1986	Technical Memorandum Report, Shallow Investigation Program, Part V, Vol. I of III, OU-B, OU-C	McLaren Environmental Engineering	MCCLN_AR_708.pdf
5/1/1986	Technical Memorandum Report, Shallow Investigation Program, Part V, Appendix 1, Vol. II of III, OU-B, OU-C	McLaren Environmental Engineering	MCCLN_AR_709.1.pdf
5/1/1986	Technical Memorandum Report, Shallow Investigation Program, Part V, Appendix 1, Vol. II of III, OU-B, OU-C	McLaren Environmental Engineering	MCCLN_AR_709.2.pdf
5/1/1986	Technical Memorandum Report, Shallow Investigation Program, Part V, Appendices 2 and 3, Vol. III of III, OU-B, OU-C	McLaren Environmental Engineering	MCCLN_AR_710.1.pdf
5/1/1986	Technical Memorandum Report, Shallow Investigation Program, Part V, Appendices 2 and 3, Vol. III of III, OU-B, OU-C	McLaren Environmental Engineering	MCCLN_AR_710.2.pdf
5/1/1986	Technical Memorandum, Shallow Investigation Program, Analytical Soil Results, Part V, Appendix 1, Vol. III of III, OU-B, OU-C	McLaren Environmental Engineering	MCCLN_AR_732.1.pdf
5/1/1986	Technical Memorandum, Shallow Investigation Program, Analytical Soil Results, Part V, Appendix 1, Vol. III of III, OU-B, OU-C	McLaren Environmental Engineering	MCCLN_AR_732.2.pdf
4/1/1989	Stage 5, ITIR, Surface Water and Stream Sediments	Radian Corp.	MCCLN_AR_1371.pdf
4/1/1989	Stage 5, ITIR, Surface Water and Stream Sediment Samples, Appendix A	Radian Corp.	MCCLN_AR_1372.pdf

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4/1/1989	Stage 5, ITIR, Surface Water and Stream Sediment Samples, Appendix B	Radian Corp.	MCCLN_AR_1373.pdf
8/1/1989	Preliminary Pathways Assessment, Stage 5, Technical and Analytical Data Letter Report	Radian Corp.	MCCLN_AR_1414.pdf
4/1/1990	Stage 5, Final Preliminary Pathways Assessment, Analytical Data Summary Report, Surface Water and Stream Sediment Samples	Radian Corp.	MCCLN_AR_1506.pdf
7/1/1990	Soil Gas Investigation Work Plan, Sampling and Analysis, OU-B	Radian Corp.	MCCLN_AR_3494.pdf
2/1/1991	Soil Gas Investigation, QA/QC Report, Vol. I of III, OU-B	Radian Corp.	MCCLN_AR_1642.pdf
2/1/1991	Soil Gas Investigation, QA/QC Report, Vol. II of III, OU-B	Radian Corp.	MCCLN_AR_1643.1.pdf
2/1/1991	Soil Gas Investigation, QA/QC Report, Vol. II of III, OU-B	Radian Corp.	MCCLN_AR_1643.2.pdf
2/1/1991	Soil Gas Investigation, QA/QC Report, Vol. III of III, OU-B	Radian Corp.	MCCLN_AR_1644.1.pdf
2/1/1991	Soil Gas Investigation, QA/QC Report, Vol. III of III, OU-B	Radian Corp.	MCCLN_AR_1644.2.pdf
2/1/1991	Stage 3, EA, EE/CA, Final Report, Disposal and Reuse, OU-B	Radian Corp.	MCCLN_AR_1654.1.pdf
2/1/1991	Stage 3, EA, EE/CA, Final Report, Disposal and Reuse, OU-B	Radian Corp.	MCCLN_AR_1654.2.pdf
3/1/1991	ROD, RI/FS, NFA, Stage 7, Final, OU-B	Radian Corp.	MCCLN_AR_1668.pdf
4/1/1991	Stage 3, Final Action Memorandum, OU-B	Radian Corp.	MCCLN_AR_1693.pdf
4/1/1991	Stage 3, FONSI, EE/CA, EA and Removal Action Final Report, Disposal and Reuse, OU-B	Radian Corp.	MCCLN_AR_1697.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. I of III, OU-B	Radian Corp.	MCCLN_AR_1793.1.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. I of III, OU-B	Radian Corp.	MCCLN_AR_1793.2.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. II of III, OU-B	Radian Corp.	MCCLN_AR_1794.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. III of III, OU-B	Radian Corp.	MCCLN_AR_1795.pdf
10/1/1991	RI, HSP, OU-B	Radian Corp.	MCCLN_AR_2974.pdf
11/1/1991	RI, Stage 7, Final SAP, OU-B	Radian Corp.	MCCLN_AR_2989.pdf
1/1/1992	Technical Memorandum, Soil Remedial Technologies Screening	Radian Corp.	MCCLN_AR_2182.pdf
1/9/1992	RI, Monthly Status Meeting, 12 Dec 91, OU-B	SM-ALC/EM	MCCLN_AR_3282.pdf

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2/17/1993	Consensus Statement, Background Inorganic Constituents in Subsurface Soils	Radian Corp.	MCCLN_AR_2084.pdf
8/1/1993	Phase I, FS, Final Report for Magpie Creek	Nolte and Associates, Inc.	MCCLN_AR_2173.pdf
9/1/1993	Stage 7, Final FSP, Surface Soil and Stream Sediment Basewide Background Study	Radian Corp.	MCCLN_AR_2197.pdf
2/1/1994	FS, Final Report, Magpie Creek	Nolte and Associates, Inc.	MCCLN_AR_2250.pdf
2/1/1994	Basewide Background Study Technical Memorandum	Radian Corp.	MCCLN_AR_2254.pdf
8/1/1994	Basewide Ecological Risk Assessment Final Scoping Report, OU-B, OU-D	Jacobs Engineering Group, Inc.	MCCLN_AR_2398.pdf
7/1/1995	Update Pages, RI, Interim Basewide Draft Final Report, Characterization Summaries, Part 2B, Appendix C, OU-B	Radian Corp.	MCCLN_AR_2675.pdf
7/1/1995	Update Pages, RI, Interim Basewide Draft Final Report, Part 1 General Framework, Appendices A Through C, E, F	Radian Corp.	MCCLN_AR_2676.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. I of IX, OU-B	Radian Corp.	MCCLN_AR_2826.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. II of IX, OU-B	Radian Corp.	MCCLN_AR_2827.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. III of IX, Appendix A, OU-B	Radian Corp.	MCCLN_AR_2828.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. IV of IX, Appendix A, OU-B	Radian Corp.	MCCLN_AR_2829.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. V of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2830.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VI of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2831.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VII of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2832.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VIII of IX, Appendix C, OU-B	Radian Corp.	MCCLN_AR_2833.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. IX of IX, Appendix D, OU-B	Radian Corp.	MCCLN_AR_2834.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
12/1/1995	Basewide Ecological Risk Assessment, Technical Memorandum, Final Scoping Summary Status Report, OU-A, OU-B, OU-C, OU-D.	Jacobs Engineering Group, Inc.	MCCLN_AR_2838.pdf
12/15/1995	RI, Interim Basewide Final Report, General Framework, Appendices A Through C, E, F, OU-B	Radian Corp.	MCCLN_AR_2855.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
4/1/1998	Final Basewide Removal Action Work Plan, SVE	URS Greiner, Inc.	MCCLN_AR_823.pdf
9/1/1998	Final Data Gap FSP 2	Radian Corp.	MCCLN_AR_898.1.pdf
9/1/1998	Final Data Gap FSP 2	Radian Corp.	MCCLN_AR_898.2.pdf
9/1/1998	Final Data Gap FSP 2	Radian Corp.	MCCLN_AR_898.3.pdf
9/1/1998	Final Data Gap FSP 2	Radian Corp.	MCCLN_AR_898.4.pdf
4/19/2000	Creek Risk Management Memo, Soil Contaminant Concentrations, West Nature Area, Sacramento Valley	Benedict, Stephanie/URS	MCCLN_AR_3815.pdf
5/1/2000	Final Work Implementation Plan, OU-B	Radian Corp.	MCCLN_AR_3823.pdf
7/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Group 4	Radian Corp.	MCCLN_AR_3866.pdf
11/1/2002	Field Sampling Plan for Petroleum, Oils, and Lubricants (POL) and Shallow Soil Gas (SSG) at Selected Sites 5.	URS, Corp.	MCCLN_AR_5058.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1	CH2M HILL	MCCLN_AR_4942.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1	CH2M HILL	MCCLN_AR_4942.1.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1	CH2M HILL	MCCLN_AR_4942.2.pdf
9/11/2003	Final Local Redevelopment Authority (LRA) Initial Parcel Proposed Plan #1(7 Sites) (DSR #510-5)	Brunner, Paul/AFRPA	MCCLN_AR_4875.pdf
9/30/2003	Initial Parcel Proposed Plan Public Meeting Reporter's Transcript	Hale, Jacqueline/AFRPA	MCCLN_AR_5157.pdf
4/2/2004	Interim Basewide Remedial Investigation Report Part 2B - Operable Unit B Remedial Investigation Characterization Summaries and Addenda Volume 1 of 6	Rogalla, Joy; Benedict, Stephanie/URS	MCCLN_AR_5478.pdf

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4/2/2004	Interim Basewide Remedial Investigation Report Part 2B - Operable Unit B Remedial Investigation Characterization Summaries and Addenda Volume 2 of 6	Rogalla, Joy; Benedict, Stephanie/URS	MCCLN_AR_5479.pdf
4/2/2004	Interim Basewide Remedial Investigation Report Part 2B - Operable Unit B Remedial Investigation Characterization Summaries and Addenda Volume 3 of 6	Rogalla, Joy; Benedict, Stephanie/URS	MCCLN_AR_5480.pdf
4/2/2004	Interim Basewide Remedial Investigation Report Part 2B - Operable Unit B Remedial Investigation Characterization Summaries and Addenda Volume 4 of 6	Rogalla, Joy; Benedict, Stephanie/URS	MCCLN_AR_5481.pdf
4/2/2004	Interim Basewide Remedial Investigation Report Part 2B - Operable Unit B Remedial Investigation Characterization Summaries and Addenda Volume 5 of 6	Rogalla, Joy; Benedict, Stephanie/URS	MCCLN_AR_5482.pdf
4/2/2004	Interim Basewide Remedial Investigation Report Part 2B - Operable Unit B Remedial Investigation Characterization Summaries and Addenda Volume 6 of 6	Rogalla, Joy; Benedict, Stephanie/URS	MCCLN_AR_5483.pdf
6/14/2004	Interim Basewide Remedial Investigation Report Operable Unit B- Group 1 POL/SSG Remedial Investigation Characterization Summaries Addenda for Selected Sites	Titus, Edward R.; Benedict, Stephanie K./URS	MCCLN_AR_5469.pdf
6/14/2004	Interim Basewide Remedial Investigation Report Operable Unit B- Group 1 POL/SSG Remedial Investigation Characterization Summaries Addenda for Selected Sites	Titus, Edward R.; Benedict, Stephanie K./URS	MCCLN_AR_5469.1.pdf
6/30/2004	LRA Initial Parcel Record of Decision #1 (7 Sites) For Soil at PRL S-014, PRL S-033, PRL S-040, SA 003, SA 035, SA 041, SA 091	CH2M HILL	MCCLN_AR_5488.pdf
11/30/2004	Soil Vapor Extraction Removal Action Quarterly Vadose Zone Monitoring Report July – September 2004	URS	MCCLN_AR_5651.pdf
11/30/2004	Soil Vapor Extraction Removal Action Quarterly Vadose Zone Monitoring Report July – September 2004	URS	MCCLN_AR_5651.1.pdf
1/1/2005	LRA Initial Parcel Remedial Action Work Plan #1	Environmental Quality Management	MCCLN_AR_5664.pdf
2/28/2005	Soil Vapor Extraction Removal Action Quarterly Vadose Zone Monitoring Report October – December 2004	URS	MCCLN_AR_5652.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
5/31/2005	Soil Vapor Extraction Removal Action Quarterly Vadose Zone Monitoring Report January – March 2005	URS	MCCLN_AR_5653.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf
8/31/2005	Soil Vapor Extraction Removal Action Quarterly Vadose Zone Monitoring Report April – June 2005	URS	MCCLN_AR_5657.pdf
4/5/2006	Installation Restoration Program Start 1: Site Evaluations For Applicability of Soil Vapor Extraction (SVE)	Graff, Paul; Benedict, Stephanie K./URS	MCCLN_AR_5663.pdf
10/2006	Final Local Reuse Authority Initial Parcel #1 Remedial Action Completion Report	EQM, Inc.	MCCLN AR 6250.pdf

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10/1/1991	PA, Stage 3, Summary Report, Vol. I of III, OU-B	Radian Corp.	MCCLN_AR_1793.1.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. I of III, OU-B	Radian Corp.	MCCLN_AR_1793.2.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. II of III, OU-B	Radian Corp.	MCCLN_AR_1794.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. III of III, OU-B	Radian Corp.	MCCLN_AR_1795.pdf
11/1/1991	RI, Stage 7, Final SAP, OU-B	Radian Corp.	MCCLN_AR_2989.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. I of IX, OU-B	Radian Corp.	MCCLN_AR_2826.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. II of IX, OU-B	Radian Corp.	MCCLN_AR_2827.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. III of IX, Appendix A, OU-B	Radian Corp.	MCCLN_AR_2828.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. IV of IX, Appendix A, OU-B	Radian Corp.	MCCLN_AR_2829.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. V of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2830.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VI of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2831.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VII of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2832.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VIII of IX, Appendix C, OU-B	Radian Corp.	MCCLN_AR_2833.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. IX of IX, Appendix D, OU-B	Radian Corp.	MCCLN_AR_2834.pdf
12/1/1995	Basewide Ecological Risk Assessment, Technical Memorandum, Final Scoping Summary Status Report, OU-A, OU-B, OU-C, OU-D	Jacobs Engineering Group, Inc.	MCCLN_AR_2838.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf

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6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
3/1/1999	Building 688 Industrial Waster/Storm/Sanitary Sewer/ Floor Drain Inspection and Repair Final Report	CBD/Dolver	MCCLN_AR_5665.pdf
12/1/1999	FS, Report, Final Basewide VOC, Vol. I of III	CH2M HILL	MCCLN_AR_3721.pdf
12/1/1999	FS, Report, Final Basewide VOC, Vol. II of III	CH2M HILL	MCCLN_AR_3722.pdf
12/1/1999	FS, Report, Final Basewide VOC, Vol. III of III	CH2M HILL	MCCLN_AR_3723.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.2.pdf
10/1/2000	Supplemental Environmental Baseline Survey (EBS), Group 5	Radian Corp.	MCCLN_AR_3925.pdf
10/1/2001	Final, Basewide Removal Action Work Plan, SVE	URSG-Laidlaw	MCCLN_AR_4293.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf
4/5/2006	Installation Restoration Program Start 1: Site Evaluations For Applicability of Soil Vapor Extraction (SVE)	Graff, Paul; Benedict, Stephanie K./URS	MCCLN_AR_5663.pdf

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10/1/1991	PA, Stage 3, Summary Report, Vol. I of III, OU-B	Radian Corp.	MCCLN_AR_1793.1.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. I of III, OU-B	Radian Corp.	MCCLN_AR_1793.2.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. II of III, OU-B	Radian Corp.	MCCLN_AR_1794.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. III of III, OU-B	Radian Corp.	MCCLN_AR_1795.pdf
11/1/1991	RI, Stage 7, Final SAP, OU-B	Radian Corp.	MCCLN_AR_2989.pdf
5/1/1993	Installation Restoration Program (IRP) Operable Unit B Sampling & Analysis Plan Addendum Field Sampling Plans For McClellan AFB	Radian Corp.	MCCLN_AR_4986.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. I of IX, OU-B	Radian Corp.	MCCLN_AR_2826.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. II of IX, OU-B	Radian Corp.	MCCLN_AR_2827.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. III of IX, Appendix A, OU-B	Radian Corp.	MCCLN_AR_2828.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. IV of IX, Appendix A, OU-B	Radian Corp.	MCCLN_AR_2829.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. V of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2830.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VI of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2831.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VII of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2832.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VIII of IX, Appendix C, OU-B	Radian Corp.	MCCLN_AR_2833.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. IX of IX, Appendix D, OU-B	Radian Corp.	MCCLN_AR_2834.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
12/1/1995	Basewide Ecological Risk Assessment, Technical Memorandum, Final Scoping Summary Status Report, OU-A, OU-B, OU-C, OU-D	Jacobs Engineering Group, Inc.	MCCLN_AR_2838.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.2.pdf
10/1/2000	Supplemental Environmental Baseline Survey (EBS), Group 5	Radian Corp.	MCCLN_AR_3925.pdf
10/1/2001	Final, Basewide Removal Action Work Plan, SVE	URSG-Laidlaw	MCCLN_AR_4293.pdf
3/11/2003	Fish and Wildlife Concerns	Harlow, David L./DOI	MCCLN_AR_4547.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1	CH2M HILL	MCCLN_AR_4942.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1	CH2M HILL	MCCLN_AR_4942.1.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1	CH2M HILL	MCCLN_AR_4942.2.pdf
3/25/2004	Installation Restoration Program Former McClellan Air Force Base Interview Database Summary 2003	Brajkovich, Laurie; Benedict, Stephanie/URS	MCCLN_AR_5411.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf

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10/1/1991	PA, Stage 3, Summary Report, Vol. I of III, OU-B	Radian Corp.	MCCLN_AR_1793.1.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. I of III, OU-B	Radian Corp.	MCCLN_AR_1793.2.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. II of III, OU-B	Radian Corp.	MCCLN_AR_1794.pdf
10/1/1991	PA, Stage 3, Summary Report, Vol. III of III, OU-B	Radian Corp.	MCCLN_AR_1795.pdf
11/1/1991	RI, Stage 7, Final SAP, OU-B	Radian Corp.	MCCLN_AR_2989.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. I of IX, OU-B	Radian Corp.	MCCLN_AR_2826.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. II of IX, OU-B	Radian Corp.	MCCLN_AR_2827.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. III of IX, Appendix A, OU-B	Radian Corp.	MCCLN_AR_2828.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. IV of IX, Appendix A, OU-B	Radian Corp.	MCCLN_AR_2829.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. V of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2830.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VI of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2831.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VII of IX, Appendix B, OU-B	Radian Corp.	MCCLN_AR_2832.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VIII of IX, Appendix C, OU-B	Radian Corp.	MCCLN_AR_2833.pdf
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. IX of IX, Appendix D, OU-B	Radian Corp.	MCCLN_AR_2834.pdf
12/1/1995	Basewide Ecological Risk Assessment, Technical Memorandum, Final Scoping Summary Status Report, OU-A, OU-B, OU-C, OU-D	Jacobs Engineering Group, Inc.	MCCLN_AR_2838.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf

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6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
10/1/2000	Supplemental Environmental Baseline Survey (EBS), Group 5	Radian Corp.	MCCLN_AR_3925.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.2.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf
4/5/2006	Installation Restoration Program Start 1: Site Evaluations For Applicability of Soil Vapor Extraction (SVE)	Graff, Paul; Benedict, Stephanie K./URS	MCCLN_AR_5663.pdf

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8/1/1990	RI/FS, Stage 4, Planning Network Report	Radian Corp.	MCCLN_AR_1567.pdf
2/1/1991	Installation Restoration Program (IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume 1: Text and Plates	Radian Corp.	MCCLN_AR_4987.pdf
2/1/1991	Installation Restoration Program (IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume II: Appendix A and Appendix B (Part 1)	Radian Corp.	MCCLN_AR_4988.pdf
2/1/1991	Installation Restoration Program (IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume III: Appendix B (Part 2)	Radian Corp.	MCCLN_AR_4989.pdf
2/1/1991	Installation Restoration Program (IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume IV: Appendix B (Part 3) and Appendices C,D,and E.	Radian Corp.	MCCLN_AR_4990.pdf
3/1/1991	ROD, RI/FS, Stage 7, Final, UST Program	Radian Corp.	MCCLN_AR_1667.pdf
4/1/1992	IRP Operable Unit A Remedial Investigation Sampling and Analysis Plan	Jacobs Engineering Group, Inc.	MCCLN_AR_4985.pdf
9/23/1992	Technical Memorandum Report, Bench-Scale Slurry Biotreatment Studies, Treatability Study, Task 7	CH2M HILL	MCCLN_AR_3496.pdf
10/19/1992	Technical Memorandum Report, Results of Biofilter Laboratory Studies, Treatability Study, Task 8	CH2M HILL	MCCLN_AR_3497.pdf
10/1/1993	Final Bioremediation Treatability Study Report, Vol. I of II	CH2M HILL	MCCLN_AR_2203.pdf
10/1/1993	Final Bioremediation Treatability Study Report, Vol. II of II	CH2M HILL	MCCLN_AR_2204.pdf
7/1/1994	Working Draft Technical Memorandum, UST Closure Certification	Radian Corp.	MCCLN_AR_2367.pdf
10/1/1994	Basewide Ecological Risk Assessment Final Scoping Report, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2472.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. I of VI, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2795.1.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. I of VI, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2795.2.pdf
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7/1996	UST Investigation, Sacramento County Closure Letters	CVRWQCB	MCCLN_AR_5636.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
4/1/1998	Final Basewide Removal Action Work Plan, SVE	URS Greiner, Inc.	MCCLN_AR_823.pdf
3/1/1999	Update Pages, Final Basewide Data Gap, FSP 3	Jacobs Engineering Group, Inc.	MCCLN_AR_929.pdf
3/1/1999	Final Basewide Data Gap FSP 3, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_3609.1.pdf

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10/1/1999	Final EE/CA, SVE Report, IC-25	URS Greiner Woodward Clyde, Inc.	MCCLN_AR_3681.pdf
3/13/2000	Final Action Memorandum, SVE, IC-25	SM-ALC/EMR	MCCLN_AR_3787.pdf
12/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Vol. I of II, Group 6	URS Greiner Woodward Clyde, Inc.	MCCLN_AR_3963.pdf
12/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Vol. II of II, Appendices A-F, Group 6	URS Greiner Woodward Clyde, Inc.	MCCLN_AR_3964.1.pdf
12/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Vol. II of II, Appendices A-F, Group 6	URS Greiner Woodward Clyde, Inc.	MCCLN_AR_3964.2.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. I of XIV, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4262.pdf
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9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. IV of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4265.1.pdf
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9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. V of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4266.1.pdf
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9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. VIII of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4269.1.pdf
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9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. IX of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4270.1.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. IX of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4270.2.pdf
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9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XI of XIV, Appendix C1-C10, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4272.2.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XI of XIV, Appendix C1-C10, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4272.3.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XII of XIV, Appendix D1-D4, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4273.1.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XII of XIV, Appendix D1-D4, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4273.2.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XIII of XIV, Appendix D4-D6, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4274.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XIV of XIV, Appendix D6-D7, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4275.pdf
5/20/2002	Final Initial Parcel Data Gaps FSP and HSP	CH2M HILL	MCCLN_AR_4450.pdf

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6/19/2002	McClellan Air Force Base Operable Unit A Remedial Investigation Characterization Summaries Addendum Final	Jacobs Engineering Group, Inc.	MCCLN_AR_4970.pdf
6/19/2002	McClellan Air Force Base Operable Unit A Remedial Investigation Characterization Summaries Addendum Final	Jacobs Engineering Group, Inc.	MCCLN_AR_4970.1.pdf
6/19/2002	McClellan Air Force Base Operable Unit A Remedial Investigation Characterization Summaries Addendum Final	Jacobs Engineering Group, Inc.	MCCLN_AR_4971.pdf
6/19/2002	McClellan Air Force Base Operable Unit A Remedial Investigation Characterization Summaries Addendum Final	Jacobs Engineering Group, Inc.	MCCLN_AR_4971.1.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1	CH2M HILL	MCCLN_AR_4942.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1	CH2M HILL	MCCLN_AR_4942.1.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1	CH2M HILL	MCCLN_AR_4942.2.pdf
9/11/2003	Final Local Redevelopment Authority (LRA) Initial Parcel Proposed Plan #1(7 Sites) (DSR #510-5)	Brunner, Paul/AFRPA	MCCLN_AR_4875.pdf
9/30/2003	Initial Parcel Proposed Plan Public Meeting Reporter's Transcript	Hale, Jacqueline/AFRPA	MCCLN_AR_5157.pdf
4/2004	Addendum to the LRA Initial Parcel FS for Site SA 035	AFRPA	MCCLN_AR_4942.pdf
6/30/2004	LRA Initial Parcel Record of Decision #1 (7 Sites) For Soil at PRL S-014, PRL S-033, PRL S-040, SA 003, SA 035, SA 041, SA 091	CH2M HILL	MCCLN_AR_5488.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf

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2/1/1991	Installation Restoration Program (IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume 1: Text and Plates	Radian Corp.	MCCLN_AR_4987.pdf
2/1/1991	Installation Restoration Program(IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume II: Appendix A and Appendix B (Part 1)	Radian Corp.	MCCLN_AR_4988.pdf
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2/1/1991	Installation Restoration Program (IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume IV: Appendix B (Part 3) and Appendices C,D,and E.	Radian Corp.	MCCLN_AR_4990.pdf
4/1/1992	IRP Operable Unit A Remedial Investigation Sampling and Analysis Plan	Jacobs Engineering Group Inc.	MCCLN_AR_4985.pdf
10/1/1994	Basewide Ecological Risk Assessment Final Scoping Report, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2472.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. I of VI, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2795.1.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. I of VI, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2795.2.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. II of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2796.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. III of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2797.1.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. III of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2797.2.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. IV of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2798.1.pdf
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11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. V of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2799.3.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. VI of VI, Appendices B-D, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2800.1.pdf
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12/1/1995	Basewide Ecological Risk Assessment, Technical Memorandum, Final Scoping Summary Status Report, OU-A, OU-B, OU-C, OU-D	Jacobs Engineering Group, Inc.	MCCLN_AR_2838.pdf
12/13/1995	Multiple Decision Documents	CH2M HILL	MCCLN_AR_2843.pdf
12/29/1995	RI, Characterization Summary Report, OU-A, SS-202	Jacobs Engineering Group, Inc.	MCCLN_AR_3027.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
12/1/1999	FS, Report, Final Basewide VOC, Vol. I of III	CH2M HILL	MCCLN_AR_3721.pdf
12/1/1999	FS, Report, Final Basewide VOC, Vol. II of III	CH2M HILL	MCCLN_AR_3722.pdf
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8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
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12/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Vol. I of II, Group 6	URS Greiner Woodward Clyde, Inc.	MCCLN_AR_3963.pdf
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8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2MHILL	MCCLN_AR_4942.1.pdf
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8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2MHILL	MCCLN_AR_4942.pdf
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9/30/2003	Initial Parcel Proposed Plan Public Meeting Reporter's Transcript	Hale, Jacqueline/AFRPA	MCCLN_AR_5157.pdf
3/25/2004	Installation Restoration Program Former McClellan Air Force Base Interview Database Summary 2003	Brajkovich, Laurie; Benedict, Stephanie/URS	MCCLN_AR_5411.pdf
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5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
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8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf
4/5/2006	Installation Restoration Program Start 1: Site Evaluations For Applicability of Soil Vapor Extraction (SVE)	Graff, Paul; Benedict, Stephanie K./URS	MCCLN_AR_5663.pdf

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3/10/1988	Transmittal Letter, Soil Removal	Ray Burgess/USAF	MCCLN_AR_5638.pdf
2/1/1991	Installation Restoration Program (IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume 1: Text and Plates	Radian Corp.	MCCLN_AR_4987.pdf
2/1/1991	Installation Restoration Program(IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume II: Appendix A and Appendix B (Part 1)	Radian Corp.	MCCLN_AR_4988.pdf
2/1/1991	Installation Restoration Program (IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume III: Appendix B (Part 2)	Radian Corp.	MCCLN_AR_4989.pdf
2/1/1991	Installation Restoration Program (IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume IV: Appendix B (Part 3) and Appendices C,D,and E.	Radian Corp.	MCCLN_AR_4990.pdf
9/1/1992	RI, Final SAP, Vol. I, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_1883.pdf
9/1/1994	PA/SI, Final Technical Summary Report	Radian Corp.	MCCLN_AR_2427.pdf
10/1/1994	Basewide Ecological Risk Assessment Final Scoping Report, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2472.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. I of VI, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2795.1.pdf
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11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. II of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2796.pdf
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. III of VI, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2797.1.pdf
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11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2A, Vol. VI of VI, Appendices B-D, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_2800.1.pdf
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12/1/1995	Basewide Ecological Risk Assessment, Technical Memorandum, Final Scoping Summary Status Report, OU-A, OU-B, OU-C, OU-D	Jacobs Engineering Group, Inc.	MCCLN_AR_2838.pdf
12/13/1995	Multiple Decision Documents	CH2M HILL	MCCLN_AR_2843.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I of II, Revision 1	Radian Corp.	MCCLN_AR_3355.pdf
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. II of II, Appendices, Revision 1	Radian Corp.	MCCLN_AR_3356.pdf
10/1/1999	Final EE/CA, SVE Report, IC-43	URS Greiner Woodward Clyde, Inc.	MCCLN_AR_3682.pdf
12/1/1999	Final Supplemental Environmental Baseline Survey (EBS), Facilities and Associated Properties, Group 1	Radian Corp.	MCCLN_AR_3724.pdf
3/13/2000	Final Action Memorandum, SVE, IC-43	SM-ALC/EMR	MCCLN_AR_3786.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.2.pdf
11/1/2000	RA, Report, SVE, IC-41, IC-42, IC-43	Radian Corp.	MCCLN_AR_3951.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. I of XIV, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4262.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. II of XIV, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4263.pdf
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9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. IV of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4265.2.pdf
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9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. VII of XIV, Appendix A, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4268.2.pdf
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9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XI of XIV, Appendix C1-C10, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4272.1.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XI of XIV, Appendix C1-C10, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4272.2.pdf
9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XI of XIV, Appendix C1-C10, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4272.3.pdf
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9/1/2001	RI, Final Interim Basewide Characterization Summaries Report, Part 2A, Vol. XIV of XIV, Appendix D6-D7, OU-A	Jacobs Engineering Group, Inc.	MCCLN_AR_4275.pdf
5/20/2002	Final Initial Parcel Data Gaps FSP and HSP	CH2M HILL	MCCLN_AR_4450.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2M HILL	MCCLN_AR_4942.1.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2M HILL	MCCLN_AR_4942.2.pdf
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 1 Data Item Nos. A008, A012, A023A, A023B, A024A, A024B, A039, A040, A044	CH2M HILL	MCCLN_AR_4942.pdf
9/11/2003	Final Local Redevelopment Authority (LRA) Initial Parcel Proposed Plan #1(7 Sites) (DSR #510-5)	Brunner, Paul/AFRPA	MCCLN_AR_4875.pdf
9/30/2003	Initial Parcel Proposed Plan Public Meeting Reporter's Transcript	Hale, Jacqueline/AFRPA	MCCLN_AR_5157.pdf
3/25/2004	Installation Restoration Program Former McClellan Air Force Base Interview Database Summary 2003	URS: Brajkovich, Laurie; Benedict, Stephanie	MCCLN_AR_5411.pdf

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6/30/2004	LRA Initial Parcel Record of Decision #1 (7 Sites) For Soil at PRL S-014, PRL S-033, PRL S-040, SA 003, SA 035, SA 041, SA 091	CH2M HILL	MCCLN_AR_5488.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf

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2/1/1991	Installation Restoration Program (IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume 1: Text and Plates	Radian Corp.	MCCLN_AR_4987.pdf
2/1/1991	Installation Restoration Program(IRP) Stage 3 Operable Unit A Preliminary Assessment Summary Report Volume II: Appendix A and Appendix B (Part 1)	Radian Corp.	MCCLN_AR_4988.pdf
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9/1/1998	Final Data Gap FSP 2	Radian Corp.	MCCLN_AR_898.4.pdf
8/1/1998	Final Data Gap FSP 1	Radian Corp.	MCCLN_AR_894.1.pdf
12/1/1999	Final Supplemental Environmental Baseline Survey (EBS), Facilities and Associated Properties, Group 1	Radian Corp.	MCCLN_AR_3724.pdf
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6/19/2002	McClellan Air Force Base Operable Unit A Remedial Investigation Characterization Summaries Addendum Final	Jacobs Engineering Group, Inc.	MCCLN_AR_4970.pdf
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3/25/2004	Installation Restoration Program Former McClellan Air Force Base Interview Database Summary 2003	Brajkovich, Laurie; Benedict, Stephanie/URS	MCCLN_AR_5411.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf
8/2007	Final Phase 1 Local Reuse Authority Initial Parcel #2 Pre-Decision Work Plan	CH2M HILL	MCCLN_AR_6508.pdf

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6/1/1986	FS and RA Plan, Source Control, Area C	McLaren Environmental Engineering	MCCLN_AR_1009.pdf
4/1/1990	Soil Management Decision Document for UST B/783	Air Force	MCCLN_AR_5658.pdf
7/1/1993	PA, Report, Vol. I of III, Summary and Overview, OU-C	CH2M HILL	MCCLN_AR_2151.pdf
7/1/1993	PA, Report, Vol. II of III, Technical Memorandums, OU-C	CH2M HILL	MCCLN_AR_2152.pdf
7/1/1993	PA, Report, Vol. III of III, Appendix A1, OU-C	CH2M HILL	MCCLN_AR_2153.1.pdf
7/1/1993	PA, Report, Vol. III of III, Appendix A1, OU-C	CH2M HILL	MCCLN_AR_2153.2.pdf
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12/1/1995	Basewide Ecological Risk Assessment, Technical Memorandum, Final Scoping Summary Status Report, OU-A, OU-B, OU-C, OU-D	Jacobs Engineering Group, Inc.	MCCLN_AR_2838.pdf
7/15/1996	Second round of UST Investigation, Sacramento County Closure Letter	CRWQCB	MCCLN_AR_5648.pdf
7/8/1997	UST Closures	CRWQCB	MCCLN_AR_5647.pdf
8/1/1997	RI, Final Interim Basewide Report, Characterization Summary, FSP, Part 2c, Vol. I of IV, OU-C	Radian Corp.	MCCLN_AR_3404.pdf
8/1/1997	RI, Final Interim Basewide Report, Characterization Summary, FSP, Part 2c, Vol. II of IV, OU-C	Radian Corp.	MCCLN_AR_3405.pdf
8/1/1997	RI, Final Interim Basewide Report, Characterization Summary, FSP, Part 2c, Vol. III of IV, Appendices, OU-C	Radian Corp.	MCCLN_AR_3406.1.pdf
8/1/1997	RI, Final Interim Basewide Report, Characterization Summary, FSP, Part 2c, Vol. III of IV, Appendices, OU-C	Radian Corp.	MCCLN_AR_3406.2.pdf
8/1/1997	RI, Final Interim Basewide Report, Characterization Summary, FSP, Part 2c, Vol. IV of IV, Appendices, OU-C	Radian Corp.	MCCLN_AR_3407.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
7/9/1998	Site Specific Supplemental Environmental Baseline Survey for Buildings 783, 786, and 788	McClellan Air Force Base	MCCLN_AR_5662.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.2.pdf
10/1/2001	Final, Basewide Removal Action Work Plan, SVE	URSG-Laidlaw	MCCLN_AR_4293.pdf
3/25/2004	Installation Restoration Program Former McClellan Air Force Base Interview Database Summary 2003	Brajkovich, Laurie; Benedict, Stephanie/URS	MCCLN_AR_5411.pdf
5/20/2004	Summary of POL Sources Technical Memorandum	Benedict, Stephanie K.; Shulters, Jacqueline C./ URS	MCCLN_AR_5397.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
6/1/1986	FS and RA Plan, Source Control, Area C	McLaren Environmental Engineering	MCCLN_AR_1009.pdf
7/1/1993	PA, Report, Vol. I of III, Summary and Overview, OU-C	CH2M HILL	MCCLN_AR_2151.pdf
7/1/1993	PA, Report, Vol. II of III, Technical Memorandums, OU-C	CH2M HILL	MCCLN_AR_2152.pdf
7/1/1993	PA, Report, Vol. III of III, Appendix A1, OU-C	CH2M HILL	MCCLN_AR_2153.1.pdf
7/1/1993	PA, Report, Vol. III of III, Appendix A1, OU-C	CH2M HILL	MCCLN_AR_2153.2.pdf
7/1/1993	PA, Report, Vol. III of III, Appendix B, OU-C	CH2M HILL	MCCLN_AR_2155.1.pdf
7/1/1993	PA, Report, Vol. III of III, Appendix B, OU-C	CH2M HILL	MCCLN_AR_2155.2.pdf
3/1/1994	RI, Draft Final SAP, OU-C	Radian Corp.	MCCLN_AR_2268.pdf
5/1/1994	RI/FS, Final Report, SAP, OU-C	Radian Corp.	MCCLN_AR_2314.pdf
3/1/1995	Final Scoping Report, Basewide Ecological Risk Assessment, OU-C	Jacobs Engineering Group, Inc.	MCCLN_AR_2566.pdf
12/1/1995	Basewide Ecological Risk Assessment, Technical Memorandum, Final Scoping Summary Status Report, OU-A, OU-B, OU-C, OU-D	Jacobs Engineering Group, Inc.	MCCLN_AR_2838.pdf
8/1/1997	RI, Final Interim Basewide Report, Characterization Summary, FSP, Part 2c, Vol. I of IV, OU-C	Radian Corp.	MCCLN_AR_3404.pdf
8/1/1997	RI, Final Interim Basewide Report, Characterization Summary, FSP, Part 2c, Vol. II of IV, OU-C	Radian Corp.	MCCLN_AR_3405.pdf
8/1/1997	RI, Final Interim Basewide Report, Characterization Summary, FSP, Part 2c, Vol. III of IV, Appendices, OU-C	Radian Corp.	MCCLN_AR_3406.1.pdf
8/1/1997	RI, Final Interim Basewide Report, Characterization Summary, FSP, Part 2c, Vol. III of IV, Appendices, OU-C	Radian Corp.	MCCLN_AR_3406.2.pdf
8/1/1997	RI, Final Interim Basewide Report, Characterization Summary, FSP, Part 2c, Vol. IV of IV, Appendices, OU-C	Radian Corp.	MCCLN_AR_3407.pdf
7/9/1998	Site Specific Supplemental Environmental Baseline Survey for Buildings 783, 786, and 788	McClellan Air Force Base	MCCLN_AR_5662.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.1.pdf
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	MCCLN_AR_3884.2.pdf
10/1/2001	Final, Basewide Removal Action Work Plan, SVE	URSG-Laidlaw	MCCLN_AR_4293.pdf

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Document Date	Subject or Title	Author/Corporate Affil	File Name
5/20/2004	Summary of POL Sources Technical Memorandum	Benedict, Stephanie K.; Shulters, Jacqueline C./ URS	MCCLN_AR_5397.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5660.pdf
5/12/2005	Final LRA Initial Parcel Feasibility Study #2	CH2M HILL	MCCLN_AR_5661.pdf
8/1/2005	Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5656.pdf
8/15/2005	Public Meeting, Proposed Plan for Soil Cleanup at 23 Sites (Initial Parcel Proposed Plan #2)	AFRPA	MCCLN_AR_5654.pdf

Appendixes

Appendix A
Site Characteristics for Group 1 Sites

SECTION A1

PRL S-014

A1.1 Site Overview and Features

Potential Release Location (PRL) S-014 is located in Operable Unit (OU) A in Investigation Cluster (IC) 26 and consists of Buildings 17 and 22, in the East McClellan District. The site encompasses an area of approximately 0.5 acre and is mostly covered with asphalt, concrete, or buildings. On the north side of Building 22, landscaped grass is present, and a narrow unpaved strip is present on the eastern side of the site. Within IC 26, PRL S-014 is surrounded by Study Area (SA) 041 to the south and SA 034 to the southeast. The site is also adjacent to Building 21 to the west, which is not an Installation Restoration Program (IRP) site, and Peacekeeper Way to the north. Building 22 was a former motor pool area. Two underground storage tanks (USTs) and a pump island, a paint facility, a hazardous waste storage area, and a washrack were present. The USTs were variously reported as gasoline and waste solvent storage tanks or gasoline and diesel tanks.

A1.2 Source of Contamination

The Preliminary Assessment identified fuels, oils, solvents, polychlorinated biphenyls (PCBs), paints, and metals as potential contaminants of concern (COCs) (Radian, 1991). However, based on the results of several investigations, metals, volatile organic compounds (VOCs), and PCB contamination were determined to be present at the site. The likely source of PCB contamination is the transformer located on the north side of Building 22. The motor pool operation is also a potential source of contamination for the VOCs and metals. In 2005, a remedial action to address PCB contamination was conducted.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Radian. 1991. *OU A Preliminary Assessment*. February.
- Regional Water Quality Control Board (RWQCB). 25 August 2000. Letter: *No Further Action, USTs at Building 22, McClellan Air Force Base* with attachments from the *Underground Storage Tank Site Closure Report Tank Site 22 McClellan Air Force Base California* prepared by LRA Engineering in June 1996.
- Jacobs. 2001. *Operable Unit A Remedial Investigation Characterization Summaries*. Final. September.

  Text: Vol. 1, IC 26, pp. 1-28
- Jacobs. 2002. *Operable Unit A Remedial Investigation Characterization Summaries Addendum*. Final. June.

  Text: Vol. 1, PRL S-14, pp. 1-14
  Hits Table: Vol. 1, PRL S-14, Attachment 1, pp. 1-7

All Data: Vol. 2, Appendix 1, PRL S-14 (PS14), pp. 12-22, 32-44
Human Health Risk Assessment Data: Vol. 3, Appendix 3, Section 1.4.1, pp. 1-7, Tables 1.4.1.10 to 1.4.1.16

- CH2M HILL. 2003. *Initial Parcel Feasibility Study #1*. Final. August.

  Risk Assessment (for PCBs only): Vol. 2, Appendix G, pp. G2-3 – G2-10
  Data Gaps Investigation Results, Vol. 2, Appendix E, pp. E2-6 – E2-11
  Data Summary and ESF excerpts, Vol. 1, Appendix H, Section 2, pp. H2-1 – H2-9

- Air Force Real Property Agency (AFRPA). 2004. *LRA Initial Parcel Record of Decision #1*. June.

- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study #2*. Final. May. Vol. 2, Appendix D, pp. D2-1 – D2-4.

- EQM. 2006. LRA Initial Parcel #1 Remedial Action Completion Report. Final. October.

A1.3 Sampling Strategy and Type of Contamination

During the Phase 1 and Phase 2 Remedial Investigations (RIs) and the Data Gap 3 investigation, soil, soil gas, and groundwater samples were collected from several borings from 1992 to 2000. The samples were analyzed for metals, semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), and VOCs (OU A Remedial Investigation Characterization Summaries [RICS] Addendum, March 2002). During 2002, additional soil samples were collected and analyzed for PCBs as a part of the Initial Parcel Feasibility Study (FS) #1 data gaps sampling effort (Initial Parcel FS #1, Appendix E, August 2003). PCBs were never sampled during the RI, although they were identified as a potential COC during the Preliminary Assessment (Jacobs, 2002).

During the RI, 16 soil samples from six borings were collected and analyzed for metals. Ten metals were detected in the soil samples above background levels (arsenic, beryllium, calcium, copper, chromium, lead, potassium, sodium, zinc, and vanadium). As documented in the OU A RICS Addendum (Volume 3, Appendix 3, Section 1.4.1, pg. 1), only six of the ten metals were reported in the soil samples at concentrations that are greater than the normal variance of their background based on a statistical analysis (arsenic, beryllium, copper, lead, vanadium, and zinc). Only one SVOC detection (diethylphthalate [DEPH]) was reported in two of the eight samples analyzed for SVOCs. Total petroleum hydrocarbons as gasoline (TPH-G) was not detected in any of the six samples analyzed; and total petroleum hydrocarbons as diesel (TPH-D) was not detected in any of the ten samples analyzed. VOCs were reported in five samples collected from three borings.

During the Initial Parcel FS #1 data gaps investigation, seven soil samples were collected south of Building 22 and analyzed for PCBs. The laboratory results indicated that no PCBs were detected in the samples, with the exception of one location (see PCB summary below). However, PCBs were detected in several soil samples collected north of Building 22.

A1.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at PRL S-014 up to the RI Data Gap 3 in 1999 and before the 2005 remedial action. Metals and PCBs were determined to be present at the site, and both arsenic and PCBs posed a risk to human health and the environment. Figure A-1 identifies the site location and significant site features.

A1.4.1 Metals

Based on a comparison of the metals concentrations to the screening levels for protection of human health and the environment, only arsenic (by Methods SW6010 and SW7060), cadmium (by Method SW6010), and vanadium exceeded these screening levels. Arsenic and cadmium were typically analyzed by Method SW6010 in phase I of the RI (prior to 1995), then later by Methods SW7060 and SW7131, respectively. At PRL S-014, results from the Method SW6010 analysis for arsenic contained reported detections in four samples – all from PS14HA001. The maximum reported detection was 10 milligrams per kilogram (mg/kg) from a depth of 2.5 feet below ground surface (bgs). Subsequently, 12 soil samples were collected from 5 locations for analysis by Method SW7060. Results from the SW7060 analysis reported concentrations in three of the samples exceeding the combined background concentration of 4.9 mg/kg. The maximum reported concentrations were 7.1 and 7.4 mg/kg from 10-foot-deep samples collected adjacent to a former fuel pump island and a former washrack, respectively. These two soil borings were approximately 60 feet apart. The arsenic concentrations from shallow and deeper samples collected from the same borings were less than 3 mg/kg.

Similarly, cadmium was reported in four samples, from a single hand-auger boring, (analyzed by Method SW6010) to a maximum concentration of 9.7 mg/kg. However, samples collected from a soil boring approximately 30 feet away (analyzed by SW7131) reported no hits above the combined background concentration of 0.4 mg/kg.

Vanadium was detected at concentrations ranging from 39 to 100 mg/kg. The maximum concentration of vanadium is only slightly greater than the “combined” background level (75.7 mg/kg). There is no known source of vanadium at the site. The levels of vanadium at PRL S-014 appear to be representative of naturally occurring variations in background levels rather than indicative of site-related contamination.

Based on this evaluation, it was determined that metals were not significant contaminants at PRL S-014 and were not identified as COCs.

A1.4.2 PCBs

Samples for PCB analysis were collected at locations north and south of Building 22. South of the building, only one sample (PLS14SS001) exceeded the field screening level of 1 mg/kg; however, interference from overlying road-base material may have triggered this false positive result. A subsequent sample collected at about 1 foot into native material did not exceed the field screening level, and the confirmatory laboratory result indicated non-detect for both samples. All other results were non-detect, with the exception of one

sample collected near the waterfall paint spray booth area south of Building 22 in boring PLS14SS02. This sample contained a laboratory-reported concentration of 0.062 mg/kg.

On the north side of Building 22, several samples exceeded the field screening level. A maximum concentration of 5.93 mg/kg for PCB-1260 was reported at the surface, which exceeded the screening levels for the protection of human health and the environment. The extent of the PCB-1260-affected area was fairly limited laterally to within approximately 20 feet of the transformer and to an approximate depth of 2 feet bgs. PCBs have been removed from locations both north and south of Building 22 during the 2005 and 2006 remedial action.

A1.4.3 SVOCs

Eight soil samples were collected from three borings and analyzed for SVOCs. Two of the locations were within 30 feet of the former USTs and hazardous waste storage area. There were no reported SVOC detections at the site except for DEPH. This common laboratory contaminant was reported in two of the eight samples at a maximum concentration of 0.1 mg/kg. The SW8270 analysis included analysis of polynuclear aromatic hydrocarbons (PAHs) at reporting limits ranging from 0.019 to 0.3 mg/kg; no PAHs were detected.

A1.4.4 TPH

Two USTs were apparently used from approximately 1938 to 1979. Descriptions of these tanks are either gasoline and waste solvent storage tanks or gasoline and diesel storage tanks. UST removal confirmation samples were taken in March 1996 by LRA Engineering. Four borings were installed in the area of the former USTs. Two borings were completed to 50 feet bgs, and two were completed to 20 feet bgs. Soils were analyzed for TPH-G and TPH-D; benzene, toluene, ethylbenzene, and xylenes; and methyl-tert butyl ether (MTBE). Fuel releases from the USTs do not appear to have been significant because no contaminants were detected in the confirmation samples from the vicinity of the former USTs. Detection limits for TPH-G and TPH-D were 1 mg/kg, 5 micrograms per kilogram (µg/kg) for benzene, toluene, ethylbenzene, and xylene compounds, and between 5 and 250 µg/kg for MTBE. The highest detection limit for MTBE was from a sample collected at 5 feet bgs (at location H2-5). However, no other contaminants were reported in that sample or in two adjacent soil gas samples (with the exception of carbon tetrachloride discussed in the next subsection) collected at 7 feet bgs during the RI (PLS14PR001 and PLS14PR003). The RWQCB has concluded that no further action is required for these USTs (RWQCB, 2000). As discussed in the following subsection, only low levels of VOCs were detected in shallow soil gas (SSG) samples collected adjacent to the former USTs, thereby providing further evidence that a significant release of waste solvents did not occur.

TPH-D was not detected in any of the 6 samples analyzed during the RI; TPH-D was not detected in any of the 10 samples analyzed from the site during the RI.

A1.4.5 VOCs

During the Phase 1 RI conducted in 1993, 15 SSG samples were collected and analyzed onsite using a gas chromatograph. Eight additional SSG samples were collected as step-outs. Of the initial 15 SSG samples collected, only 1 sample (PS14SG09) was confirmed by Method TO-14. This sample was collected at a depth of 8 feet. The highest VOC concentration was carbon

tetrachloride at 180 J parts per billion by volume (ppbv) (Volume 1, OU A RICS, Jacobs, 2001). This concentration exceeds the industrial-use screening level (44 ppbv). Concentrations of chloroform, 1,1-dichloroethane, tetrachloroethene (PCE), and trichloroethene (TCE) exceed unrestricted use screening levels.

In 1993, five soil gas samples were also collected from one soil boring (PS14HP13) and analyzed for VOCs using Method E18. All samples were collected at depths greater than 20 feet, and VOCs were not detected in any of the samples. However, several VOCs (carbon tetrachloride, 1,1-dichloroethene, cis-1,2-dichloroethene, TCE, and m- and p-xylene) were flagged with analytical qualifiers indicating that the contaminants were "presumptively identified," thus there is assumed evidence of the contaminants being present. This boring was located north of PRL S-014 outside the boundaries of the site to determine the source of groundwater contamination, and is likely representative of smear-zone contamination (CH2M HILL, 2005).

During the Phase 2 RI conducted in 1996, two borings (PLS14SB001 and PLS14SB002) were installed – one in the former wash rack area and the other in the former UST/hazardous materials storage area. Four soil gas samples were collected from these two borings at depths greater than 20 feet. All samples were analyzed for VOCs using Method TO-14. VOCs were reported in all samples. Because VOCs were detected at depths greater than 20 feet, the concentrations are not directly relevant to the evaluation of human health risks at the surface.

In 1999, Data Gap 3 samples were collected to evaluate the former UST and wash rack areas. During this investigation, five samples were collected from five borings (PLS14PR001, PLS14PR002, PLS14PR003, PLS14PR004, and PLS14PR005), each at approximately 7 feet, and analyzed for VOCs using Method M18MS. Only one detection of carbon tetrachloride (250 J ppbv in PLS14PR001) and one detection of Freon 11 (490 J ppbv in PLS14PR004) were reported. The carbon tetrachloride concentration exceeds the industrial-use screening level of 44 ppbv. The Freon 11 concentration does not exceed unrestricted-use or industrial-use screening levels.

TCE and xylenes were detected above detection limits, but below equivalent water quality goals in groundwater. Groundwater has been impacted by VOCs from a source to the northwest in OU H (Jacobs, 2002).

SSG contamination at the site is sufficiently characterized. Six definitive SSG samples (Methods M18MS or TO-14) have been collected from six borings located southwest of Building 22. The site is approximately 0.5 acre, and samples were collected adjacent to the former USTs, hazardous waste storage area, pump islands, washrack, and paint spray booth.

A1.5 2005/2006 Remedial Action

In 2006, a remedial action was completed at the north and south ends of PRL S-014. Field activities consisted of pre-excavation sampling, removal of the transformer and transformer pad, excavation of contaminated soil, confirmation sampling of the excavation, characterization of the excavated soils, transportation of contaminated soil and offsite disposal, backfilling the excavated areas to restore the site to the original grade, replacement of the transformer, and hydroseeding to re-establish the lawn. The pre-excavation sampling

included the collection of samples from beneath the transformer pad and hazardous waste storage pad. The samples under the transformer pad were analyzed for PCBs; the samples under the hazardous waste storage pad were analyzed for metals, PCBs, and PAHs. The results verified that the soils beneath the transformer pad contained PCBs above action levels, and the soils beneath the hazardous waste storage pad were clean. Soils were removed where pre-excavation samples indicated that PCB concentrations were above cleanup levels.

Approximately 920 cubic yards of PCB-contaminated soil were excavated and disposed of at an offsite facility. Post-remedial action sampling confirmed that all contaminated soil with concentrations exceeding cleanup levels was removed.

A1.6 Contamination Exposure and Migration

Non-VOC contamination at the site presented a threat to human health and surface water. However, the contamination was removed from the site during the 2005 remedial action. Concentrations of carbon tetrachloride, chloroform, 1,1-dichloroethane, PCE, and TCE exceeded screening levels for the protection of human health in SSG samples.

A1.7 Current and Potential Future Site and Resource Uses

The building at PRL S-014 is currently occupied by a catering company through a lease arrangement with McClellan Park. In the future, PRL S-014 will likely continue to be used for commercial/industrial purposes.

A1.8 Human Health Risk Assessment

Based on results of the confirmation sampling from the 2005 remedial action, contaminants at the north end of the site do not present a significant threat to human health. Both residential and occupational exposure scenarios were evaluated for PRL S-014 (South) excluding detections of PCBs, which were also removed during the 2005 remedial action. The risk results for these scenarios are summarized below and in the risk summary tables found in the Attachment at the end of this site summary.

A1.8.1 Risk Characterization

The potential cancer risks for PRL S-014 (South) are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 2×10^{-4}
- Future adult resident (0-to-10-foot-bgs depth interval): 2×10^{-4}
- Future adult resident (0-to-2-foot-bgs depth interval excluding produce pathway): 1×10^{-4}
- Future adult resident (0-to-10-foot-bgs depth interval excluding produce pathway): 1×10^{-4}
- Future adult resident (0-to-2-foot-bgs depth interval) and groundwater: 2×10^{-4}
- Future adult resident (0-to-10-foot-bgs depth interval) and groundwater: 2×10^{-4}
- Future adult resident (groundwater only): 1×10^{-6}
- Outdoor occupational worker: 3×10^{-6}
- Indoor occupational worker: 7×10^{-6}
- Future construction worker: 1×10^{-6}

The main contributor to the cumulative risks for the residential scenarios is the ingestion of arsenic in homegrown produce and the inhalation of carbon tetrachloride in indoor air. Potential risks associated with VOCs in groundwater do not exceed 1×10^{-6}. The noncancer hazard indexes for the future adult residential scenario are 1 and 2 (for 0 to 2 and 0 to 10 feet bgs, respectively), primarily due to the ingestion of vanadium in homegrown produce. Excluding the produce pathway, the hazard index for the 0-to-10-foot-bgs depth interval is 1.

The hazard indexes are less than 1 for the indoor occupation worker, outdoor occupation worker, and future construction worker scenarios. The main contributor to the hazard index for the child residential scenario is the hazard quotient (HQ) for arsenic and vanadium for the incidental soil ingestion and homegrown produce pathways. The following shows that some of the hazard indexes for some of the future child resident scenarios exceeded 1:

- Future child resident (0-to-2-foot-bgs depth interval): 3
- Future child resident (0-to-10-foot-bgs depth interval): 4
- Future child resident (0-to-2-foot-bgs depth interval excluding the produce pathway): 1
- Future child resident (0-to-10-foot-bgs depth interval excluding the produce pathway): 2
- Future child resident (0-to-2-foot-bgs depth interval) and groundwater: 4
- Future child resident (0-to-10-foot-bgs depth interval) and groundwater: 5
- Future child resident (groundwater only): < 1

For PRL S-014 South, blood lead levels were estimated using soil lead concentrations and Lead-spread 7; estimated blood lead levels were below the target level of 10 micrograms per deciliter (µg/dL) in 99 percent (0.01 risk) of potentially exposed adult and child residents, outdoor workers, and construction workers.

Based on the risk assessment, the potential cancer risk from groundwater exposure for future adult residents is 1×10^{-6}. The main contributor to the potential cancer risk is TCE. For groundwater, the noncancer hazard index for the future adult resident is 0.2 and the hazard index for the future child resident is 0.4. The main contributors to the hazard indexes are TCE and xylenes.

A1.8.2 Uncertainties

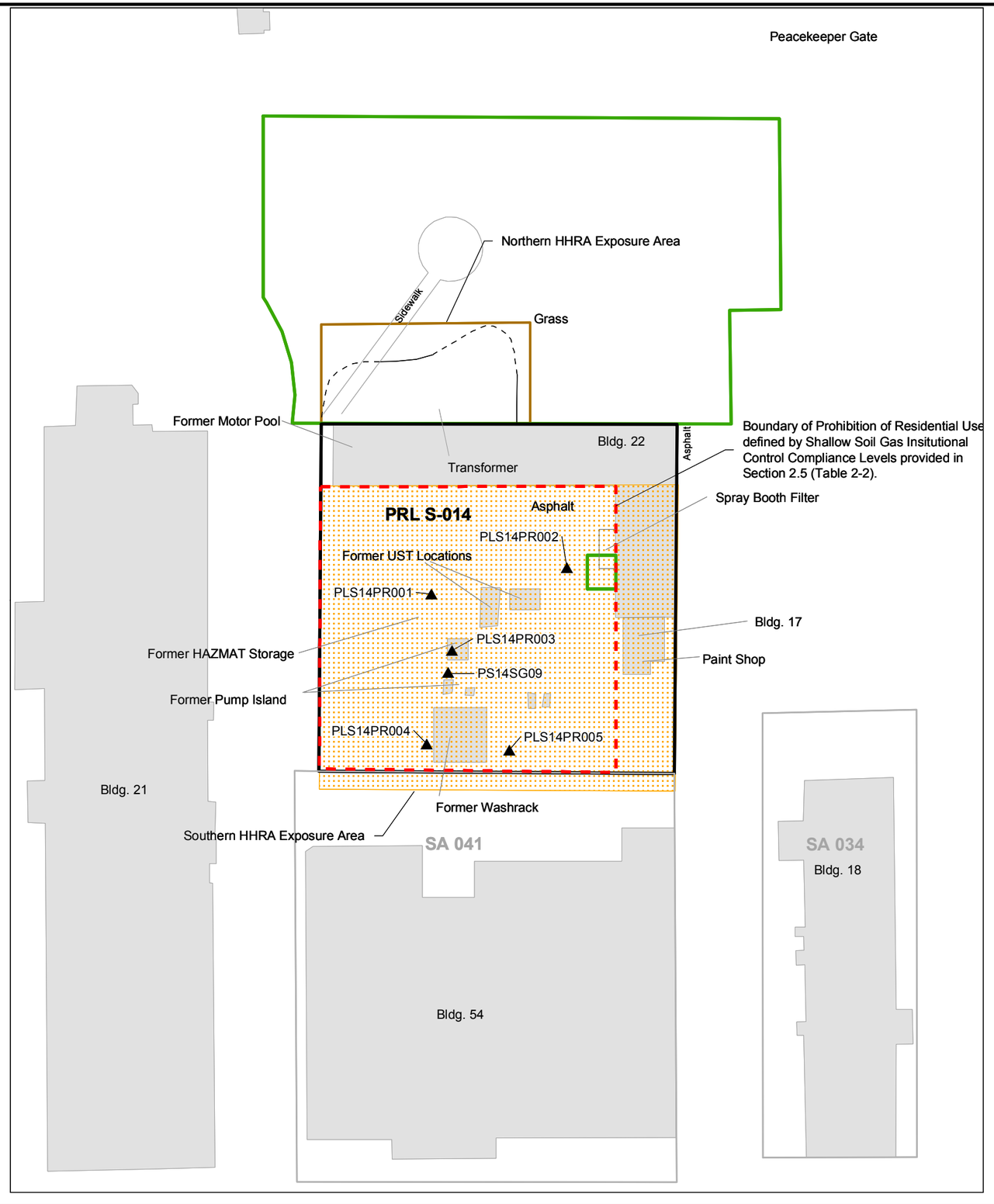
There are uncertainties associated with the risk estimates for PRL S-014. These are listed briefly below with additional discussion provided in an attachment to this site summary:

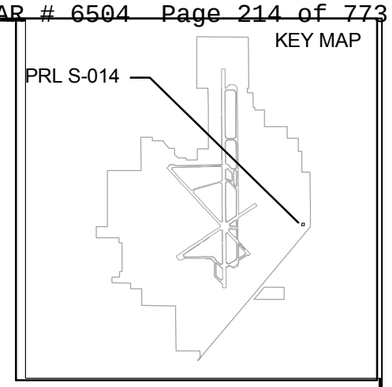
- Current re-use plans for this site are indefinite; however, the site is planned for commercial/industrial use.
- The partition coefficients used to estimate potential risks from the homegrown produce pathway for arsenic are uncertain.
- Arsenic was detected at concentrations that appear greater than the "combined" background concentration at selected locations, primarily in samples analyzed by Method SW6010. These SW6010 data were not used for the risk assessment. The maximum reported concentrations of arsenic by the preferred analytical method, Method SW7060, are less than the maximum reported concentrations by Method 6010. In addition, the sporadic elevated concentrations are not indicative of a contaminant source. Therefore, the risk associated with arsenic at this site may be representative of background.

- Vanadium was detected at concentrations that appear greater than the "combined" background concentration at selected locations. The maximum concentration of vanadium is only slightly greater than the "combined" background level. There is no known source of vanadium at the site. The levels of vanadium at PRL S-014 appear to be representative of naturally occurring variations in background levels rather than indicative of site-related contamination. Therefore, the risk associated with vanadium at this site may be representative of background.

A1.8.3 Basis for Action

The incremental carcinogenic risks are at the upper end of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) risk range for the residential scenarios, but are within the low-end of the risk range for the industrial scenarios. The hazard indexes are greater than 1 for the residential scenarios but are less than 1 for the industrial scenarios. There are no known sources of arsenic or vanadium present at the site, and the risk associated with the metals may be representative of background. Institutional controls will be implemented to prohibit residential use of the site. As shown on Figure A-1, the boundary for the institutional controls encompasses an area south and west of Building 22 that includes all sampling locations with detected concentrations that exceed the institutional control compliance levels for unrestricted use presented in Section 2.5 (see Table 2-2).





Boring ID	Analyte	Depth (ft bgs)	Concentration (ppbv)
VOCs (In shallow soil gas from 0-15 feet)			
PLS14PR001	**Carbon Tetrachloride**	**7**	**250 J**
PLS14PR001	Freon 11	7	490 J
PLS14PR002	--	7	ND
PLS14PR003	--	6.8	ND
PLS14PR004	--	6.8	ND
PLS14PR005	--	7	ND
PS14SG09	Acetone	8	19
PS14SG09	Benzene	8	4.5
PS14SG09	**Carbon Tetrachloride**	**8**	**180 J**
PS14SG09	Chloroform	8	18
PS14SG09	1,1-Dichloroethane	8	110
PS14SG09	1,1-Dichloroethene	8	68
PS14SG09	cis-1,2-Dichloroethene	8	1.3 J
PS14SG09	Ethylbenzene	8	1.6 J
PS14SG09	Freon	8	150 J
PS14SG09	Freon 113	8	11
PS14SG09	Freon 12	8	170 J
PS14SG09	PCE	8	7.2
PS14SG09	Propene	8	25
PS14SG09	Styrene	8	2.1 J
PS14SG09	1,1,1-Trichloroethane	8	2.8 J
PS14SG09	TCE	8	130
PS14SG09	Toluene	8	5.9
PS14SG09	1,2,4-Trimethylbenzene	8	3.9
PS14SG09	1,3,5-Trimethylbenzene	8	2.9
PS14SG09	m,p-xylene	8	4.9 J
PS14SG09	o-xylene	8	2 J

Note: Bold Text indicates the result exceeds the Industrial Screening Level established for the given analyte (Table C-2).

N

0 25 50

Feet

LEGEND

- RI SOIL GAS LOCATIONS
- EXCAVATED DURING THE 2005/2006 IP ROD #1 REMEDIAL ACTION
- BOUNDARY OF INSTITUTIONAL CONTROLS
- IRP SITE BOUNDARY

FIGURE A-1
PRL S-014 VOC CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

Attachment A1
PRL S-014 Human Health Risk Assessment

ATTACHMENT A1

PRL S-014 Human Health Risk Assessment

The baseline human health risk assessment estimates what risks the site would pose if no action were taken. This section of the ROD summarizes the results of the updated baseline risk assessment for PRL S-014. This risk assessment was originally presented in the OU A RICS Addendum (Jacobs, 2002). This update uses the same risk assessment methodology as OU A for all exposure pathways except those involving indoor air. For indoor air pathways (i.e., inhalation exposure route for VOCs for the residential and indoor occupational scenarios), the SSG screening levels that are presented in Appendix C of this ROD and the SSG exposure point concentrations (EPCs) (see Table A1-1a) were used as the basis for inhalation cancer risk and noncancer hazard calculations. In addition, for chemicals that have had toxicity value updates since the OU A RICS Addendum was published, more recent toxicity criteria have been used.

Identification of Chemicals of Concern

Potential COCs for PRL S-014 include VOCs and metals. Tables A1-1a through A1-1d present the soil gas, air, groundwater, and soil data summaries, respectively, for the potential COCs (site-specific tables are located at the end of each section). No groundwater samples were collected within a 200-foot radius of this site. However, groundwater samples collected at PS14HP13, located cross-gradient and outside of the groundwater exposure area, were used to estimate groundwater EPCs for PRL S-014.

Tables A1-1a through A1-1d include the range of potential COC concentrations, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the EPCs, and how the EPCs were derived for each of the media and exposure areas of PRL S-014. In general, the lower value of the maximum concentration or the upper 95th percent confidence limit on the mean was used as the EPC for potential COCs detected in more than one sample.

Exposure Assessment

A conceptual model was developed that describes the potential exposure pathways associated with soil and groundwater at PRL S-014 (see Figure 2-3 in Section 2.4 of the ROD). Although PRL S-014 will likely be used for commercial/industrial purposes in the future; several exposure scenarios were evaluated in the human health risk assessment to provide information for future risk-management decisions.

The following exposure scenarios were quantitatively evaluated in the human health risk assessment:

- Exposure of hypothetical future residents (adults and children) to soil (0 to 2 feet bgs) and groundwater

- Exposure of hypothetical future residents (adults and children) to soil (0 to 10 feet bgs) and groundwater
- Exposure of outdoor workers to soil (0 to 2 feet bgs)
- Exposure of indoor workers to VOCs in indoor air
- Exposure of construction workers to soil (0 to 15 feet bgs)

The exposure routes that were considered in the risk assessment for residents and workers potentially exposed to soil include incidental soil ingestion, inhalation of VOCs (indoor air for residents and ambient air for outdoor workers and construction workers) and resuspended particulates, and dermal contact with soil. For the residential scenarios, the ingestion of homegrown produce also was included. For groundwater, the ingestion, inhalation of VOCs, and dermal contact exposure routes were evaluated. For the indoor worker, potential risk associated with inhalation of VOCs in indoor air was evaluated.

PRL S-014 was divided into two sections: the area north of Building 22 in the vicinity of the former transformer (PRL S-014 North), and the area south of Building 22 where activities related to the motor pool facility were conducted (PRL S-014 South). During the 2005 remedial action, PCBs found north and south of Building 22 were removed.

Toxicity Assessment

The toxicity data that were used in the human health risk assessment are summarized in Tables A1-2 and A1-3. Health effects are divided into two categories: cancer and noncancer effects.

Table A1-2 presents the slope factors used to estimate potential excess lifetime cancer risks associated with exposure to potential COCs in soil, air, and groundwater at PRL S-014. As shown in Table A1-2, the oral slope factor was used to estimate potential risks associated with dermal exposure. Table A1-3 presents the reference doses (RfDs) used to evaluate the potential for noncancer health effects. Inhalation reference concentrations are not available for some of the COCs, so the oral RfDs were used to evaluate potential health effects from the inhalation exposure route.

The hierarchy of sources for toxicity values follows EPA and Air Force guidance (EPA, 2003; USAF, 2006); the sources are listed below in order of preference:

1. EPA Integrated Risk Information System (IRIS) – online database (EPA, 2007)
2. EPA's Provisional Peer Reviewed Toxicity Values (as cited in the 2004 EPA Region 9 Preliminary Remediation Goal [PRG] table [EPA, 2004])
3. California Environmental Protection Agency (Cal-EPA) cancer potency factors and reference exposure levels (RELs) online database (Cal-EPA, 2007)
4. Other EPA sources (including Health Effects Assessment Summary Table [HEAST], National Center for Environmental Assessment [NCEA] provisional toxicity values, and route-extrapolated toxicity values as cited in the 2004 EPA Region 9 PRG table [EPA, 2004])

Toxicity criteria for several contaminants have changed since the human health risk assessment was first presented. The risk estimates have been updated with the most current toxicity factors.

The following cancer toxicity slope factors were updated:

- Chloroform – Inhalation: 0.080 to 0.081 (milligrams per kilogram per day [mg/kg-day])$^{-1}$
- 1,1-Dichloroethene – Oral: 0.6 (mg/kg-day)$^{-1}$ to no oral slope factor. Inhalation: 0.18 (mg/kg-day)$^{-1}$ to no inhalation slope factor. Oral and inhalation slope factors were withdrawn from IRIS on August 13, 2002
- PCE – Oral: 0.052 to 0.54 (mg/kg-day)$^{-1}$
- TCE – Oral: 0.015 to 0.013 (mg/kg-day)$^{-1}$. Inhalation: 0.01 to 0.007 (mg/kg-day)$^{-1}$
- Benzene – Oral: 0.1 to 0.055 (mg/kg-day)$^{-1}$. Inhalation: 0.1 to 0.027 (mg/kg-day)$^{-1}$
- Carbon tetrachloride – Oral: 0.15 to 0.13 (mg/kg-day)$^{-1}$. Inhalation: 0.15 to 0.053 (mg/kg-day)$^{-1}$
- Ethylbenzene – Oral: 0.0 to 0.011 (mg/kg-day)$^{-1}$. Inhalation: 0.0 to 0.0087 (mg/kg-day)$^{-1}$

The following non-cancer toxicity RfDs also were updated:

- Arsenic – Inhalation: $3.0x10^{-4}$ to $8.6x10^{-6}$ mg/kg-day
- Copper – Oral: 0.037 to 0.040 mg/kg-day. Inhalation: 0.037 to 0.040 mg/kg-day
- Acetone – Oral: 0.1 to 0.9 mg/kg-day. Inhalation: 0.1 to 0.9 mg/kg-day
- Benzene – Inhalation: 0.0017 to 0.0086 mg/kg-day
- Carbon tetrachloride – Inhalation: $5.7x10^{-4}$ to 0.011 mg/kg-day
- Chloroform – Inhalation: 0.01 to 0.086 mg/kg-day
- 1,1-Dichloroethene – Oral: 0.009 to 0.05 mg/kg-day. Inhalation: 0.009 to 0.057 mg/kg-day
- PCE – Inhalation: 0.11 to 0.01 mg/kg-day
- Toluene – Oral: 0.2 to 0.08 mg/kg-day. Inhalation: 0.11 to 1.4 mg/kg-day
- 1,1,1-Trichloroethane – Oral: 0.035 to 2.0 mg/kg-day. Inhalation: 0.29 to 1.4 mg/kg-day
- TCE – Oral: 0.006 to 0.0003 mg/kg-day. Inhalation: 0.006 to 0.17 mg/kg-day
- Xylenes – Oral: 2.0 to 0.2 mg/kg-day. Inhalation: 2.0 to 0.029 mg/kg-day
- Vanadium – Oral: 0.007 to 0.001 mg/kg-day. Inhalation: 0.007 to 0.001 mg/kg-day
- Benzene – Oral: 0.003 to 0.004 mg/kg-day

Risk Characterization

Cal-EPA and EPA toxicity values described above were used in the human health risk assessment along with the exposure information to estimate the potential risks from contacting potential COCs in soil, air, and groundwater. For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{SF} \quad (1)$$

Where:

Risk = a unitless probability (e.g., 1×10^{-6}) of an individual developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(\text{mg/kg-day})^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in a million chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer that individuals face from other causes such as smoking or exposure to too much sun. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with an RfD derived for a similar exposure period. An RfD represents a level to which an individual may be exposed that is not expected to cause any deleterious effect. The ratio of the receptor average daily exposure to the route-specific RfD is called a hazard quotient (HQ). An HQ less than 1 indicates that the receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index is generated by adding the HQs over the exposure routes. A hazard index less than 1 indicates that, based on the sum of all HQs from different exposure routes, toxic noncarcinogenic effects are unlikely. A hazard index greater than 1 indicates that site-related exposure may present a risk to human health.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD} \quad (2)$$

Where:

CDI = chronic daily intake (mg/kg-day)
RfD = reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

Table A1-4 presents the potential cancer risk estimates for the various exposure scenarios and exposure routes at PRL S-014. These risk estimates are based on reasonable maximum exposure and were developed taking into account various conservative assumptions

about the frequency and duration of receptors' exposure to soil and the toxicity of the potential COCs.

Residential and occupational exposure scenarios were evaluated for PRL S-014. Risk estimates were calculated for PRL S-014 South only, since PCBs were removed from the site during the 2005 removal action. The risk results for these scenarios are summarized below and presented in the risk summary tables at the end of this section.

The potential cancer risks for PRL S-014 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 2×10^{-4}
- Future adult resident (0-to-10-foot-bgs depth interval): 2×10^{-4}
- Future adult resident (0-to-2-foot-bgs depth interval excluding produce pathway): 1×10^{-4}
- Future adult resident (0-to-10-foot-bgs depth interval excluding produce pathway): 1×10^{-4}
- Future adult resident (0-to-2-foot-bgs depth interval) and groundwater: 2×10^{-4}
- Future adult resident (0-to-10-foot-bgs depth interval) and groundwater: 2×10^{-4}
- Future adult resident (groundwater only): 1×10^{-6}
- Outdoor occupational worker: 3×10^{-6}
- Indoor occupational worker: 7×10^{-6}
- Future construction worker: 1×10^{-6}

The main contributor to the cumulative risks for the residential scenarios is the ingestion of arsenic in homegrown produce and the inhalation of carbon tetrachloride in indoor air. Potential risks associated with VOCs in groundwater do not exceed 1×10^{-6}.

The noncancer hazard indexes for the future adult residential scenario are 1 and 2 (for 0 to 2 feet bgs and 0 to 10 feet bgs, respectively), primarily due to the ingestion of vanadium in homegrown produce. Excluding the produce pathway, the hazard index for the 0-to-10-foot-bgs depth interval is 1.

The hazard indexes are less than 1 for the indoor occupation worker, outdoor occupation worker, and future construction worker scenarios. The main contributor to the hazard index for the child residential scenario is the HQ for arsenic and vanadium for the incidental soil ingestion and homegrown produce pathways. The following shows that some of the hazard indexes for some of the future child resident scenarios exceeded 1:

- Future child resident (0-to-2-foot-bgs depth interval): 3
- Future child resident (0-to-10-foot-bgs depth interval): 4
- Future child resident (0-to-2-foot-bgs depth interval excluding the produce pathway): 1
- Future child resident (0-to-10-foot-bgs depth interval excluding the produce pathway): 2
- Future child resident (0-to-2-foot-bgs depth interval) and groundwater: 4
- Future child resident (0-to-10-foot-bgs depth interval) and groundwater: 5
- Future child resident (groundwater only): < 1

Table A1-5 presents the noncancer hazard indexes and the various exposure scenarios and exposure routes at PRL S-014.

For PRL S-014, blood lead levels were estimated using soil lead concentrations and Lead-spread 7; estimated blood lead levels were below the target level of 10 µg/dL in 99 percent (0.01 risk) of potentially exposed adult and child residents, outdoor workers, and construction workers.

Based on the risk assessment, the potential cancer risk from groundwater exposure for future adult residents is 1×10^{-6}. The main contributor to the potential cancer risk is TCE. For groundwater, the noncancer hazard index for the future adult resident is 0.2 and the hazard index for the future child resident is 0.4. The main contributors to the hazard indexes are TCE and xylenes.

Uncertainties

The following uncertainties are associated with the risk estimates for PRL S-014:

Current re-use plans for this site are indefinite, but do not include residential or other "sensitive" use scenarios (day-care centers, schools, hospitals, etc.). Hence, the use of the residential scenario for the site should be considered hypothetical at this time.

There is considerable uncertainty associated with the homegrown produce pathway. For example, for arsenic, a range of empirical values of the partition coefficients used for the produce pathway calculations span approximately an order of magnitude. Since the homegrown produce pathway is a major contributor to the risk estimates for the residential scenarios for the site, the uncertainties from this pathway are reflected in the overall risk estimates, which may be overestimated or underestimated because of the uncertainties with the plant partition coefficients.

Arsenic was detected at concentrations that appear greater than the combined background concentration at selected locations. These detections were in samples analyzed by EPA Method 6010, which may have quality concerns for this site. We do not have confirmation samples using EPA Method 7060 at the same location(s), or in the immediate vicinity of the samples with elevated arsenic detections, so an uncertainty regarding arsenic as a contaminant is introduced. The maximum reported concentrations of arsenic by the preferred analytical method, Method SW7060, are less than the maximum reported concentrations by Method SW6010. In addition, the sporadic elevated concentrations are not indicative of a contaminant source. Therefore, the risk associated with arsenic at this site may be representative of background.

Vanadium was detected at concentrations that appear greater than the "combined" background concentration at selected locations. The maximum concentration of vanadium is only slightly greater than the "combined" background level. There is no known source of vanadium at the site. The levels of vanadium at PRL S-014 appear to be representative of naturally occurring variations in background levels rather than indicative of site-related contamination. Therefore, the risk associated with vanadium at this site may be representative of background.

Chromium was detected at concentrations about background levels, but was eliminated as a COC for the human health risk assessment based on the statistical background comparison. There is some uncertainty associated with the elimination of metals as COCs based on the background comparisons. However, site-specific background concentrations of chromium at the former McClellan Air Force Base are less than risk-based screening levels and therefore, the potential cancer risk associated with background levels of chromium is less than 1×10^{-6} and the HQ for background levels of chromium is less than 1.

For several compounds, Cal-EPA presents more conservative toxicity values than the EPA values used in the risk calculations presented in Tables A1-4 and A1-5. The following chemicals have more conservative Cal-EPA cancer slope factors and noncancer RfDs:

- Arsenic – Oral slope factor: 9.5 $(mg/kg\text{-}day)^{-1}$
- Beryllium – Inhalation RfD: 2.0E-06 (mg/kg-day)
- Benzene – Oral slope factor: 1.0E-01 $(mg/kg\text{-}day)^{-1}$. Inhalation slope factor: 1.0E-01 $(mg/kg\text{-}day)^{-1}$
- Carbon tetrachloride – Oral slope factor: 1.5E-01 $(mg/kg\text{-}day)^{-1}$. Inhalation slope factor: 1.5E-01 $(mg/kg\text{-}day)^{-1}$
- 1,1-Dichloroethene – Inhalation RfD: 2.0E-02 (mg/kg-day)
- Styrene – Inhalation RfD: 2.6E-01 (mg/kg-day)
- 1,1,1-Trichloroethane – Inhalation RfD: 2.9E-01 (mg/kg-day)

Use of these toxicity values would yield more conservative estimates for cancer risks and hazard indexes. For PRL S-014, the differences in RfDs have no significant impact on the hazard index results. For the cancer risk estimates, the results are greater using the Cal-EPA slope factors primarily due to the differences in slope factors between Cal-EPA and EPA for arsenic and carbon tetrachloride. The cancer risk estimates using the more conservative Cal-EPA slope factors are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 8×10^{-4}
- Future adult resident (0-to-10-foot-bgs depth interval): 1×10^{-3}
- Outdoor occupational worker: 2×10^{-5}
- Indoor occupational worker: 2×10^{-5}
- Future construction worker: 7×10^{-6}

An additional uncertainty relates to the classification of ethylbenzene as a carcinogen. EPA does not classify ethylbenzene as a carcinogen, whereas Cal-EPA considers ethylbenzene carcinogenic by the oral and inhalation exposure routes and provides oral and inhalation slope factors in the Office of Environmental Health Hazard Assessment (OEHHA) database. The cumulative cancer risk calculations presented for PRL S-014 (Table A1-4) include ethylbenzene. However, since ethylbenzene was detected at low concentrations in soil gas, this uncertainty does not have a significant impact on the risk results for this site. If ethylbenzene is excluded from the cancer risk calculations, the cumulative risks are essentially equal to the cumulative risks that include ethylbenzene.

References

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Jacobs. 2002. Operable Unit A Remedial Investigation Characterization Summaries Addendum. Final. June.

United States Air Force (USAF). 2006. "Toxicity Values for Use in Risk Assessments and Establishing Risk-Based Cleanup Levels." Memorandum from Gregory R. Ottoman, Major, USAF. July 14.

United States Environmental Protection Agency (EPA). 2003. "Human Health Toxicity Values in Superfund Risk Assessments." OSWER Directive 9285.7-53. December 5.

United States Environmental Protection Agency (EPA). 2004. Region 9 Preliminary Remediation Goal (PRG) table. October.

United States Environmental Protection Agency (EPA). 2007. Integrated Risk Information System (IRIS). Online database.

Table A1-1a
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
PRL S-014

Scenario Timeframe:	**Future**							
Medium	**Soil Gas**							
Exposure Medium	**Soil Gas**							
Exposure Point	**Chemical of Concern**	**Concentration Detected (ppbv) Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration (ppbv)**	**Statistical Measure[a]**	**Exposure Point Concentration[b] (ppbv)**	**Exposure Point Concentration in Soil[c] (mg/kg)**
PRL S-014 - Soil Gas	Acetone	1.9E+01	1.9E+01	1/6	2.3E+03	Max Detect	1.9E+01	1.1E-02
	Benzene	4.5E+00	4.5E+00	1/6	2.6E+03	Max Detect	4.5E+00	1.6E-05
	Carbon tetrachloride	1.8E+02	3.0E+02	2/6	2.5E+02	95UCL Lognormal	2.5E+02	1.1E-03
	Chloroform	1.8E+01	1.8E+01	1/6	2.7E+02	Max Detect	1.8E+01	1.3E-04
	Dichlorodifluoromethane	1.7E+02	1.7E+02	1/6	1.4E+02	95UCL Lognormal	1.4E+02	9.8E-05
	1,1-Dichloroethane	1.1E+02	1.1E+02	1/6	1.1E+02	95UCL Lognormal	1.1E+02	4.6E-04
	1,1-Dichloroethene	6.8E+01	6.8E+01	1/6	1.1E+02	Max Detect	6.8E+01	9.7E-05
	cis-1,2-Dichloroethene	1.3E+00	1.3E+00	1/6	7.0E+04	Max Detect	1.3E+00	6.7E-06
	Ethylbenzene	1.6E+00	1.6E+00	1/6	3.7E+04	Max Detect	1.6E+00	7.0E-06
	Propene	2.5E+01	2.5E+01	1/1	--[d]	Max Detect	2.5E+01	7.6E-06
	Styrene	2.1E+00	2.1E+00	1/1	--[d]	Max Detect	2.1E+00	3.3E-05
	Tetrachloroethene	7.2E+00	7.2E+00	1/6	1.0E+03	Max Detect	7.2E+00	2.7E-05
	Toluene	5.9E+00	5.9E+00	1/6	1.5E+03	Max Detect	5.9E+00	2.5E-05
	1,1,1-Trichloroethane	2.8E+00	2.8E+00	1/6	8.0E+03	Max Detect	2.8E+00	7.2E-06
	Trichloroethene	1.3E+02	1.3E+02	1/6	1.2E+02	95UCL Lognormal	1.2E+02	4.2E-04
	1,1,2-Trichloro-1,2,2-trifluoroethane	1.1E+01	1.1E+01	1/6	5.1E+02	Max Detect	1.1E+01	1.3E-05
	Trichlorofluoromethane	1.5E+02	4.9E+02	2/6	4.1E+02	95UCL Lognormal	4.1E+02	4.6E-04
	1,2,4-Trimethylbenzene	3.9E+00	3.9E+00	1/1	--[d]	Max Detect	3.9E+00	7.7E-05
	1,3,5-Trimethylbenzene	2.9E+00	2.9E+00	1/1	--[d]	Max Detect	2.9E+00	5.2E-05
	Xylenes	6.9E+00	6.9E+00	1/6	1.1E+03	Max Detect	6.9E+00	1.2E-04

[a] The statistical measure indicates the basis for the exposure point concentration.
[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.
[c] Exposure point concentrations for these VOCs in soil are estimated from measured shallow soil gas concentrations.
[d] Due to the limited data set, a statistical analysis could not be conducted to determine the 95th UCL concentration.
95th UCL = 95 percent upper confidence limit on the mean.

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Table A1-1b
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
PRL S-014

Scenario Timeframe:	**Future**
Medium	**Air**
Exposure Medium	**Air**

			Construction Worker Air Exposure		Occupational Worker Air Exposure	
Exposure Point	**Chemical of Concern**	**Exposure Point Concentration in Soil[a] (mg/kg)**	**1-Year Flux Rate (g/m^2-s)**	**Exposure Point Concentration Construction Worker Outdoor Air[b] (mg/m^3)**	**25-Year Flux Rate (g/m^2-s)**	**Exposure Point Concentration Occupational Outdoor Air[b] (mg/m^3)**
PRL S-014 - VOCs in Air	Acetone	1.1E-02	8.04E-22	3.1E-18	2.01E-12	7.8E-09
	Benzene	1.6E-05	6.56E-13	2.5E-09	1.29E-13	5.0E-10
	Carbon tetrachloride	1.1E-03	6.30E-11	2.4E-07	8.92E-12	3.5E-08
	Chloroform	1.3E-04	4.03E-12	1.6E-08	9.84E-13	3.8E-09
	Dichlorodifluoromethane	9.8E-05	1.40E-11	5.4E-08	8.04E-13	3.1E-09
	1,1-Dichloroethane	4.6E-04	1.64E-11	6.3E-08	3.55E-12	1.4E-08
	1,1-Dichloroethene	9.7E-05	8.82E-12	3.4E-08	8.31E-13	3.2E-09
	cis-1,2-Dichloroethene	6.7E-06	2.12E-13	8.2E-10	5.08E-14	2.0E-10
	Ethylbenzene	7.0E-06	2.70E-13	1.1E-09	5.43E-14	2.1E-10
	Propene	7.6E-06	1.16E-12	4.5E-09	6.10E-14	2.4E-10
	Styrene	3.3E-05	2.30E-13	8.9E-10	1.78E-13	6.8E-10
	Tetrachloroethene	2.7E-05	1.71E-12	6.6E-09	2.28E-13	8.8E-10
	Toluene	2.5E-05	9.03E-13	3.5E-09	1.92E-13	7.4E-10
	1,1,1-Trichloroethane	7.2E-06	5.50E-13	2.1E-09	6.13E-14	2.4E-10
	Trichloroethene	4.2E-04	2.48E-11	9.6E-08	3.50E-12	1.4E-08
	1,1,2-Trichloro-1,2,2-trifluoroethane	1.3E-05	1.07E-12	4.1E-09	1.11E-13	4.3E-10
	Trichlorofluoromethane	4.6E-04	5.98E-11	2.3E-07	3.87E-12	1.5E-08
	1,2,4-Trimethylbenzene	7.7E-05	3.93E-13	1.5E-09	3.86E-13	1.5E-09
	1,3,5-Trimethylbenzene	5.2E-05	3.14E-13	1.2E-09	2.73E-13	1.1E-09
	Xylenes	1.2E-04	3.64E-14	1.4E-10	3.06E-13	1.2E-09

[a] Exposure point concentrations for these VOCs in soil are estimated from measured shallow soil gas concentrations.

[b] Emissions from soil and resulting air concentrations were estimated from models using the exposure point concentration estimated for soil.

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Table A1-1c
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
PRL S-014

Scenario Timeframe:	**Future**						
Medium	**Groundwater**						
Exposure Medium	**Groundwater**						
Exposure Point	**Chemical of Concern**	**Concentration Detected (µg/L) Min**	**Concentration Detected (µg/L) Max**	**Frequency of Detection**	**95th UCL Concentration (µg/L) [a]**	**Statistical Measure[b]**	**Exposure Point Concentration[c] (µg/L)**
PRL S-014 - Groundwater On-site Direct Contact	Trichloroethene	1.6E+00	1.6E+00	1/2	--	Max Detect	1.6E+00
	Xylenes	2.1E+00	2.1E+00	1/2	--	Max Detect	2.1E+00

[a] Due to the limited data set, a statistical analysis could not be conducted to determine the 95th UCL concentration.
[b] The statistical measure indicates the basis for the exposure point concentration.
[c] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.
95th UCL = 95 percent upper confidence limit on the mean.

Table A1-1d
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
PRL S-014

Scenario Timeframe:	**Future**
Medium	**Soil**
Exposure Medium	**Soil**

Exposure Point	Chemical of Concern	Concentration Detected (mg/kg) Min	Concentration Detected (mg/kg) Max	Frequency of Detection	95th UCL Concentration (mg/kg)	Statistical Measure[a]	Exposure Point Concentration[b] (mg/kg)
PRL S-014 South - Soil On-site Direct Contact (0-2 ft bgs)	Arsenic	1.5E+00	8.0E+00	6/6	6.1E+00	95UCL Normal	6.1E+00
	Beryllium	4.0E-01	6.4E-01	4/4	6.5E-01	Max Detect	6.4E-01
	Copper	1.8E+01	2.8E+01	4/4	2.7E+01	95UCL Normal	2.7E+01
	Lead	5.7E+00	3.2E+01	4/4	4.4E+02	Max Detect	3.2E+01
	Vanadium	4.5E+01	5.8E+01	4/4	5.9E+01	Max Detect	5.8E+01
	Zinc	3.4E+01	6.2E+01	4/4	5.9E+01	95UCL Normal	5.9E+01
PRL S-014 South - Soil On-site Direct Contact (0-10 ft bgs)	Arsenic	9.7E-01	1.0E+01	13/13	8.4E+00	95UCL Lognormal	8.4E+00
	Beryllium	1.8E-01	8.2E-01	10/10	5.9E-01	95UCL Normal	5.9E-01
	Copper	1.5E+01	3.3E+01	10/10	2.5E+01	95UCL Normal	2.5E+01
	Lead	3.0E+00	3.2E+01	11/11	1.2E+01	95UCL Lognormal	1.2E+01
	Vanadium	3.9E+01	1.0E+02	10/10	7.5E+01	95UCL Lognormal	7.5E+01
	Zinc	3.4E+01	6.5E+01	10/10	5.1E+01	95UCL Normal	5.1E+01
PRL S-014 South - Soil On-site Direct Contact (0-15 ft bgs)	Arsenic	9.7E-01	1.0E+01	14/14	8.6E+00	95UCL Lognormal	8.6E+00
	Beryllium	1.8E-01	8.2E-01	10/10	5.9E-01	95UCL Normal	5.9E-01
	Copper	1.5E+01	3.3E+01	10/10	2.5E+01	95UCL Normal	2.5E+01
	Lead	3.0E+00	3.2E+01	11/11	1.2E+01	95UCL Lognormal	1.2E+01
	Vanadium	3.9E+01	1.0E+02	10/10	7.5E+01	95UCL Lognormal	7.5E+01
	Zinc	3.4E+01	6.5E+01	10/10	5.1E+01	95UCL Normal	5.1E+01

[a] The statistical measure indicates the basis for the exposure point concentration.

[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.

95th UCL = 95 percent upper confidence limit on the mean.

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Table A1-2
Cancer Toxicity Data Summary
PRL S-014

Pathway: Ingestion, Dermal						
Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence[a]	Source	Date
Arsenic	1.5E+00	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Beryllium				B2		
Lead				B2		
Benzene	5.5E-02	5.5E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Carbon Tetrachloride	1.3E-01	1.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Chloroform	3.1E-02	3.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Ethylbenzene	1.1E-02	1.1E-02	$(mg/kg\text{-}day)^{-2}$		Cal-EPA	2007
1,1-Dichloroethane	5.7E-03	5.7E-03	$(mg/kg\text{-}day)^{-1}$	C	Cal-EPA	2007
1,1-Dichloroethene				C		
Tetrachloroethene	5.4E-01	5.4E-01	$(mg/kg\text{-}day)^{-1}$		Cal-EPA	2007
Trichloroethene	1.3E-02	1.3E-02	$(mg/kg\text{-}day)^{-1}$	B2/C	Cal-EPA	2007
Pathway: Inhalation						
Chemical of Concern	Inhalation Cancer Slope Factor		Slope Factor Units	Weight of Evidence[a]	Source	Date
Arsenic	1.5E+01		$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Beryllium	8.4E+00		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Lead				B2		
Benzene	2.7E-02		$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Carbon Tetrachloride	5.3E-02		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Chloroform	8.1E-02		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Ethylbenzene	8.7E-03		$(mg/kg\text{-}day)^{-2}$		Cal-EPA	2007
1,1-Dichloroethane	5.7E-03		$(mg/kg\text{-}day)^{-1}$	C	Cal-EPA	2007
1,1-Dichloroethene				C		
Tetrachloroethene	2.1E-02		$(mg/kg\text{-}day)^{-1}$		Cal-EPA	2007
Trichloroethene	7.0E-03		$(mg/kg\text{-}day)^{-1}$	B2/C	Cal-EPA	2007

[a]Weight of Evidence Classification

A - human carcinogen
B1 and B2 - probable human carcinogen
C - possible human carcinogen
D - not classifiable as a human carcinogen
E - evidence of noncarcinogenicity for humans
Reference = USEPA 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December.

Cal-EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System

Table A1-3
Non-Cancer Toxicity Data Summary
PRL S-014

Pathway: Ingestion, Dermal

Chemical of Concern	Chronic/ subchronic	Oral RfD	Oral RfD Units	Dermal RfD	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Arsenic	Chronic	3.0E-04	mg/kg-day	3.0E-04	mg/kg-day	Vascular	3	IRIS	2007
Beryllium	Chronic	2.0E-03	mg/kg-day	2.0E-03	mg/kg-day	Small intestine; Lungs	300	IRIS	2007
Copper	Chronic	4.0E-02	mg/kg-day	4.0E-02	mg/kg-day	Cal-EPA		HEAST	1997
Lead	Chronic								
Vanadium	Chronic	1.0E-03	mg/kg-day	1.0E-03	mg/kg-day	Liver and kidney		NCEA	2004
Zinc	Chronic	3.0E-01	mg/kg-day	3.0E-01	mg/kg-day	Blood	3	IRIS	2007
Acetone	Chronic	9.0E-01	mg/kg-day	9.0E-01	mg/kg-day	Kidney	1000	IRIS	2007
Benzene	Chronic	4.0E-03	mg/kg-day	4.0E-03	mg/kg-day	Blood	3000	IRIS	2007
Carbon Tetrachloride	Chronic	7.0E-04	mg/kg-day	7.0E-04	mg/kg-day	Liver	1000	IRIS	2007
Chloroform	Chronic	1.0E-02	mg/kg-day	1.0E-02	mg/kg-day	Liver	1000	IRIS	2007
Dichlorodifluoromethane	Chronic	2.0E-01	mg/kg-day	2.0E-01	mg/kg-day	Liver	100	IRIS	2007
1,1-Dichloroethane	Chronic	1.0E-01	mg/kg-day	1.0E-01	mg/kg-day	Kidney	1000	HEAST	1997
1,1-Dichloroethene	Chronic	5.0E-02	mg/kg-day	5.0E-02	mg/kg-day	Liver	1000	IRIS	2007
cis -1,2-Dichloroethene	Chronic	1.0E-02	mg/kg-day	1.0E-02	mg/kg-day	Blood	3000	PPRTV	2004
Ethylbenzene	Chronic	1.0E-01	mg/kg-day	1.0E-01	mg/kg-day	Liver and kidney	1000	IRIS	2007
Propene	Chronic								
Styrene	Chronic	2.0E-01	mg/kg-day	2.0E-01	mg/kg-day	Blood and liver	1000	IRIS	2007
Tetrachloroethene	Chronic	1.0E-02	mg/kg-day	1.0E-02	mg/kg-day	Liver	1000	IRIS	2007
Toluene	Chronic	8.0E-02	mg/kg-day	8.0E-02	mg/kg-day	Liver and kidney	1000	IRIS	2007
1,1,1-Trichloroethane	Chronic	2.0E+00	mg/kg-day	2.0E+00	mg/kg-day			IRIS	2007
Trichloroethene	Chronic	3.0E-04	mg/kg-day	3.0E-04	mg/kg-day			NCEA	2004
1,1,2-Trichloro-1,2,2-trifluoroethane	Chronic	3.0E+01	mg/kg-day	3.0E+01	mg/kg-day	Brain	10	IRIS	2007
Trichlorofluoromethane	Chronic	3.0E-01	mg/kg-day	3.0E-01	mg/kg-day	Cellular	1000	IRIS	2007
1,2,4-Trimethylbenzene	Chronic	5.0E-02	mg/kg-day	5.0E-02	mg/kg-day	Lungs		PPRTV	2004
1,3,5-Trimethylbenzene	Chronic	5.0E-02	mg/kg-day	5.0E-02	mg/kg-day	Lungs		PPRTV	2004
Xylenes	Chronic	2.0E-01	mg/kg-day	2.0E-01	mg/kg-day	Decreased body weight	1000	IRIS	2007

Pathway: Inhalation

Chemical of Concern	Chronic/ subchronic	Inhalation RfD	Inhalation RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Arsenic	Chronic	8.6E-06	mg/kg-day	Vascular	3	Cal-EPA	2007
Beryllium	Chronic	5.7E-06	mg/kg-day	Small intestine; Lungs	10	IRIS	2007
Copper	Chronic	4.0E-02	mg/kg-day	Gastro-intestinal system		ROUTE	
Lead	Chronic						
Vanadium	Chronic	1.0E-03	mg/kg-day	Liver and kidney	100	ROUTE	
Zinc	Chronic	3.0E-01	mg/kg-day	Blood	3	ROUTE	
Acetone	Chronic	9.0E-01	mg/kg-day	Kidney	1000	ROUTE	
Benzene	Chronic	8.6E-03	mg/kg-day	Blood	1000	IRIS	2007
Carbon Tetrachloride	Chronic	1.1E-02	mg/kg-day	Liver		Cal-EPA	2007
Chloroform	Chronic	8.6E-02	mg/kg-day	Liver	1000	Cal-EPA	2007
Dichlorodifluoromethane	Chronic	5.7E-02	mg/kg-day	Liver		HEAST	1997
1,1-Dichloroethane	Chronic	1.4E-01	mg/kg-day	Kidney	1000	HEAST	1997
1,1-Dichloroethene	Chronic	5.7E-02	mg/kg-day	Liver		IRIS	2007
cis -1,2-Dichloroethene	Chronic	1.0E-02	mg/kg-day	Blood		ROUTE	
Ethylbenzene	Chronic	2.9E-01	mg/kg-day	Liver and kidney	300	IRIS	2007
Propene	Chronic						
Styrene	Chronic	2.9E-01	mg/kg-day	Nervous system	30	IRIS	2007
Tetrachloroethene	Chronic	1.0E-02	mg/kg-day	Liver	300	Cal-EPA	2007
Toluene	Chronic	1.4E+00	mg/kg-day	Liver and kidney	300	IRIS	2007
1,1,1-Trichloroethane	Chronic	1.4E+00	mg/kg-day			IRIS	2007
Trichloroethene	Chronic	1.7E-01	mg/kg-day			Cal-EPA	2007
1,1,2-Trichloro-1,2,2-trifluoroethane	Chronic	8.6E+00	mg/kg-day	Brain		HEAST	1997
Trichlorofluoromethane	Chronic	2.0E-01	mg/kg-day	Cellular		HEAST	1997
1,2,4-Trimethylbenzene	Chronic	1.7E-03	mg/kg-day	Lungs		PPRTV	2004
1,3,5-Trimethylbenzene	Chronic	1.7E-03	mg/kg-day	Lungs		PPRTV	2004
Xylenes	Chronic	2.9E-02	mg/kg-day	Decreased body weight	1000	IRIS	2007

Notes:
Toxicity values used were accurate as of the date of report submittal and are not necessarily the most current values.
Blank cells indicate information is not available or not applicable.

Cal-EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
mg/kg-day = milligrams per kilogram per day
NCEA = National Center for Environmental Assessment
PPRTV = Provisional Peer Reviewed Toxicity Value
RfD = reference dose
ROUTE = route-to-route extrapolated value (e.g., oral RfD used for inhalation RfD)

Table A1-4
Risk Characterization Summary - Carcinogens
PRL S-014

Scenario Timeframe:	**Future**									
Receptor Population:	**Resident**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-014 South - Soil On-site Direct Contact (0-2 ft bgs)	Arsenic	6.1E+00	mg/kg	1.4E-05	1.5E-08	1.4E-06	6.6E-05	8.2E-05
			Beryllium	6.4E-01	mg/kg	--	8.9E-10	--	--	8.9E-10
			Lead	3.2E+01	mg/kg	--	--	--	--	--
			Benzene	1.6E-05	mg/kg	1.4E-12	4.6E-07	4.6E-13	--	4.6E-07
			Carbon tetrachloride	1.1E-03	mg/kg	2.2E-10	9.6E-05	7.1E-11	--	9.6E-05
			Chloroform	1.3E-04	mg/kg	6.4E-12	8.4E-06	2.1E-12	--	8.4E-06
			Ethylbenzene	7.0E-06	mg/kg	1.2E-13	7.3E-08	3.9E-14	--	7.3E-08
			1,1-Dichloroethane	4.6E-04	mg/kg	4.1E-12	2.8E-06	1.3E-12	--	2.8E-06
			1,1-Dichloroethene	9.7E-05	mg/kg	--	--	--	--	--
			Tetrachloroethene	2.7E-05	mg/kg	2.3E-11	1.2E-06	7.5E-12	--	1.2E-06
			Trichloroethene	4.2E-04	mg/kg	8.6E-12	5.0E-06	2.8E-12	--	5.0E-06
			TOTAL			**1.4E-05**	**1.1E-04**	**1.4E-06**	**6.6E-05**	**2.E-04**
		PRL S-014 South - Soil On-site Direct Contact (0-10 ft bgs)	Arsenic	8.4E+00	mg/kg	2.0E-05	0.0E+00	1.9E-06	9.0E-05	1.1E-04
			Beryllium	5.9E-01	mg/kg	--	8.2E-10	--	--	8.2E-10
			Lead	1.2E+01	mg/kg	--	--	--	--	--
			Benzene	1.6E-05	mg/kg	1.4E-12	4.6E-07	4.6E-13	--	4.6E-07
			Carbon tetrachloride	1.1E-03	mg/kg	2.2E-10	9.6E-05	7.1E-11	--	9.6E-05
			Chloroform	1.3E-04	mg/kg	6.4E-12	8.4E-06	2.1E-12	--	8.4E-06
			Ethylbenzene	7.0E-06	mg/kg	1.2E-13	7.3E-08	3.9E-14	--	7.3E-08
			1,1-Dichloroethane	4.6E-04	mg/kg	4.1E-12	2.8E-06	1.3E-12	--	2.8E-06
			1,1-Dichloroethene	9.7E-05	mg/kg	--	--	--	--	--
			Tetrachloroethene	2.7E-05	mg/kg	2.3E-11	1.2E-06	7.5E-12	--	1.2E-06
			Trichloroethene	4.2E-04	mg/kg	8.6E-12	5.0E-06	2.8E-12	--	5.0E-06
			TOTAL			**2.0E-05**	**1.1E-04**	**1.9E-06**	**9.0E-05**	**2.E-04**
Groundwater	Groundwater	PRL S-014 South - Groundwater On-site Direct Contact	Arsenic	--	--	--	--	--	--	--
			Beryllium	--	--	--	--	--	--	--
			Lead	--	--	--	--	--	--	--
			Benzene	--	--	--	--	--	--	--
			Carbon tetrachloride	--	--	--	--	--	--	--
			Chloroform	--	--	--	--	--	--	--
			Ethylbenzene	--	--	--	--	--	--	--
			1,1-Dichloroethane	--	--	--	--	--	--	--
			1,1-Dichloroethene	--	--	--	--	--	--	--
			Tetrachloroethene	--	--	--	--	--	--	--
			Trichloroethene	1.6E+00	µg/L	3.1E-07	8.4E-07	5.2E-08	--	1.2E-06
			PCB-1260 (arochlor 1260)	--	--	--	--	--	--	--
			TOTAL			**3.1E-07**	**8.4E-07**	**5.2E-08**	**--**	**1.E-06**

PRL S-014 South TOTAL (soil [0-2 ft bgs] + groundwater) = 2.E-04
PRL S-014 South TOTAL (soil [0-10 ft bgs] + groundwater) = 2.E-04

Table A1-4
Risk Characterization Summary - Carcinogens
PRL S-014

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Occupational**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Carcinogenic Risk				
						Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-014 South - Soil On-site Direct Contact (0-2 ft bgs)	Arsenic	6.1E+00	mg/kg	1.6E-06	7.2E-09	1.1E-06	--	2.7E-06
			Beryllium	6.4E-01	mg/kg	--	4.2E-10	0.0E+00	--	4.2E-10
			Lead	3.2E+01	mg/kg	--	--	--	--	--
			Benzene	1.6E-05	mg/kg	1.6E-13	9.5E-13	3.6E-13	--	1.5E-12
			Carbon tetrachloride	1.1E-03	mg/kg	2.4E-11	1.3E-10	5.5E-11	--	2.1E-10
			Chloroform	1.3E-04	mg/kg	7.1E-13	2.1E-11	1.6E-12	--	2.4E-11
			Ethylbenzene	7.0E-06	mg/kg	2.7E-14	7.8E-13	3.0E-14	--	8.4E-13
			1,1-Dichloroethane	4.6E-04	mg/kg	4.6E-13	5.5E-12	1.0E-12	--	7.0E-12
			1,1-Dichloroethene	9.7E-05	mg/kg	--	--	--	--	--
			Tetrachloroethene	2.7E-05	mg/kg	2.6E-12	1.3E-12	5.9E-12	--	9.8E-12
			Trichloroethene	4.2E-04	mg/kg	9.5E-13	6.7E-12	2.2E-12	--	9.8E-12
			TOTAL			**1.6E-06**	**7.8E-09**	**1.1E-06**	**--**	**3.E-06**

Scenario Timeframe:	**Future**
Receptor Population:	**Indoor Occupational**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Carcinogenic Risk				
						Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-014 South - Soil On-site Direct Contact (0-2 ft bgs)	Benzene	4.5E+00	ppbv	--	2.7E-08	--	--	2.7E-08
			Carbon tetrachloride	2.5E+02	ppbv	--	5.7E-06	--	--	5.7E-06
			Chloroform	1.8E+01	ppbv	--	5.0E-07	--	--	5.0E-07
			Ethylbenzene	1.6E+00	ppbv	--	4.4E-09	--	--	4.4E-09
			1,1-Dichloroethane	1.1E+02	ppbv	--	1.7E-07	--	--	1.7E-07
			1,1-Dichloroethene	6.8E+01	ppbv	--	--	--	--	--
			Tetrachloroethene	7.2E+00	ppbv	--	7.3E-08	--	--	7.3E-08
			Trichloroethene	1.2E+02	ppbv	--	3.0E-07	--	--	3.0E-07
			TOTAL			**--**	**6.8E-06**	**--**	**--**	**7.E-06**

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Carcinogenic Risk				
						Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-014 South - Soil On-site Direct Contact (0-15 ft bgs)	Arsenic	6.1E+00	mg/kg	8.7E-07	3.6E-07	2.5E-07	--	1.5E-06
			Beryllium	6.4E-01	mg/kg	--	1.4E-08	--	--	1.4E-08
			Lead	3.2E+01	mg/kg	--	--	--	--	--
			Benzene	1.6E-05	mg/kg	6.1E-14	1.9E-13	5.5E-14	--	3.1E-13
			Carbon tetrachloride	1.1E-03	mg/kg	9.5E-12	3.5E-11	8.7E-12	--	5.3E-11
			Chloroform	1.3E-04	mg/kg	2.7E-13	3.5E-12	2.6E-13	--	4.1E-12
			Ethylbenzene	7.0E-06	mg/kg	3.5E-15	3.1E-14	4.9E-15	--	4.0E-14
			1,1-Dichloroethane	4.6E-04	mg/kg	1.8E-13	1.0E-12	1.7E-13	--	1.4E-12
			1,1-Dichloroethene	9.7E-05	mg/kg	--	--	--	--	--
			Tetrachloroethene	2.7E-05	mg/kg	1.0E-12	3.9E-13	9.5E-13	--	2.3E-12
			Trichloroethene	4.2E-04	mg/kg	3.7E-13	1.9E-12	3.5E-13	--	2.6E-12
			TOTAL			**8.7E-07**	**3.7E-07**	**2.5E-07**	**--**	**1.E-06**

Table A1-5
Risk Characterization Summary - Non-Carcinogens
PRL S-014

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-014 South - Soil On-site Direct Contact (0-2 ft bgs)	Arsenic	6.1E+00	mg/kg	Vascular	2.8E-02	2.2E-04	3.3E-03	2.5E-01	2.8E-01
			Beryllium	6.4E-01	mg/kg	Small intestine; Lungs	4.4E-04	3.4E-05	1.7E-05	2.4E-03	2.9E-03
			Copper	2.7E+01	mg/kg	Gastro-intestinal system	9.3E-04	2.0E-07	3.7E-05	3.9E-03	4.8E-03
			Lead	3.2E+01	mg/kg	--	--	--	--	--	--
			Vanadium	5.8E+01	mg/kg	Liver and kidney	7.7E-02	1.8E-05	3.2E-03	3.3E-01	4.1E-01
			Zinc	5.9E+01	mg/kg	Blood	0.0E+00	6.0E-08	1.1E-05	1.1E-03	1.1E-03
			Acetone	1.1E-02	mg/kg	Kidney	1.7E-08	1.4E-04	6.8E-09	--	1.4E-04
			Benzene	1.6E-05	mg/kg	Blood	5.6E-06	4.8E-03	2.3E-09	--	4.8E-03
			Carbon Tetrachloride	1.1E-03	mg/kg	Liver	2.1E-06	3.9E-01	8.4E-07	--	3.9E-01
			Chloroform	1.3E-04	mg/kg	Liver	1.8E-08	2.9E-03	7.2E-09	--	2.9E-03
			Dichlorodifluoromethane	9.8E-05	mg/kg	Liver	6.7E-10	3.4E-02	2.7E-10	--	3.4E-02
			1,1-Dichloroethane	4.6E-04	mg/kg	Kidney	6.3E-09	8.5E-03	2.5E-09	--	8.5E-03
			1,1-Dichloroethene	9.7E-05	mg/kg	Liver	0.0E+00	1.4E-02	1.1E-09	--	1.4E-02
			cis-1,2-Dichloroethene	6.7E-06	mg/kg	Blood	9.2E-10	1.5E-03	3.7E-10	--	1.5E-03
			Ethylbenzene	7.0E-06	mg/kg	Liver and kidney	9.5E-11	7.1E-05	3.8E-11	--	7.1E-05
			Propene	7.6E-06	mg/kg	--	--	--	--	--	--
			Styrene	3.3E-05	mg/kg	Blood and liver	2.2E-10	8.5E-05	8.9E-11	--	8.5E-05
			Tetrachloroethene	2.7E-05	mg/kg	Liver	3.8E-09	1.4E-02	1.5E-09	--	1.4E-02
			Toluene	2.5E-05	mg/kg	Liver and kidney	0.0E+00	4.4E-05	1.7E-10	--	4.4E-05
			1,1,1-Trichloroethane	7.2E-06	mg/kg	--	4.9E-12	3.0E-05	1.9E-12	--	3.0E-05
			Trichloroethene	4.2E-04	mg/kg	--	1.9E-06	1.0E-02	7.6E-07	--	1.0E-02
			1,2-Trichloro-1,2,2-trifluoroethan	1.3E-05	mg/kg	Brain	5.9E-13	2.6E-05	2.4E-13	--	2.6E-05
			Trichlorofluoromethane	4.6E-04	mg/kg	Cellular	2.1E-09	3.3E-02	8.4E-10	--	3.3E-02
			1,2,4-Trimethylbenzene	7.7E-05	mg/kg	Lungs	2.1E-09	3.2E-02	8.4E-10	--	3.2E-02
			1,3,5-Trimethylbenzene	5.2E-05	mg/kg	Lungs	1.4E-09	2.4E-02	5.7E-10	--	2.4E-02
			Xylenes	1.2E-04	mg/kg	Decreased body weight	8.0E-10	1.6E-06	3.2E-10	--	1.6E-06
			TOTAL				**1.1E-01**	**5.7E-01**	**6.5E-03**	**5.9E-01**	**1.E+00**
		PRL S-014 South - Soil On-site Direct Contact (0-10 ft bgs)	Arsenic	8.4E+00	mg/kg	Vascular	3.8E-02	3.0E-04	4.6E-03	3.5E-01	3.9E-01
			Beryllium	5.9E-01	mg/kg	Small intestine; Lungs	4.0E-04	3.1E-05	1.6E-05	2.2E-03	2.6E-03
			Copper	2.5E+01	mg/kg	Gastro-intestinal system	8.5E-04	1.9E-07	3.4E-05	3.5E-03	4.4E-03
			Lead	1.2E+01	mg/kg	--	--	--	--	--	--
			Vanadium	7.5E+01	mg/kg	Liver and kidney	1.1E-01	2.3E-05	4.1E-03	4.3E-01	5.4E-01
			Zinc	5.1E+01	mg/kg	Blood	2.3E-04	5.2E-08	9.3E-06	9.7E-04	1.2E-03
			Acetone	1.1E-02	mg/kg	Kidney	1.7E-08	1.4E-04	6.8E-09	--	1.4E-04
			Benzene	1.6E-05	mg/kg	Blood	5.6E-09	4.8E-03	2.3E-09	--	4.8E-03
			Carbon Tetrachloride	1.1E-03	mg/kg	Liver	2.1E-06	3.9E-01	8.4E-07	--	3.9E-01
			Chloroform	1.3E-04	mg/kg	Liver	1.8E-08	2.9E-03	7.2E-09	--	2.9E-03
			Dichlorodifluoromethane	9.8E-05	mg/kg	Liver	6.7E-10	3.4E-02	2.7E-10	--	3.4E-02
			1,1-Dichloroethane	4.6E-04	mg/kg	Kidney	6.3E-09	8.5E-03	2.5E-09	--	8.5E-03
			1,1-Dichloroethene	9.7E-05	mg/kg	Liver	2.7E-09	1.4E-02	1.1E-09	--	1.4E-02
			cis-1,2-Dichloroethene	6.7E-06	mg/kg	Blood	9.2E-10	1.5E-03	3.7E-10	--	1.5E-03
			Ethylbenzene	7.0E-06	mg/kg	Liver and kidney	9.5E-11	7.1E-05	3.8E-11	--	7.1E-05
			Propene	7.6E-06	mg/kg	--	--	--	--	--	--
			Styrene	3.3E-05	mg/kg	Blood and liver	2.2E-10	8.5E-05	8.9E-11	--	8.5E-05
			Tetrachloroethene	2.7E-05	mg/kg	Liver	3.8E-09	1.4E-02	1.5E-09	--	1.4E-02
			Toluene	2.5E-05	mg/kg	Liver and kidney	4.3E-10	4.4E-05	1.7E-10	--	4.4E-05
			1,1,1-Trichloroethane	7.2E-06	mg/kg	--	4.9E-12	3.0E-05	1.9E-12	--	3.0E-05
			Trichloroethene	4.2E-04	mg/kg	--	1.9E-06	1.0E-02	7.6E-07	--	1.0E-02
			1,2-Trichloro-1,2,2-trifluoroethan	1.3E-05	mg/kg	Brain	5.9E-13	2.6E-05	2.4E-13	--	2.6E-05
			Trichlorofluoromethane	4.6E-04	mg/kg	Cellular	2.1E-09	3.3E-02	8.4E-10	--	3.3E-02
			1,2,4-Trimethylbenzene	7.7E-05	mg/kg	Lungs	2.1E-09	3.2E-02	8.4E-10	--	3.2E-02
			1,3,5-Trimethylbenzene	5.2E-05	mg/kg	Lungs	1.4E-09	2.4E-02	5.7E-10	--	2.4E-02
			Xylenes	1.2E-04	mg/kg	Decreased body weight	8.0E-10	1.6E-06	3.2E-10	--	1.6E-06
			TOTAL				**1.4E-01**	**5.7E-01**	**8.7E-03**	**7.8E-01**	**2.E+00**

Table A1-5
Risk Characterization Summary - Non-Carcinogens
PRL S-014

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Groundwater	Groundwater	PRL S-014 South - Groundwater On-site Direct Contact	Arsenic	--	--	Vascular	--	--	--	--	--
			Beryllium	--	--	Small intestine; Lungs	--	--	--	--	--
			Copper	--	--	Gastro-intestinal system	--	--	--	--	--
			Lead	--	--	--	--	--	--	--	--
			Vanadium	--	--	Liver and kidney	--	--	--	--	--
			Zinc	--	--	Blood	--	--	--	--	--
			Acetone	--	--	Kidney	--	--	--	--	--
			Benzene	--	--	Blood	--	--	--	--	--
			Carbon Tetrachloride	--	--	Liver	--	--	--	--	--
			Chloroform	--	--	Liver	--	--	--	--	--
			Dichlorodifluoromethane	--	--	Liver	--	--	--	--	--
			1,1-Dichloroethane	--	--	Kidney	--	--	--	--	--
			1,1-Dichloroethene	--	--	Liver	--	--	--	--	--
			cis -1,2-Dichloroethene	--	--	Blood	--	--	--	--	--
			Ethylbenzene	--	--	Liver and kidney	--	--	--	--	--
			Propene	--	--	--	--	--	--	--	--
			Styrene	--	--	Blood and liver	--	--	--	--	--
			Tetrachloroethene	--	--	Liver	--	--	--	--	--
			Toluene	--	--	Liver and kidney	--	--	--	--	--
			1,1,1-Trichloroethane	--	--	--	--	--	--	--	--
			Trichloroethene	1.6E+00	µg/L	--	1.5E-01	1.3E-03	2.8E-02	--	1.8E-01
			,1,2-Trichloro-1,2,2-trifluoroethan	--	--	Brain	--	--	--	--	--
			Trichlorofluoromethane	--	--	Cellular	--	--	--	--	--
			1,2,4-Trimethylbenzene	--	--	Lungs	--	--	--	--	--
			1,3,5-Trimethylbenzene	--	--	Lungs	--	--	--	--	--
			Xylenes	2.1E+00	µg/L	Decreased body weight	2.9E-05	1.4E-04	2.3E-05	--	1.9E-04
			PCB-1260 (arochlor 1260)	--	--	--	--	--	--	--	--
			TOTAL				**1.5E-01**	**1.4E-03**	**2.8E-02**	--	**2.E-01**

PRL S-014 South Receptor Hazard Index (soil [0-2 ft bgs] + groundwater) = 1.E+00
PRL S-014 South Receptor Hazard Index (soil [0-10 ft bgs] + groundwater) = 2.E+00

Table A1-5
Risk Characterization Summary - Non-Carcinogens
PRL S-014

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Child**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-014 South - Soil On-site Direct Contact (0-2 ft bgs)	Arsenic	6.1E+00	mg/kg	Vascular	2.6E-01	1.5E-04	2.3E-02	6.9E-01	9.7E-01
			Beryllium	6.4E-01	mg/kg	Small intestine; Lungs	4.1E-03	2.4E-05	1.2E-04	6.5E-03	1.1E-02
			Copper	2.7E+01	mg/kg	Gastro-intestinal system	8.7E-03	1.5E-07	2.5E-04	1.1E-02	2.0E-02
			Lead	3.2E+01	mg/kg	--	--	--	--	--	--
			Vanadium	5.8E+01	mg/kg	Liver and kidney	7.7E-01	1.3E-05	2.2E-02	9.1E-01	1.7E+00
			Zinc	5.9E+01	mg/kg	Blood	2.5E-02	4.3E-08	7.2E-05	3.1E-03	2.8E-02
			Acetone	1.1E-02	mg/kg	Kidney	1.6E-07	1.4E-04	4.6E-08	--	1.4E-04
			Benzene	1.6E-05	mg/kg	Blood	5.3E-08	4.8E-03	1.5E-08	--	4.8E-03
			Carbon Tetrachloride	1.1E-03	mg/kg	Liver	2.0E-05	3.9E-01	5.7E-06	--	3.9E-01
			Chloroform	1.3E-04	mg/kg	Liver	1.7E-07	2.9E-03	4.9E-08	--	2.9E-03
			Dichlorodifluoromethane	9.8E-05	mg/kg	Liver	6.3E-09	3.4E-02	1.8E-09	--	3.4E-02
			1,1-Dichloroethane	4.6E-04	mg/kg	Kidney	5.9E-08	8.5E-03	1.7E-08	--	8.5E-03
			1,1-Dichloroethene	9.7E-05	mg/kg	Liver	2.5E-08	1.4E-02	7.2E-09	--	1.4E-02
			cis-1,2-Dichloroethene	6.7E-06	mg/kg	Blood	8.6E-09	1.5E-03	2.5E-09	--	1.5E-03
			Ethylbenzene	7.0E-06	mg/kg	Liver and kidney	8.9E-10	7.1E-05	2.6E-10	--	7.1E-05
			Propene	7.6E-06	mg/kg	--	--	--	--	--	--
			Styrene	3.3E-05	mg/kg	Blood and liver	2.1E-09	8.5E-05	6.1E-10	--	8.5E-05
			Tetrachloroethene	2.7E-05	mg/kg	Liver	3.5E-08	1.4E-02	1.0E-08	--	1.4E-02
			Toluene	2.5E-05	mg/kg	Liver and kidney	4.0E-09	4.4E-05	1.2E-09	--	4.4E-05
			1,1,1-Trichloroethane	7.2E-06	mg/kg	--	4.6E-11	3.0E-05	1.3E-11	--	3.0E-05
			Trichloroethene	4.2E-04	mg/kg	--	1.8E-05	1.0E-02	5.2E-06	--	1.0E-02
			1,2-Trichloro-1,2,2-trifluoroethan	1.3E-05	mg/kg	Brain	5.6E-12	2.6E-05	1.6E-12	--	2.6E-05
			Trichlorofluoromethane	4.6E-04	mg/kg	Cellular	2.0E-08	3.3E-02	5.7E-09	--	3.3E-02
			1,2,4-Trimethylbenzene	7.7E-05	mg/kg	Lungs	2.0E-08	3.2E-02	5.7E-09	--	3.2E-02
			1,3,5-Trimethylbenzene	5.2E-05	mg/kg	Lungs	1.3E-08	2.4E-02	2.9E-09	--	2.4E-02
			Xylenes	1.2E-04	mg/kg	Decreased body weight	7.4E-09	1.2E-06	2.2E-09	--	1.2E-06
			TOTAL				**1.1E+00**	**5.7E-01**	**4.5E-02**	**1.6E+00**	**3.E+00**
		PRL S-014 South - Soil On-site Direct Contact (0-10 ft bgs)	Arsenic	8.4E+00	mg/kg	Vascular	3.6E-01	7.0E-04	3.1E-02	9.6E-01	1.4E+00
			Beryllium	5.9E-01	mg/kg	Small intestine; Lungs	3.8E-03	7.3E-05	1.1E-04	6.0E-03	1.0E-02
			Copper	2.5E+01	mg/kg	Gastro-intestinal system	8.0E-03	4.4E-07	2.3E-04	1.0E-02	1.8E-02
			Lead	1.2E+01	mg/kg	--	--	--	--	--	--
			Vanadium	7.5E+01	mg/kg	Liver and kidney	9.8E-01	5.3E-05	2.8E-02	1.2E+00	2.2E+00
			Zinc	5.1E+01	mg/kg	Blood	2.2E-03	1.2E-07	6.3E-05	2.7E-03	5.0E-03
			Acetone	1.1E-02	mg/kg	Kidney	1.6E-07	1.4E-04	4.6E-08	--	1.4E-04
			Benzene	1.6E-05	mg/kg	Blood	5.3E-08	4.8E-03	1.5E-08	--	4.8E-03
			Carbon Tetrachloride	1.1E-03	mg/kg	Liver	2.0E-05	3.9E-01	5.7E-06	--	3.9E-01
			Chloroform	1.3E-04	mg/kg	Liver	1.7E-07	2.9E-03	4.9E-08	--	2.9E-03
			Dichlorodifluoromethane	9.8E-05	mg/kg	Liver	6.3E-09	3.4E-02	1.8E-09	--	3.4E-02
			1,1-Dichloroethane	4.6E-04	mg/kg	Kidney	5.9E-08	8.5E-03	1.7E-08	--	8.5E-03
			1,1-Dichloroethene	9.7E-05	mg/kg	Liver	2.5E-08	1.4E-02	7.2E-09	--	1.4E-02
			cis-1,2-Dichloroethene	6.7E-06	mg/kg	Blood	8.6E-09	1.5E-03	2.5E-09	--	1.5E-03
			Ethylbenzene	7.0E-06	mg/kg	Liver and kidney	8.9E-10	7.1E-05	2.6E-10	--	7.1E-05
			Propene	7.6E-06	mg/kg	--	--	--	--	--	--
			Styrene	3.3E-05	mg/kg	Blood and liver	2.1E-09	8.5E-05	6.1E-10	--	8.5E-05
			Tetrachloroethene	2.7E-05	mg/kg	Liver	3.5E-08	1.4E-02	1.0E-08	--	1.4E-02
			Toluene	2.5E-05	mg/kg	Liver and kidney	4.0E-09	4.4E-05	1.2E-09	--	4.4E-05
			1,1,1-Trichloroethane	7.2E-06	mg/kg	--	4.6E-11	3.0E-05	1.3E-11	--	3.0E-05
			Trichloroethene	4.2E-04	mg/kg	--	1.8E-05	1.0E-02	5.2E-06	--	1.0E-02
			1,2-Trichloro-1,2,2-trifluoroethan	1.3E-05	mg/kg	Brain	5.6E-12	2.6E-05	1.6E-12	--	2.6E-05
			Trichlorofluoromethane	4.6E-04	mg/kg	Cellular	2.0E-08	3.3E-02	5.7E-09	--	3.3E-02
			1,2,4-Trimethylbenzene	7.7E-05	mg/kg	Lungs	2.0E-08	3.2E-02	5.7E-09	--	3.2E-02
			1,3,5-Trimethylbenzene	5.2E-05	mg/kg	Lungs	1.3E-08	2.4E-02	3.9E-09	--	2.4E-02
			Xylenes	1.2E-04	mg/kg	Decreased body weight	7.4E-09	3.7E-06	2.2E-09	--	3.7E-06
			TOTAL				**1.4E+00**	**5.7E-01**	**5.9E-02**	**2.2E+00**	**4.E+00**

Table A1-5
Risk Characterization Summary - Non-Carcinogens
PRL S-014

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Child**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Groundwater	Groundwater	PRL S-014 South - Groundwater On-site Direct Contact	Arsenic			Vascular	--	--	--	--	--
			Beryllium	--	--	Small intestine; Lungs	--	--	--	--	--
			Copper	--	--	Gastro-intestinal system	--	--	--	--	--
			Lead	--	--		--	--	--	--	--
			Vanadium	--	--	Liver and kidney	--	--	--	--	--
			Zinc	--	--	Blood	--	--	--	--	--
			Acetone	--	--	Kidney	--	--	--	--	--
			Benzene	--	--	Blood	--	--	--	--	--
			Carbon Tetrachloride	--	--	Liver	--	--	--	--	--
			Chloroform	--	--	Liver	--	--	--	--	--
			Dichlorodifluoromethane	--	--	Liver	--	--	--	--	--
			1,1-Dichloroethane	--	--	Kidney	--	--	--	--	--
			1,1-Dichloroethene	--	--	Liver	--	--	--	--	--
			cis-1,2-Dichloroethene	--	--	Blood	--	--	--	--	--
			Ethylbenzene	--	--	Liver and kidney	--	--	--	--	--
			Propene	--	--	--	--	--	--	--	--
			Styrene	--	--	Blood and liver	--	--	--	--	--
			Tetrachloroethene	--	--	Liver	--	--	--	--	--
			Toluene	--	--	Liver and kidney	--	--	--	--	--
			1,1,1-Trichloroethane	--	--	--	--	--	--	--	--
			Trichloroethene	1.6E+00	µg/L	--	3.4E-01	3.0E-03	4.4E-02	--	3.9E-01
			,1,2-Trichloro-1,2,2-trifluoroethan	--	--	Brain	--	--	--	--	--
			Trichlorofluoromethane	--	--	Cellular	--	--	--	--	--
			1,2,4-Trimethylbenzene	--	--	Lungs	--	--	--	--	--
			1,3,5-Trimethylbenzene	--	--	Lungs	--	--	--	--	--
			Xylenes	2.1E+00	µg/L	Decreased body weight	6.7E-04	2.3E-02	3.7E-04	--	2.4E-02
			PCB-1260 (arochlor 1260)	--	--	--	--	--	--	--	--
			TOTAL				**3.4E-01**	**2.6E-02**	**4.4E-02**	--	**4.E-01**

PRL S-014 South Receptor Hazard Index (soil [0-2 ft bgs] + groundwater) = 4.E+00
PRL S-014 South Receptor Hazard Index (soil [0-10 ft bgs] + groundwater) = 5.E+00

Table A1-5
Risk Characterization Summary - Non-Carcinogens
PRL S-014

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Occupational**
Receptor Age:	**Adult**

							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-014 South - Soil On-site Direct Contact (0-2 ft bgs)	Arsenic	6.1E+00	mg/kg	Vascular	9.9E-03	1.5E-04	6.8E-03	--	1.7E-02
			Beryllium	6.4E-01	mg/kg	Small intestine; Lungs	1.6E-04	2.4E-05	3.6E-05	--	2.2E-04
			Copper	2.7E+01	mg/kg	Gastro-intestinal system	3.3E-04	1.5E-07	7.6E-05	--	4.1E-04
			Lead	3.2E+01	mg/kg	--	--	--	--	--	--
			Vanadium	5.8E+01	mg/kg	Liver and kidney	2.9E-02	1.3E-05	6.4E-03	--	3.5E-02
			Zinc	5.9E+01	mg/kg	Blood	9.6E-05	4.3E-08	2.2E-05	--	1.2E-04
			Acetone	1.1E-02	mg/kg	Kidney	6.0E-09	1.7E-09	1.3E-08	--	2.1E-08
			Benzene	1.6E-05	mg/kg	Blood	2.0E-09	1.1E-08	4.6E-09	--	1.8E-08
			Carbon Tetrachloride	1.1E-03	mg/kg	Liver	7.5E-07	6.0E-07	1.7E-06	--	3.0E-06
			Chloroform	1.3E-04	mg/kg	Liver	6.4E-09	8.8E-09	1.5E-08	--	3.0E-08
			Dichlorodifluoromethane	9.8E-05	mg/kg	Liver	2.4E-10	1.1E-08	5.5E-10	--	1.2E-08
			1,1-Dichloroethane	4.6E-04	mg/kg	Kidney	2.3E-09	1.9E-08	5.1E-09	--	2.6E-08
			1,1-Dichloroethene	9.7E-05	mg/kg	Liver	9.5E-10	1.1E-08	2.2E-09	--	1.4E-08
			cis-1,2-Dichloroethene	6.7E-06	mg/kg	Blood	3.3E-10	3.8E-09	7.5E-10	--	4.9E-09
			Ethylbenzene	7.0E-06	mg/kg	Liver and kidney	3.4E-11	1.4E-10	7.8E-11	--	2.5E-10
			Propene	7.6E-06	mg/kg	--	--	--	--	--	--
			Styrene	3.3E-05	mg/kg	Blood and liver	8.0E-11	4.7E-10	1.8E-10	--	7.3E-10
			Tetrachloroethene	2.7E-05	mg/kg	Liver	1.3E-09	1.9E-09	3.1E-09	--	6.3E-09
			Toluene	2.5E-05	mg/kg	Liver and kidney	1.5E-10	1.0E-11	3.5E-10	--	5.1E-10
			1,1,1-Trichloroethane	7.2E-06	mg/kg	--	1.8E-12	3.2E-11	4.0E-12	--	3.8E-11
			Trichloroethene	4.2E-04	mg/kg	--	6.8E-07	1.5E-08	1.6E-06	--	2.3E-06
			,1,2-Trichloro-1,2,2-trifluoroethan	1.3E-05	mg/kg	Brain	2.1E-13	9.8E-12	4.8E-13	--	1.0E-11
			Trichlorofluoromethane	4.6E-04	mg/kg	Cellular	7.5E-10	1.5E-08	1.7E-09	--	1.7E-08
			1,2,4-Trimethylbenzene	7.7E-05	mg/kg	Lungs	7.5E-10	1.7E-07	1.7E-09	--	1.7E-07
			1,3,5-Trimethylbenzene	5.2E-05	mg/kg	Lungs	5.1E-10	1.2E-07	1.2E-09	--	1.2E-07
			Xylenes	1.2E-04	mg/kg	Decreased body weight	2.8E-10	8.3E-09	--	--	8.6E-09
			TOTAL				**3.9E-02**	**1.9E-04**	**1.3E-02**	**--**	**5.E-02**

Table A1-5
Risk Characterization Summary - Non-Carcinogens
PRL S-014

Scenario Timeframe:	**Future**
Receptor Population:	**Indoor Occupational**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-014 South - Soil On-site Direct Contact (0-2 ft bgs)	Acetone	1.9E+01	ppbv	Kidney	--	9.8E-06	--	--	9.8E-06
			Benzene	4.5E+00	ppbv	Blood	--	3.3E-04	--	--	3.3E-04
			Carbon Tetrachloride	2.5E+02	ppbv	Liver	--	2.7E-02	--	--	2.7E-02
			Chloroform	1.8E+01	ppbv	Liver	--	2.0E-04	--	--	2.0E-04
			Dichlorodifluoromethane	1.4E+02	ppbv	Liver	--	2.3E-03	--	--	2.3E-03
			1,1-Dichloroethane	1.1E+02	ppbv	Kidney	--	5.8E-04	--	--	5.8E-04
			1,1-Dichloroethene	6.8E+01	ppbv	Liver	--	9.3E-04	--	--	9.3E-04
			cis-1,2-Dichloroethene	1.3E+00	ppbv	Blood	--	1.0E-04	--	--	1.0E-04
			Ethylbenzene	1.6E+00	ppbv	Liver and kidney	--	4.9E-06	--	--	4.9E-06
			Propene	2.5E+01	ppbv	--	--	--	--	--	--
			Styrene	2.1E+00	ppbv	Blood and liver	--	5.8E-06	--	--	5.8E-06
			Tetrachloroethene	7.2E+00	ppbv	Liver	--	9.8E-04	--	--	9.8E-04
			Toluene	5.9E+00	ppbv	Liver and kidney	--	3.0E-06	--	--	3.0E-06
			1,1,1-Trichloroethane	2.8E+00	ppbv	--	--	2.0E-06	--	--	2.0E-06
			Trichloroethene	1.2E+02	ppbv	--	--	7.0E-04	--	--	7.0E-04
			1,2-Trichloro-1,2,2-trifluoroethan	1.1E+01	ppbv	Brain	--	1.8E-06	--	--	1.8E-06
			Trichlorofluoromethane	4.1E+02	ppbv	Cellular	--	2.3E-03	--	--	2.3E-03
			1,2,4-Trimethylbenzene	3.9E+00	ppbv	Lungs	--	2.2E-03	--	--	2.2E-03
			1,3,5-Trimethylbenzene	2.9E+00	ppbv	Lungs	--	1.6E-03	--	--	1.6E-03
			Xylenes	6.9E+00	ppbv	Decreased body weight	--	2.5E-07	--	--	2.5E-07
			TOTAL				**--**	**3.9E-02**	**--**	**--**	**4.E-02**

Table A1-5
Risk Characterization Summary - Non-Carcinogens
PRL S-014

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-014 South - Soil On-site Direct Contact (0-15 ft bgs)	Arsenic	6.1E+00	mg/kg	Vascular	1.3E-01	2.0E-01	3.8E-02	--	3.6E-01
			Beryllium	6.4E-01	mg/kg	Small intestine; Lungs	1.4E-03	2.0E-02	1.3E-04	--	2.1E-02
			Copper	2.7E+01	mg/kg	Gastro-intestinal system	3.0E-03	1.2E-04	2.8E-04	--	3.4E-03
			Lead	3.2E+01	mg/kg	--	--	--	--	--	--
			Vanadium	5.8E+01	mg/kg	Liver and kidney	3.5E-01	1.5E-02	3.4E-02	--	4.0E-01
			Zinc	5.9E+01	mg/kg	Blood	8.0E-04	3.3E-05	7.6E-05	--	9.1E-04
			Acetone	1.1E-02	mg/kg	Kidney	5.8E-08	6.8E-19	5.4E-08	--	1.1E-07
			Benzene	1.6E-05	mg/kg	Blood	2.0E-08	5.7E-08	1.8E-08	--	9.5E-08
			Carbon Tetrachloride	1.1E-03	mg/kg	Liver	7.2E-06	4.2E-05	6.9E-06	--	5.6E-05
			Chloroform	1.3E-04	mg/kg	Liver	6.2E-08	3.5E-08	5.9E-08	--	1.6E-07
			Dichlorodifluoromethane	9.8E-05	mg/kg	Liver	2.3E-09	1.9E-07	2.2E-09	--	1.9E-07
			1,1-Dichloroethane	4.6E-04	mg/kg	Kidney	2.2E-08	8.7E-08	2.1E-08	--	1.3E-07
			1,1-Dichloroethene	9.7E-05	mg/kg	Liver	9.2E-09	1.2E-07	8.6E-09	--	1.3E-07
			cis-1,2-Dichloroethene	6.7E-06	mg/kg	Blood	3.2E-09	1.6E-08	3.0E-09	--	2.2E-08
			Ethylbenzene	7.0E-06	mg/kg	Liver and kidney	3.3E-10	7.2E-10	3.1E-10	--	1.4E-09
			Propene	7.6E-06	mg/kg	--	--	--	--	--	--
			Styrene	3.3E-05	mg/kg	Blood and liver	7.7E-10	6.1E-10	7.3E-10	--	2.1E-09
			Tetrachloroethene	2.7E-05	mg/kg	Liver	1.3E-08	1.4E-08	1.2E-08	--	3.9E-08
			Toluene	2.5E-05	mg/kg	Liver and kidney	1.5E-09	4.6E-11	1.4E-09	--	2.9E-09
			1,1,1-Trichloroethane	7.2E-06	mg/kg	--	1.7E-11	2.8E-10	1.6E-11	--	3.2E-10
			Trichloroethene	4.2E-04	mg/kg	--	6.6E-06	1.1E-07	6.2E-06	--	1.3E-05
			,1,2-Trichloro-1,2,2-trifluoroethan	1.3E-05	mg/kg	Brain	2.0E-12	9.4E-11	1.9E-12	--	9.8E-11
			Trichlorofluoromethane	4.6E-04	mg/kg	Cellular	7.2E-09	2.3E-07	6.8E-09	--	2.4E-07
			1,2,4-Trimethylbenzene	7.7E-05	mg/kg	Lungs	7.2E-09	1.8E-07	6.9E-09	--	1.9E-07
			1,3,5-Trimethylbenzene	5.2E-05	mg/kg	Lungs	4.9E-09	1.4E-07	4.7E-09	--	1.5E-07
			Xylenes	1.2E-04	mg/kg	Decreased body weight	2.7E-09	9.7E-10	2.6E-09	--	6.3E-09
			TOTAL				**4.9E-01**	**2.3E-01**	**7.2E-02**	**--**	**8.E-01**

SECTION A2

PRL S-033

A2.1 Site Overview and Features

PRL S-033 is in the northwestern portion of OU B along the western boundary of the Base, which is located in the West McClellan District. PRL S-033 was the location of a former chemical storage and chemical waste storage facility inside Building 786A. The site covers approximately 2 acres, and Building 786A comprises approximately 80,000 square feet. CS 023 is the closest IRP site to PRL S-033, located just southwest of the site. There are no other IRP sites immediately adjacent to PRL S-033. Directly south of PRL S-033 is a parking lot; north is Bay B of Building 786; and to the east is Building 783.

Building 786A and its associated loading docks are surrounded by asphalt-covered parking areas, a grass-covered area to the west, and railroad tracks to the east (Radian, 1995). There are several drainage depressions and connecting culverts beneath the roadways west of the loading dock on the northwestern side of Building 786A (URS, 2002d). Surface water that flows to the north of the dock drains into an unlined drainage canal. The unlined drainage canal (located west of PRL S-033) flows to Magpie Creek (URS, 2002d). Surface water that flows to the south of the dock (located on the western side of Building 786A) flows to stormwater drains that also discharge into Magpie Creek (URS, 2002d).

Building 786A served as a collection point for chemical wastes for most industrial facilities on Base from the mid-1950s until 1980 (Radian, 1995). Drums were loaded and unloaded at docks located on the south, west, and east sides of the building. Materials handled in the area include paints, solvents, acids, bases, unspecified VOCs and SVOCs, fuels, and oils. Building 786A was used for office space, a boiler room, and furniture storage area after 1980.

A2.2 Source of Contamination

During the RI, TPH, SVOCs (mainly PAHs), and metals were detected; and PAHs were identified as the contaminant of potential concern. The primary source of PAH contamination was spills that occurred in the loading dock area on the northwestern side of Building 786A. In 2001, a PAH removal action was conducted.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Radian. 1995. *Operable Unit B Remedial Investigation Characterization Summaries*. Final. December.

  Text: Vol. 2, PRL S-33, pp. 1-16
  All Data: Vol. 4, Appendix A, PRL S-33 (PS33), pp. 1-8
  Human Health Risk Assessment Data: Vol. 8, Appendix C, PRL S-33

- Roy F. Weston, Inc., and Kleinfelder, Inc. 2002. *Final Removal Action Report PRL S-033*. April.

  Confirmation Soil Sampling Results: Section 5.2.2, pp. 24 – 25
  Human Health Risk Assessment: Section 5.4, pp. 32 – 35

- URS. 2004. Operable Unit B Data Gaps Remedial Investigation Characterization Summaries Addendum. Final.April.

  Text: Vol. 2, Other Areas, PRL S-33, pp. 1-24
  Hits Table: Vol. 2, Other Areas, PRL S-33, Attachment 1, pp. 1-3
  All Data: Vol. 2, Appendix A, PRL S-33, pp. 1-5

- CH2M HILL. 2003. LRA Initial Parcel Feasibility Study #1. Final. August.

  Data Summary and ESF excerpts, Vol. 1, Appendix H, Section 3, pp. H3-1 – H3-7

- AFRPA. 2004. *LRA Initial Parcel Record of Decision #1*. June.

- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study #2*. Final. May. Vol. 2, Appendix D, pp. D3-1 – D3-4.

- URS. 2006. START 1: Site Evaluations for Applicability of Soil Vapor Extraction. Final. April.

A2.3 Sampling Strategy and Type of Contamination

During the OU B soil gas investigation, the RI, and the Data Gap investigation, soil and soil gas samples were collected from several borings from 1991 to 1993 and again in 1998. The samples were analyzed for metals, SVOCs, TPH, and VOCs (soil gas samples only). During the removal action effort in 2001, soil samples were collected and analyzed for metals and SVOCs, including PAHs.

Prior to the RI, 9 soil gas samples were collected from PRL S-033 and analyzed for VOCs. Halogenated VOCs were detected. During the RI, 17 samples were collected and analyzed for SVOCs (all PAHs). Of the 17 samples, 7 were collected outside of the PAH excavation area. Although PAHs were detected, they were removed from the site according to the removal action efforts described in the PRL S-033 Removal Action Report (Weston and Kleinfelder, 2002). TPH-D was also detected in seven soil borings on the western side of Building 786A. On the south and east sides of Building 786A, metals were detected in shallow soil samples collected during the RI. Arsenic, chromium, cobalt, and nickel were detected above their background concentrations. These sample locations were outside of the PAH excavation area. Surface soil samples were also collected at the location of the two highest arsenic concentrations in the shallow soil samples.

During the removal action, pre- and post-excavation and backfill soil samples were collected and analyzed for PAHs. Backfill soil samples were also analyzed for metals and SVOCs. All metals, except copper, were detected below background concentrations defined in the PAH Removal Action Report (Weston and Kleinfelder, 2002).

In 2006, nine soil gas samples were collected at the same locations at those collected prior to the RI. The samples were analyzed for VOCs using a definitive analytical method (TO-15).

A2.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at PRL S-033. PAHs, metals, and TPH-D were the primary contaminants. Figure A-2a identifies the site location and significant site features. Figure A-2b provides the data from the remedial investigation sampling.

A2.4.1 PAHs

PAHs were detected in surface and shallow soil samples collected from PRL S-033. However, PAHs have been removed according to the removal action efforts described in the final Removal Action Report for PRL S-033 (Weston and Kleinfelder, 2002). Post-removal action sampling indicated that maximum residual concentrations of benzo(a)pyrene at 0.020 mg/kg were detected slightly above the screening levels for the protection of human health for unrestricted use (0.0176 mg/kg) (Table 5-2, Removal Action Report, Weston and Kleinfelder, 2002). However, based on the removal action report, benzo(a)pyrene was below the 1999 EPA Region 9 residential preliminary remediation goal of 0.062 mg/kg (Weston and Kleinfelder, 2002). The exposure point concentrations used to assess the human health risk at the site were 0.0023 mg/kg for benzo(a)pyrene and 0.0031 mg/kg for dibenzo(a,h)anthracene (see risk assessment tables at the end of this site summary).

PAHs were also detected in two sediment samples collected outside the excavation area and northwest of PRL S-033. The sediments contained concentrations of benzo(a)pyrene (0.0049 mg/kg and 0.0029 mg/kg) that were less than the residential PRG (0.062 mg/kg) (OU B RICS Addendum). Each reported concentration exceeded the exposure point concentration (0.0023 mg/kg), but was within the range of detected concentrations; thus, no significant impacts to exposure point concentration are expected if these data were included in the exposure area.

A2.4.2 Metals

Metals were also detected in surface and subsurface soil samples collected during the OU B RI. Shallow soil samples were collected in 10 locations (east, south, and west side of Building 786A). Arsenic, chromium, cobalt, and nickel were detected above their combined background concentrations. Only concentrations of arsenic exceeded screening levels; detections of chromium, cobalt, and nickel were all below screening levels. The maximum concentrations of these metals were detected in soil borings located outside the excavation area for the PAH removal action.

Arsenic was analyzed in soil samples from 10 locations using Method SW6010, and at 2 adjacent locations using SW7060. The samples for SW7060 analysis were located immediately adjacent to the highest reported concentrations of arsenic from the SW6010 analysis (Final OU B RICS, Vol. 4 of 9, soil data, pp. 1-8). In PS33H004, located on the south side of building, the SW6010 value for arsenic is 17 mg/kg. The adjacent sample analyzed with SW7060 is 5.26 mg/kg. Likewise on the east side of the building, PS33H008 had an SW6010 arsenic value of 18 mg/kg, and an SW7060 value of 4.6 mg/kg. The combined

background concentration for arsenic is 4.9 mg/kg. Therefore, although the SW6010 data appear to be biased high, the SW7060 results suggest that results slightly exceeded background concentrations, and no data gap for arsenic exists.

During the removal action, all metals were detected below the background concentrations as defined in the PAH Removal Action Report (Weston and Kleinfelder, 2002). A slightly elevated copper concentration was detected in one sample of backfill soil used following the removal action; however, the soil was determined to be acceptable for use as backfill (Weston and Kleinfelder, 2002). Based on this information, metals were not considered significant contaminants at the site, and the remedial project managers have agreed with this conclusion.

A2.4.3 TPH

TPH-D was detected in seven soil borings collected from the site. The maximum concentration of TPH-D measured at the site, 310 mg/kg, was detected in a surface soil sample collected from soil boring PS33H001. Although the maximum concentration is above the screening level for the protection of surface water and groundwater, the TPH was removed during the PAH removal action. Concentrations of TPH-D below the 100 mg/kg cleanup level remain in boring locations outside the excavated area.

A2.4.4 VOCs

In 1990, a soil gas investigation was conducted with nine screening-level SSG samples collected from nine soil boring locations (S33P01 to S33P09) at a depth of 6 feet. VOCs were detected in all samples. Maximum concentrations of VOCs were primarily detected in sample S33P02. However, these VOC concentrations were erroneously reported in units of ppbv in subsequent RI documents. Conversion of the concentrations from µg/L (original units) to ppbv indicates that contaminant concentrations exceed SSG preliminary cleanup goals (PCGs). (Maximum concentrations of 5,000 ppbv for chloroform or 4,600 ppbv for 1,1,1-trichloroethane that co-elute were reported, as well as, total 1,2-dichloroethene at 1,400 ppbv.)

During 2006, SSG samples were collected from approximately the same locations as during the 1990 investigation and were analyzed using a definitive analytical method (URS, 2006). Chloroform concentrations detected in three samples exceed unrestricted use screening levels. All other reported concentrations were less than unrestricted use screening levels. Results of the 2006 sampling effort are presented on Figure A-2b.

A2.5 Contamination Exposure and Migration

PAHs have been removed from PRL S-033; therefore, no human health impacts are expected as a result of contact with soil. There are no threats to surface water or groundwater remaining at this site. Migration is also not expected because there are no significant levels of contaminants present at the site.

A2.6 Current and Potential Future Site and Resource Uses

PRL S-033 is currently being leased to Beutler Heating and Air Conditioning. In the future, PRL S-033 will likely continue to be used for commercial/industrial purposes.

A2.7 Human Health Risk Assessment

The final human health risk assessment for PRL S-033 is based on 39 confirmation soil samples that were collected west of the building within the excavation footprint and analyzed for PAHs, and soil gas data collected in 2006. Data collected from unexcavated areas at the site and from imported soil used to fill the excavated area were not included in the risk assessment. This section of the ROD summarizes the results of the updated baseline risk assessment for PRL S-033. This risk assessment was originally presented in the PRL S-033 Removal Action Report (Weston and Kleinfelder, 2002). This update uses the same risk assessment methodology as OU A for all exposure pathways except those involving indoor air. For indoor air pathways, the SSG screening levels that are presented in Appendix C of this ROD were used as the basis for inhalation cancer risk and noncancer hazard calculations. In addition, for chemicals that have had toxicity value updates since the PRL S-033 Removal Action Report was published, more recent toxicity criteria have been used. The risk results are summarized below and in the risk summary tables found in the attachment at the end of this site summary.

A2.7.1 Risk Characterization

The potential cancer risk for soil is as follows:

- Future adult resident (0-to-5-foot-bgs depth interval): 7×10^{-6}

The potential noncancer risks for soil are as follows:

- Future adult resident (0-to-5-foot-bgs depth interval): < 1
- Future child resident (0-to-5-foot-bgs depth interval): < 1

The risk estimates for the residential scenarios are within EPA's risk management range. These risk estimates are based on a reasonable maximum exposure and were developed taking into account various conservative assumptions about the frequency and duration of the receptor's exposure to soil and the toxicity of the COCs.

A2.7.2 Uncertainties

There are uncertainties associated with the risk estimates for PRL S-033. These are listed briefly below with additional discussion provided in an attachment at the end of this site summary:

- Groundwater samples have not been collected for the site; therefore, risks from groundwater are not known.
- Noncancer health hazards were not evaluated for metals at PRL S-033; therefore, hazard indexes may be underestimated.

- Although a site inspection noted no apparent spills in the building, the possibility exists that leaks may have migrated through foundation cracks to the subsurface.
- Future re-use plans for this site are indefinite, but do not include residential use.

A2.7.3 Basis for No Action

The risk estimates for PRL S-033 are within EPA's risk management range, and there are no threats to surface water or groundwater remaining at this site. Therefore, no action is necessary at this site under CERCLA.

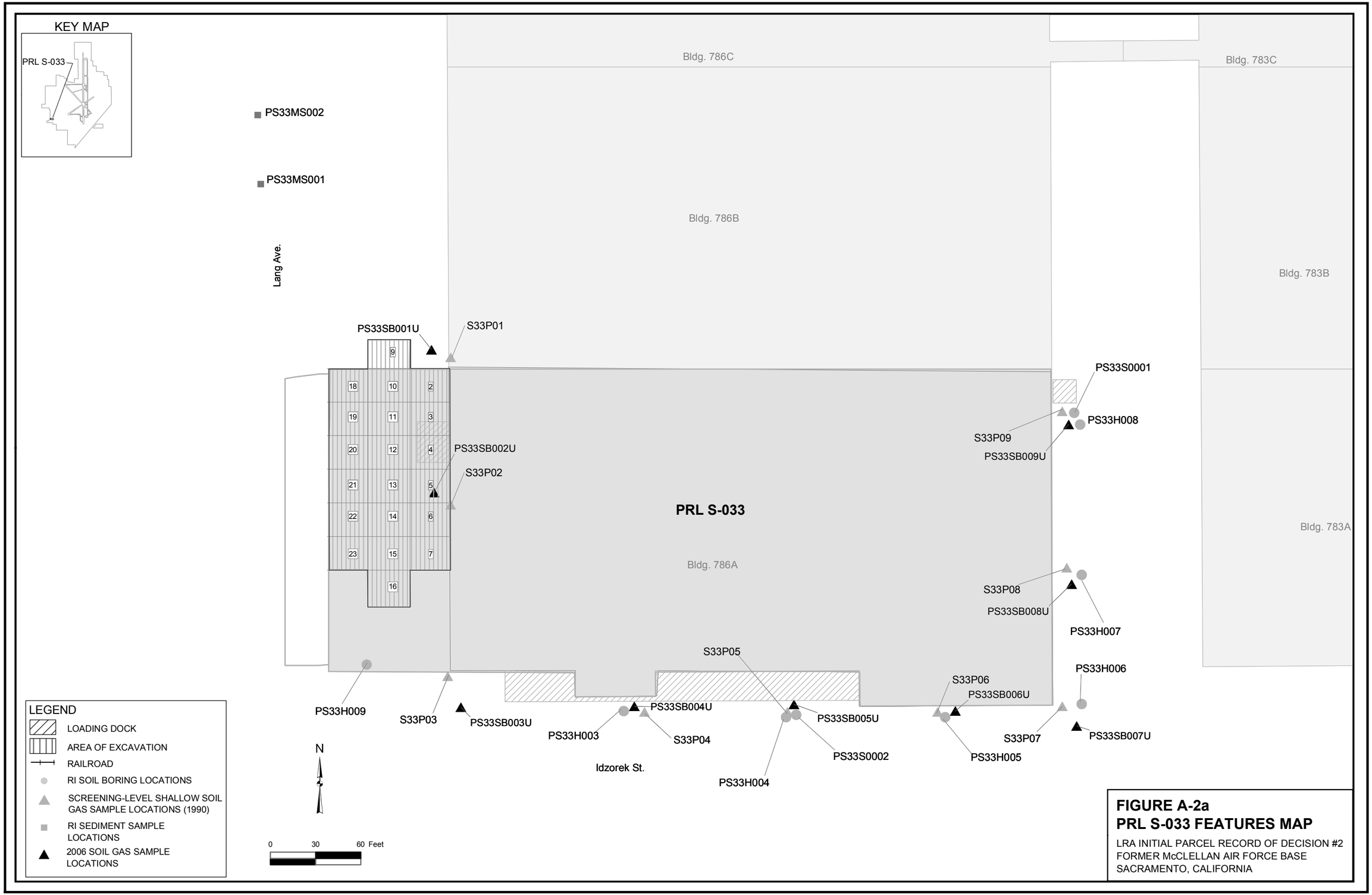

FIGURE A-2a
PRL S-033 FEATURES MAP

LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

SAC \\GLACIER\PROJ\MCCLELLAN\340972_TO400\MAPFILES\IP2_ROD\FIGA-2A_PRL_S-033.MXD FIGA-2A_PRL_S-033.PDF 6/13/2008 13:58:26

VOCs in Shallow Soil Gas at PRL S-033 (2006)

Boring ID	Analyte	Depth (feet bgs)	Concentration (ppbv)
PS33SB001U	Benzene	5	5.1
	Toluene	5	1.2
	Freon 12	5	4.6
	Freon 11	5	2.8
	Total Volatile Hydrocarbons	5	1800
PS33SB002U	Toluene	10	15/16
	m,p-Xylene	10	16/16
	Chloroform	**10**	**15/15**
	Freon 12	10	26/27
PS33SB003U	Toluene	5	ND/3.6
	m,p-Xylene	5	2.2/3.3
	2-Butanone (MEK)	5	4.5/5.4
	Acetone	5	22/23
	Total Volatile Hydrocarbons	5	67/190
PS33SB004U	Benzene	5	1.7
	Toluene	5	2
	Chloroform	**5**	**12**
	2-Butanone (MEK)	5	15
	Acetone	5	81
	Freon 113	5	1.2
	Freon 12	5	7.8
	Freon 11	5	1.9
	Total Volatile Hydrocarbons	5	600
PS33SB005U	Benzene	5	2.1
	Toluene	5	2.9
	m,p-Xylene	5	1.8
	Chloroform	**5**	**17**
	Chlorobenzene	5	2.3
	2-Butanone (MEK)	5	4
	Acetone	5	19
	Total Volatile Hydrocarbons	5	390
PS33SB006U	Benzene	5	2.4
	Toluene	5	4.3
	2-Butanone (MEK)	5	15
	Acetone	5	77
	Total Volatile Hydrocarbons	5	360
PS33SB007U	Toluene	5	2
	2-Butanone (MEK)	5	2
	Acetone	5	13
	Total Volatile Hydrocarbons	5	25
PS33SB008U	Benzene	5	4.8
	Toluene	5	7.3
	Ethyl Benzene	5	1.4
	m,p-Xylene	5	3.1
	o-Xylene	5	3.1
	2-Butanone (MEK)	5	27
	Acetone	5	120
	Freon 12	5	1.6
	Freon 11	5	450
	Total Volatile Hydrocarbons	5	2000
PS33SB009U	Benzene	5	4.2/4.3
	Toluene	5	4.1/4.2
	m,p-Xylene	5	1.5/1.4
	2-Butanone (MEK)	5	12/12
	Acetone	5	48/51
	Total Volatile Hydrocarbons	5	750/790

Notes:
Bold text indicates the result exceeds the unrestricted use screening level established for the given analyte. (Table C-2).
ND = Not Detected
15 J/ND - Normal sample/field duplicate

PRL S-033 Confirmation Sampling Results

Grid Number	Location[a]	Sample Number	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (b) fluoranthene	Benzo (k) fluoranthene	Benzo (a) pyrene	Benzo (ghi) perylene	Chrysene	Dibenz (ah) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
			(mg/kg)															
2	bottom (1')	PS33SS094	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2	north wall (0.5')	PS33SS093	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	bottom (2')	PS33SS083	ND	ND	ND	0.004	0.007	ND	ND	ND	0.005	ND	ND	ND	0.008	ND	ND	ND
4	bottom (3')	PS33SS095	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4	5'	PS33SS097	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4	east wall (0.5')	PS33SS098	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	bottom (1.5')	PS33SS099	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	east wall (2.75')	PS33SS100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	bottom (1.5")	PS33SS106	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7	south wall (0.5')	PS33SS103	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7	bottom (1')	PS33SS102	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9	east wall (0.5')	PS33SS092	ND	ND	ND	0.014	0.018	0.009	0.017	0.02	0.014	0.025	0.018	ND	ND	ND	ND	0.019
9	north wall (1.0')	PS33SS091	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9	west wall (0.5')	PS33SS088	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9	bottom (1')	PS33SS089	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	bottom (0.5')	PS33SS078	ND	ND	ND	0.01	0.015	0.007	0.014	0.016	0.012	0.023	0.015	ND	0.014	ND	ND	0.016
11	bottom (1.5')	PS33SS084	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
12	bottom (0.5')	PS33SS073	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.007	ND	ND	ND
13	bottom (2')	PS33SS082	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	bottom (0.5')	PS33SS068	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
15	bottom (2.25')	PS33SS062	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
16	south wall (0.5')	PS33SS104	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
16	west wall (0.5')	PS33SS105	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
16	east wall (0.5')	PS33SS060	ND	ND	ND	0.01	0.012	0.006	0.01	0.013	0.013	ND	0.017	ND	0.015	ND	ND	0.017
16	bottom (1.5')	PS33SS061	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
18	bottom (1')	PS33SS079	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
18	north wall (0.5')	PS33SS080	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
18	west wall (0.5')	PS33SS081	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
19	west wall (0.5')	PS33SS087	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
19	bottom (1')	PS33SS075	ND	ND	ND	0.016	0.021	0.012	0.02	0.027	0.018	0.029	0.019	ND	0.024	ND	ND	0.021
19	bottom (1.5')	PS33SS085	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
20	bottom (0.5')	PS33SS074	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
21	west wall (0.5')	PS33SS069	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
21	bottom (1.5')	PS33SS070	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
22	west wall (0.5')	PS33SS066	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
22	bottom (1.5')	PS33SS067	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
23	south wall (0.5')	PS33SS086	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
23	bottom (1')	PS33SS065	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
23	west wall (0.5')	PS33SS057	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
ND = Not Detected
Data summarized from the *Final PRL S-033 Removal Action Report (Weston and Kleinfelder, 2002)*.

[a] Indicates sample location in the grid (see Figure 2-5) and depth of sample.

RI Soil boring locations are not shown in the excavation area.
Grid numbers correpsond to the excavation confirmation sample locations.

FIGURE A-2b
PRL S-033 DATA TABLES
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

Attachment A2
PRL S-033 Human Health Risk Assessment

ATTACHMENT A2

PRL S-033 Human Health Risk Assessment

The final human health risk assessment for PRL S-033 is based on 39 confirmation soil samples that were collected west of the building within the excavation footprint and analyzed for PAHs, and soil gas data collected in 2006. Data collected from unexcavated areas at the site and from imported soil used to fill the excavated area were not included in the risk assessment. This section of the ROD summarizes the results of the updated baseline risk assessment for PRL S-033. This risk assessment was originally presented in the PRL S-033 Removal Action Report (Weston and Kleinfelder, 2002). This update uses the same risk assessment methodology as OU A for all exposure pathways except those involving indoor air. For indoor air pathways (i.e., inhalation exposure route for VOCs for the residential and indoor occupational scenarios), the SSG screening levels that are presented in Appendix C of this ROD and the SSG EPCs (see Table A2-1a) were used as the basis for inhalation cancer risk and noncancer hazard calculations. In addition, for chemicals that have had toxicity value updates since the PRL S-033 Removal Action Report was published, more recent toxicity criteria have been used.

Identification of Chemicals of Concern

Seven PAHs were identified as potential COCs for PRL S-033. In addition, soil gas data collected in 2006 were included in this updated risk assessment. Table A2-1a presents the soil gas data summary and Table A2-1b presents the soil data summary for PRL S-033. The tables include the range of concentrations for potential COCs, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the EPCs, and how the EPCs were derived. In general, the lower value of the maximum concentration or the upper 95th percent confidence limit on the mean was used as the EPC for potential COCs detected in more than one sample. All samples were used in the calculation of the EPCs and a proxy value of one-half the detection limit was used for nondetects.

Exposure Assessment

A conceptual model was developed that describes the potential exposure pathways associated with soil at PRL S-033 (see Figure 2-3 in Section 2.4 of the ROD). Although PRL S-033 will likely be used for commercial/industrial purposes in the future; several exposure scenarios were evaluated in the human health risk assessment to provide information for future risk-management decisions.

The following exposure scenarios were quantitatively evaluated in the human health risk assessment:

- Exposure of hypothetical future residents (adults and children) to soil (0 to 5 feet bgs)
- Exposure of outdoor workers to soil (0 to 5 feet bgs)

- Exposure of indoor workers to VOCs in indoor air
- Exposure of construction workers to soil (0 to 15 feet bgs)

The exposure routes that were considered in the risk assessment for residents and workers potentially exposed to soil include incidental soil ingestion, inhalation of VOCs (indoor air for residents and ambient air for outdoor workers and construction workers) and resuspended particulates, and dermal contact with soil. For the residential scenarios, the ingestion of homegrown produce also was included. For the indoor worker, potential risk associated with inhalation of VOCs in indoor air was evaluated.

There was a deviation from the depth intervals used in risk assessments for other McClellan sites because according to the Removal Action Report for PRL S-033, confirmation samples were collected between 0 and 5 feet bgs. Although the majority of the samples were collected from the 0-to-2-foot-bgs depth interval, there was limited information available in the report to confirm what samples were used in the risk calculation.

No potential sources of groundwater contamination were identified at PRL S-033 during the RI (OU B RICS, Volume 2 of 9, PRL S-033, Section 4.2). No contaminants of concern were identified for groundwater at the site, and groundwater samples have not been collected. Therefore, the groundwater exposure scenario was not evaluated.

Toxicity Assessment

The toxicity data that were used in the human health risk assessment are summarized in Tables A2-2 and A2-3. Health effects are divided into two categories: cancer and non-cancer effects.

Table A2-2 presents the slope factors used to estimate potential excess lifetime cancer risks associated with exposure to soil at PRL S-033. As shown in Table A2-2, the oral slope factor was used to estimate potential risks associated with dermal exposure.

Table A2-3 presents the RfDs used to evaluate the potential for non-cancer health effects. The oral RfD was used to estimate potential health effects associated with dermal exposure.

The hierarchy of sources for toxicity values follows EPA and Air Force guidance (EPA, 2003; USAF, 2006); the sources are listed below in order of preference:

1. EPA IRIS – online database (EPA, 2007)
2. EPA's Provisional Peer Reviewed Toxicity Values (as cited in the 2004 EPA Region 9 PRG table [EPA, 2004])
3. Cal-EPA cancer potency factors and RELs online database (Cal-EPA, 2007)
4. Other EPA sources (including HEAST, NCEA provisional toxicity values, and route-extrapolated toxicity values as cited in the 2004 EPA Region 9 PRG table [EPA, 2004])

Toxicity criteria for several contaminants have changed since the human health risk assessment was last conducted. The risk estimates have been updated with the most current toxicity factors.

The following cancer toxicity slope factors were updated:

- Chrysene – Inhalation: 0.39 to 0.039 mg/kg-day
- Benzo(a)pyrene – Oral: 12 to 7.3 mg/kg-day
- Dibenzo(a,h)anthracene – Oral: 7.3 to 4.1 mg/kg-day

Risk Characterization

Cal-EPA and EPA toxicity values described above were used in the human health risk assessment along with the exposure information to estimate the potential risks from contacting potential COCs in soil and air at PRL S-033. For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{SF} \quad (1)$$

Where:

Risk = a unitless probability (e.g., 1×10^{-6}) of an individual developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(\text{mg/kg-day})^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in a million chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer that individuals face from other causes such as smoking or exposure to too much sun. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with an RfD derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of the receptor average daily exposure to the route-specific RfD is called a hazard quotient (HQ). An HQ less than 1 indicates that the receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index is generated by adding the HQs over the exposure routes. A hazard index less than 1 indicates that, based on the sum of all HQs from different exposure routes, toxic noncarcinogenic effects are unlikely. A hazard index greater than 1 indicates that site-related exposure may present a risk to human health.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD} \quad (2)$$

Where:

CDI = chronic daily intake (mg/kg-day)
RfD = reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

The risk characterization process and calculations are described in Appendix A, Section A.1.4. Tables A2-4 and A2-5 present the potential cancer risk estimates and the non-cancer hazard indexes, respectively, for the residential exposure scenarios at PRL S-033. Only the residential risk results are presented in the Final ROD. These risk results were originally presented in a Removal Action Report for PRL S-033 and represent residual risks after the removal action was completed. Residential PRGs were used as cleanup goals for the removal action. Thus, the occupational scenario was not presented in the Removal Action Report. Using updated toxicity values, the risks for the worker scenarios are less than 1×10^{-6} and the hazard indexes are less than 1.

The potential cancer risk for soil is as follows:

- Future adult resident (0-to-5-foot-bgs depth interval): 7×10^{-6}

The potential noncancer risks for soil are as follows:

- Future adult resident (0-to-5-foot-bgs depth interval): < 1
- Future child resident (0-to-5-foot-bgs depth interval): < 1

The risk estimates for the residential scenarios are within EPA's risk management range. These risk estimates are based on a reasonable maximum exposure and were developed taking into account various conservative assumptions about the frequency and duration of the receptor exposure to soil and the toxicity of the potential COCs.

The HQs presented in the Removal Action Report (Weston and Kleinfelder, 2002) were corrected here. As presented in Table A2-5, the values are calculated using EPCs for each COC and the appropriate chronic toxicity criteria.

Uncertainties

There are uncertainties associated with the risk estimates for PRL S-033. The main uncertainties are as follows:

Noncancer health hazards were not evaluated for metals at PRL S-033; therefore, hazard indexes may be underestimated. Four metals were detected above background levels (arsenic, chromium, cobalt, and nickel). HQs were estimated for these metals by comparing maximum detected concentrations to risk-based soil screening levels for noncarcinogenic effects including the homegrown produce pathway. The HQ for arsenic was based on a maximum measured concentration of 18 mg/kg by Method 6010. The estimated HQs are as follows:

- Arsenic HQ = 2
- Chromium HQ = 0.001 (assuming Cr III)
- Cobalt HQ = 0.04
- Nickel HQ = 0.2

The combined hazard index for these four metals is 3. Using risk-based screening levels for noncarcinogenic effects that do not include the homegrown produce pathway and maximum detected concentrations, the hazard index is 0.9. For all other metals analyzed for PRL S-033, site-specific background levels for the former McClellan Air Force Base are less

than risk-based screening levels except for vanadium. For the residential scenario, the HQ for background levels of vanadium is 2.

Groundwater samples have not been collected for the site. Therefore, risks from groundwater are not known and consequently, cumulative risks from potential exposure to all media may be underestimated. Although a site inspection noted no apparent spills in the building, the possibility exists that leaks from drums may have occurred and the contents may have migrated through foundation cracks to the subsurface. This results in an uncertainty because sampling was not conducted beneath foundation cracks. Sampling was conducted, however, beneath the exposed building foundation during the removal action, and results were non-detect for PAHs.

Current re-use plans for this site are indefinite, but do not include residential use. Hence, the use of the residential scenario for the site should be considered hypothetical at this time.

For several compounds, Cal-EPA presents more conservative toxicity values than the EPA values used in the risk calculations presented in Table A2-4. The following chemicals have more conservative Cal-EPA cancer slope factors:

- Benzene – Oral slope factor: 1.0E-01 $(mg/kg\text{-}day)^{-1}$. Inhalation slope factor: 1.0E-01 $(mg/kg\text{-}day)^{-1}$
- Benzo(a)pyrene – Oral slope factor: 12 $(mg/kg\text{-}day)^{-1}$

Use of these toxicity values would yield more conservative estimates for cancer risks. For the cancer risk estimates for the residential scenario, the results are 9×10^{-6} using the Cal-EPA slope factors, primarily due to the differences in slope factors between Cal-EPA and EPA for benzene.

An additional uncertainty relates to the classification of ethylbenzene as a carcinogen. EPA does not classify ethylbenzene as a carcinogen, whereas Cal-EPA considers ethylbenzene carcinogenic by the oral and inhalation exposure routes and provides oral and inhalation slope factors in the OEHHA database. The cumulative cancer risk calculations presented for PRL S-033 (Table A2-4) include ethylbenzene. However, since ethylbenzene was detected at low concentrations in soil gas, this uncertainty does not have a significant impact on the risk results for this site. If ethylbenzene is excluded from the cancer risk calculations, the cumulative risks are essentially equal to the cumulative risks that include ethylbenzene.

References

California Environmental Protection Agency (Cal-EPA). 2007. Office of Environmental Health Hazard Assessment (OEHHA). Cal-EPA – OEHHA Toxicity Criteria Database.

Roy F. Weston, Inc., and Kleinfelder, Inc. 2002. *Final Removal Action Report PRL S-033*. April.

United States Air Force (USAF). 2006. "Toxicity Values for Use in Risk Assessments and Establishing Risk-Based Cleanup Levels." Memorandum from Gregory R. Ottoman, Major, USAF. July 14.

United States Environmental Protection Agency (EPA). 2003. "Human Health Toxicity Values in Superfund Risk Assessments." OSWER Directive 9285.7-53. December 5.

United States Environmental Protection Agency (EPA). 2004. Region 9 Preliminary Remediation Goal (PRG) table. October.

United States Environmental Protection Agency (EPA). 2007. Integrated Risk Information System (IRIS). Online database.

Table A2-1a
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
PRL S-033

Scenario Timeframe:	**Future**							
Medium	**Soil Gas**							
Exposure Medium	**Soil Gas**							
Exposure Point	**Chemical of Concern**	**Concentration Detected (ppbv)**		**Frequency of Detection**	**95th UCL Concentration (ppbv)**	**Statistical Measure[a]**	**Exposure Point Concentration[b] (ppbv)**	**Exposure Point Concentration in Soil[c] (mg/kg)**
		Min	**Max**					
PRL S-033 - Soil Gas	METHYL ETHYL KETONE (2-BUTANONE)	2	27	8/8	18.1	95% Student's-t UCL	18.1	6.4E-03
	Acetone	13	120	8/8	80.9	95% Student's-t UCL	80.9	3.2E-02
	Benzene	1.70	4.80	6/9	3.70	95% KM (t) UCL	3.70	2.2E-05
	Chlorobenzene	2.30	2.30	1/9	1.70	Too Few Unique Detected Values [d]	1.70	3.6E-05
	Chloroform	12	17	3/9	14.2	95% KM (t) UCL	14.2	1.8E-04
	Dichlorodifluoromethane (Freon® 12)	1.60	26	4/9	10.8	95% KM (t) UCL	10.8	1.9E-05
	Ethylbenzene	1.40	1.40	1/9	1.52	Maximum Result	1.40	1.3E-05
	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon® 113)	1.20	1.20	1/9	0.934	Too Few Unique Detected Values [d]	0.934	6.0E-06
	Toluene	2	15	9/9	8.14	95% Approximate Gamma UCL	8.14	5.5E-05
	Trichlorofluoromethane (Freon® 11)	1.90	450	3/9	624	Maximum Result	450	8.0E-04
	m,p-Xylenes	1.50	16	6/9	6.82	95% KM (BCA) UCL	6.82	9.4E-05
	O-XYLENE (1,2-DIMETHYL BENZENE)	1.30	1.30	1/9	1.67	Maximum Result	1.30	1.8E-05

[a] The statistical measure indicates the basis for the exposure point concentration.
[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.
[c] Exposure point concentrations for these VOCs in soil are estimated from measured shallow soil gas concentrations.
[d] Due to the limited data set, a statistical analysis could not be conducted to determine the 95th UCL concentration.

95th UCL = 95 percent upper confidence limit on the mean.

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Table A2-1b
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
PRL S-033

Scenario Timeframe:	**Future**						
Medium	**Soil**						
Exposure Medium	**Soil**						
Exposure Point	**Chemical of Concern**	**Concentration Detected (mg/kg) Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration (mg/kg)**	**Statistical Measure[a]**	**Exposure Point Concentration[b] (mg/kg)**
PRL S-033 - Soil On-site Direct Contact (0 - 5 ft bgs)	METHYL ETHYL KETONE (2-BUTANONE)	7.1E-04	9.6E-03	8/8	6.4E-03	95% Student's-t UCL	6.4E-03
	Acetone	5.2E-03	4.8E-02	8/8	3.2E-02	95% Student's-t UCL	3.2E-02
	Benzene	8.5E-06	2.4E-05	6/9	2.2E-05	95% KM (t) UCL	2.2E-05
	Chlorobenzene	3.6E-05	3.6E-05	1/9	9.5E-01	Maximum Result	3.6E-05
	Chloroform	1.3E-04	1.8E-04	3/9	1.8E-04	Maximum Result	1.8E-04
	Dichlorodifluoromethane (Freon® 12)	1.5E-06	2.5E-05	4/9	1.9E-05	95% KM (t) UCL	1.9E-05
	Ethylbenzene	1.3E-05	1.3E-05	1/9	1.3E+00	Maximum Result	1.3E-05
	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon® 113)	6.0E-06	6.0E-06	1/9	5.9E-01	Maximum Result	6.0E-06
	Toluene	1.4E-05	1.0E-04	9/9	5.5E-05	95% Approximate Gamma UCL	5.5E-05
	Trichlorofluoromethane (Freon® 11)	3.4E-06	8.0E-04	3/9	2.9E-03	Maximum Result	8.0E-04
	m,p-Xylenes	1.6E-05	1.7E-04	6/9	9.4E-05	95% KM (BCA) UCL	9.4E-05
	O-XYLENE (1,2-DIMETHYL BENZENE)	1.8E-05	1.8E-05	1/9	1.5E+00	Maximum Result	1.8E-05
	Benzo(a)anthracene	4.0E-03	1.6E-02	5/39	2.0E-03	95UCL Normal	2.0E-03
	Benzo(b)fluoranthene	7.0E-03	2.1E-02	5/39	3.1E-03	95UCL Normal	3.1E-03
	Benzo(k)fluoranthene	6.0E-03	1.2E-02	3/39	1.5E-03	95UCL Normal	1.5E-03
	Benzo(a)pyrene	1.0E-02	2.0E-02	4/39	2.3E-03	95UCL Normal	2.3E-03
	Chrysene	5.0E-03	1.8E-02	5/39	2.5E-03	95UCL Normal	2.5E-03
	Dibenz(a,h)anthracene	2.3E-02	2.9E-02	3/39	3.1E-03	95UCL Normal	3.1E-03
	Indeno(1,2,3-cd)pyrene	7.0E-03	2.4E-02	5/39	2.3E-03	95UCL Normal	2.3E-03

[a] The statistical measure indicates the basis for the exposure point concentration.

[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.

95th UCL = 95 percent upper confidence limit on the mean.

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Table A2-2
Cancer Toxicity Data Summary
PRL S-033

Pathway: Ingestion, Dermal						
Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence[a]	Source	Date
METHYL ETHYL KETONE (2-BUTANONE)						
Acetone						
Benzene	5.5E-02	5.5E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Chlorobenzene						
Chloroform	3.1E-02	3.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Dichlorodifluoromethane (Freon® 12)						
Ethylbenzene	1.1E-02	1.1E-02	$(mg/kg\text{-}day)^{-1}$	NA	CalEPA	2007
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon® 113)						
Toluene						
Trichlorofluoromethane (Freon® 11)						
m,p-Xylenes						
O-XYLENE (1,2-DIMETHYL BENZENE)						
Benzo(a)anthracene	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Benzo(b)fluoranthene	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Benzo(k)fluoranthene	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Benzo(a)pyrene	7.3E+00	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Chrysene	1.2E-01	1.2E-01	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Dibenz(a,h)anthracene	4.1E+00	4.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Indeno(1,2,3-cd)pyrene	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Pathway: Inhalation						
Chemical of Concern	InhalationCancer Slope Factor		Slope Factor Units	Weight of Evidence[a]	Source	Date
METHYL ETHYL KETONE (2-BUTANONE)						
Acetone						
Benzene	2.7E-02		$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Chlorobenzene						
Chloroform	8.1E-02		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Dichlorodifluoromethane (Freon® 12)						
Ethylbenzene	8.7E-03		$(mg/kg\text{-}day)^{-1}$	NA	CalEPA	2007
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon® 113)						
Toluene						
Trichlorofluoromethane (Freon® 11)						
m,p-Xylenes						
O-XYLENE (1,2-DIMETHYL BENZENE)						
Benzo(a)anthracene	3.9E-01		$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Benzo(b)fluoranthene	3.9E-01		$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Benzo(k)fluoranthene	3.9E-01		$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Benzo(a)pyrene	3.9E+00		$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Chrysene	3.9E-02		$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Dibenz(a,h)anthracene	4.1E+00		$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Indeno(1,2,3-cd)pyrene	3.9E-01		$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007

Cal-EPA = California Environmental Protection Agency
IRIS - Integrated Risk Information System
[a]Weight of Evidence Classification

A - human carcinogen
B1 and B2 - probable human carcinogen
C - possible human carcinogen
D - not classifiable as a human carcinogen
E - evidence of noncarcinogenicity for humans
Reference = USEPA 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December.

Table A2-3
Non-Cancer Toxicity Data Summary
PRL S-033

Pathway: Ingestion, Dermal

Chemical of Concern	Chronic/ subchronic	Oral RfD	Dermal RfD	Oral RfD Units	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
METHYL ETHYL KETONE (2-BUTANONE)	Chronic	6.0E-01	6.0E-01	mg/kg-day	mg/kg-day			IRIS	2007
Acetone	Chronic	9.0E-01	9.0E-01	mg/kg-day	mg/kg-day	Kidney	1000	IRIS	2007
Benzene	Chronic	4.0E-03	4.0E-03	mg/kg-day	mg/kg-day	Blood	3000	IRIS	2007
Chlorobenzene	Chronic	2.0E-02	2.0E-02	mg/kg-day	mg/kg-day	Kidney	1000	IRIS	2007
Chloroform	Chronic	1.0E-02	1.0E-02	mg/kg-day	mg/kg-day	Liver	1000	IRIS	2007
Dichlorodifluoromethane (Freon® 12)	Chronic	2.0E-01	2.0E-01	mg/kg-day	mg/kg-day	Liver		IRIS	2007
Ethylbenzene	Chronic	1.0E-01	1.0E-01	mg/kg-day	mg/kg-day	Liver and Kidney	1000	IRIS	2007
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon® 113)	Chronic	3.0E+01	3.0E+01	mg/kg-day	mg/kg-day	Brain		IRIS	2007
Toluene	Chronic	8.0E-02	8.0E-02	mg/kg-day	mg/kg-day	Liver and Kidney	1000	IRIS	2007
Trichlorofluoromethane (Freon® 11)	Chronic	3.0E-01	3.0E-01	mg/kg-day	mg/kg-day	Cellular		IRIS	2007
m,p-Xylenes	Chronic	2.0E-01	2.0E-01	mg/kg-day	mg/kg-day	Nervous and Respiratory Systems		IRIS	2007
O-XYLENE (1,2-DIMETHYL BENZENE)	Chronic	2.0E-01	2.0E-01	mg/kg-day	mg/kg-day	Nervous and Respiratory Systems	1000	IRIS	2007
Benzo(a)anthracene	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day		3000	SURROGATE	NA
Benzo(b)fluoranthene	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day			SURROGATE	NA
Benzo(k)fluoranthene	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day			SURROGATE	NA
Benzo(a)pyrene	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day		3000	SURROGATE	NA
Chrysene	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day		3000	SURROGATE	NA
Dibenz(a,h)anthracene	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day		3000	SURROGATE	NA
Indeno(1,2,3-cd)pyrene	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day		3000	SURROGATE	NA

Pathway: Inhalation

Chemical of Concern	Chronic/subchronic	Inhalation RfD	Inhalation RfD Units		Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
METHYL ETHYL KETONE (2-BUTANONE)	Chronic	1.4E+00	mg/kg-day				IRIS	2007
Acetone	Chronic	9.0E-01	mg/kg-day		Kidney	1000	ROUTE	NA
Benzene	Chronic	8.6E-03	mg/kg-day		Blood		IRIS	2007
Chlorobenzene	Chronic	2.9E-01	mg/kg-day		Kidney		CalEPA	2007
Chloroform	Chronic	8.6E-02	mg/kg-day		Liver		CalEPA	2007
Dichlorodifluoromethane (Freon® 12)	Chronic	5.7E-02	mg/kg-day		Liver		HEAST	1997
Ethylbenzene	Chronic	2.9E-01	mg/kg-day		Liver and Kidney	300	IRIS	2007
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon® 113)	Chronic	8.6E+00	mg/kg-day		Brain		HEAST	1997
Toluene	Chronic	1.4E+00	mg/kg-day		Liver and Kidney	10	IRIS	2007
Trichlorofluoromethane (Freon® 11)	Chronic	2.0E-01	mg/kg-day		Cellular		HEAST	1997
m,p-Xylenes	Chronic	2.9E-02	mg/kg-day		Nervous and Respiratory Systems		IRIS	2007
O-XYLENE (1,2-DIMETHYL BENZENE)	Chronic	2.9E-02	mg/kg-day		Nervous and Respiratory Systems	300	IRIS	2007
Benzo(a)anthracene	Chronic	3.0E-02	mg/kg-day			3000	SURROGATE	NA
Benzo(b)fluoranthene	Chronic	3.0E-02	mg/kg-day				SURROGATE	NA
Benzo(k)fluoranthene	Chronic	3.0E-02	mg/kg-day				SURROGATE	NA
Benzo(a)pyrene	Chronic	3.0E-02	mg/kg-day			3000	SURROGATE	NA
Chrysene	Chronic	3.0E-02	mg/kg-day			3000	SURROGATE	NA
Dibenz(a,h)anthracene	Chronic	3.0E-02	mg/kg-day			3000	SURROGATE	NA
Indeno(1,2,3-cd)pyrene	Chronic	3.0E-02	mg/kg-day			3000	SURROGATE	NA

Notes:
Toxicity values used were accurate as of the date of report submittal and are not necessarily the most current values.
Blank cells indicate information is not available or not applicable.

Cal-EPA = California Environmental Protection Agency
HEAST - Health Effects Assessment Summary Tables
IRIS - Integrated Risk Information System
mg/kg-day = milligrams per kilogram per day
RfD = reference dose
ROUTE - route extrapolated
SURROGATE = RfDs for pyrene used for other polynuclear aromatic hydrocarbons (IRIS 2007)

Table A2-4
Risk Characterization Summary - Carcinogens
PRL S-033

Scenario Timeframe:	**Future**									
Receptor Population:	**Resident**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-033 - Soil On-site Direct Contact (0-5 ft bgs)	METHYL ETHYL KETONE (2-BUTANONE)	6.4E-03	mg/kg	--	--	--	--	--
			Acetone	3.2E-02	mg/kg	--	--	--	--	--
			Benzene	2.2E-05	mg/kg	1.9E-12	3.7E-07	6.1E-13	--	3.7E-07
			Chlorobenzene	3.6E-05	mg/kg	--	--	--	--	--
			Chloroform	1.8E-04	mg/kg	8.7E-12	6.6E-06	2.8E-12	--	6.6E-06
			Dichlorodifluoromethane (Freon® 12)	1.9E-05	mg/kg	--	--	--	--	--
			Ethylbenzene	1.3E-05	mg/kg	2.2E-13	6.4E-08	7.1E-14	--	6.4E-08
			1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon® 113)	6.0E-06	mg/kg	--	--	--	--	--
			Toluene	5.5E-05	mg/kg	--	--	--	--	--
			Trichlorofluoromethane (Freon® 11)	8.0E-04	mg/kg	--	--	--	--	--
			m,p-Xylenes	9.4E-05	mg/kg	--	--	--	--	--
			O-XYLENE (1,2-DIMETHYL BENZENE)	1.8E-05	mg/kg	--	--	--	--	--
			Benzo(a)anthracene	2.0E-03	mg/kg	3.8E-09	1.3E-14	1.8E-09	1.3E-08	1.9E-08
			Benzo(b)fluoranthene	3.1E-03	mg/kg	5.9E-09	2.0E-14	2.8E-09	2.0E-08	2.9E-08
			Benzo(k)fluoranthene	1.5E-03	mg/kg	2.9E-09	9.7E-15	1.4E-09	9.8E-09	1.4E-08
			Benzo(a)pyrene	2.3E-03	mg/kg	2.7E-08	1.5E-13	1.3E-08	9.2E-08	1.3E-07
			Chrysene	2.5E-03	mg/kg	4.8E-11	1.6E-17	2.3E-11	1.6E-10	2.3E-10
			Dibenz(a,h)anthracene	3.1E-03	mg/kg	3.3E-08	2.0E-13	1.6E-08	1.1E-07	1.6E-07
			Indeno(1,2,3-cd)pyrene	2.3E-03	mg/kg	4.4E-09	1.5E-14	2.1E-09	1.5E-08	2.2E-08
			TOTAL			**7.7E-08**	**7.0E-06**	**3.7E-08**	**2.6E-07**	**7.E-06**

[a] These results are based on post-removal action contaminant concentrations as measured in final confirmation samples.

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Table A2-5
Risk Characterization Summary - Non-Carcinogens
PRL S-033

Scenario Timeframe: **Future**
Receptor Population: **Resident**
Receptor Age: **Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient [a]				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-033 - Soil On-site Direct Contact (0-5 ft bgs)	METHYL ETHYL KETONE (2-BUTANONE)	6.4E-03	mg/kg		1.5E-08	1.1E-04	5.8E-09	--	1.1E-04
			Acetone	3.2E-02	mg/kg	Kidney	4.9E-08	6.1E-04	2.0E-08	--	6.1E-04
			Benzene	2.2E-05	mg/kg	Blood	7.6E-09	3.9E-03	3.0E-09	--	3.9E-03
			Chlorobenzene	3.6E-05	mg/kg	Kidney	2.5E-09	7.6E-05	9.8E-10	--	7.6E-05
			Chloroform	1.8E-04	mg/kg	Liver	2.5E-08	2.3E-03	9.8E-09	--	2.3E-03
			Dichlorodifluoromethane (Freon® 12)	1.9E-05	mg/kg	Liver	1.3E-10	2.7E-03	5.3E-11	--	2.7E-03
			Ethylbenzene	1.3E-05	mg/kg	Liver and Kidney	1.8E-10	6.2E-05	7.0E-11	--	6.2E-05
			1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon® 113)	6.0E-06	mg/kg	Brain	2.7E-13	2.4E-06	1.1E-13	--	2.4E-06
			Toluene	5.5E-05	mg/kg	Liver and Kidney	9.4E-10	6.1E-05	3.8E-10	--	6.1E-05
			Trichlorofluoromethane (Freon® 11)	8.0E-04	mg/kg	Cellular	3.6E-09	3.6E-02	1.5E-09	--	3.6E-02
			m,p-Xylenes	9.4E-05	mg/kg	Nervous and Respiratory Systems	6.4E-10	3.0E-03	2.6E-10	--	3.0E-03
			O-XYLENE (1,2-DIMETHYL BENZENE)	1.8E-05	mg/kg	Nervous and Respiratory Systems	1.2E-10	5.8E-04	4.8E-11	--	5.8E-04
			Benzo(a)anthracene	2.0E-03	mg/kg		9.1E-08	2.0E-12	5.5E-08	6.2E-07	7.6E-07
			Benzo(b)fluoranthene	3.1E-03	mg/kg		1.4E-07	3.1E-12	8.5E-08	9.6E-07	1.2E-06
			Benzo(k)fluoranthene	1.5E-03	mg/kg		6.8E-08	1.5E-12	4.1E-08	4.6E-07	5.7E-07
			Benzo(a)pyrene	2.3E-03	mg/kg		1.0E-07	2.3E-12	6.3E-08	7.1E-07	8.8E-07
			Chrysene	2.5E-03	mg/kg		1.1E-07	2.5E-12	6.8E-08	7.7E-07	9.5E-07
			Dibenz(a,h)anthracene	3.1E-03	mg/kg		1.4E-07	3.1E-12	8.5E-08	9.6E-07	1.2E-06
			Indeno(1,2,3-cd)pyrene	2.3E-03	mg/kg		1.0E-07	2.3E-12	6.3E-08	7.1E-07	8.8E-07
			TOTAL				**8.7E-07**	**5.0E-02**	**5.0E-07**	**5.2E-06**	**5.E-02**

Scenario Timeframe: **Future**
Receptor Population: **Resident**
Receptor Age: **Child**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient [a]				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-033 - Soil On-site Direct Contact (0-5 ft bgs)	METHYL ETHYL KETONE (2-BUTANONE)	6.4E-03	mg/kg		1.4E-07	1.1E-04	4.0E-08	--	1.1E-04
			Acetone	3.2E-02	mg/kg	Kidney	4.6E-07	6.1E-04	1.3E-07	--	6.1E-04
			Benzene	2.2E-05	mg/kg	Blood	7.1E-08	3.9E-03	2.0E-08	--	3.9E-03
			Chlorobenzene	3.6E-05	mg/kg	Kidney	2.3E-08	7.6E-05	6.6E-09	--	7.7E-05
			Chloroform	1.8E-04	mg/kg	Liver	2.3E-07	2.3E-03	6.6E-08	--	2.3E-03
			Dichlorodifluoromethane (Freon® 12)	1.9E-05	mg/kg	Liver	1.2E-09	2.7E-03	3.6E-10	--	2.7E-03
			Ethylbenzene	1.3E-05	mg/kg	Liver and Kidney	1.6E-09	6.2E-05	4.7E-10	--	6.2E-05
			1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon® 113)	6.0E-06	mg/kg	Brain	2.5E-12	2.4E-06	7.4E-13	--	2.4E-06
			Toluene	5.5E-05	mg/kg	Liver and Kidney	8.8E-09	6.1E-05	2.5E-09	--	6.1E-05
			Trichlorofluoromethane (Freon® 11)	8.0E-04	mg/kg	Cellular	3.4E-08	3.6E-02	9.9E-09	--	3.6E-02
			m,p-Xylenes	9.4E-05	mg/kg	Nervous and Respiratory Systems	6.0E-09	3.0E-03	1.7E-09	--	3.0E-03
			O-XYLENE (1,2-DIMETHYL BENZENE)	1.8E-05	mg/kg	Nervous and Respiratory Systems	1.1E-09	5.8E-04	3.3E-10	--	5.8E-04
			Benzo(a)anthracene	2.0E-03	mg/kg		8.5E-07	5.1E-12	3.6E-07	1.7E-06	2.9E-06
			Benzo(b)fluoranthene	3.1E-03	mg/kg		1.3E-06	7.9E-12	5.6E-07	2.7E-06	4.6E-06
			Benzo(k)fluoranthene	1.5E-03	mg/kg		6.4E-07	3.8E-12	2.7E-07	1.3E-06	2.2E-06
			Benzo(a)pyrene	2.3E-03	mg/kg		9.8E-07	5.9E-12	4.2E-07	2.0E-06	3.4E-06
			Chrysene	2.5E-03	mg/kg		1.1E-06	6.4E-12	4.5E-07	2.2E-06	3.7E-06
			Dibenz(a,h)anthracene	3.1E-03	mg/kg		1.3E-06	7.9E-12	5.6E-07	2.7E-06	4.6E-06
			Indeno(1,2,3-cd)pyrene	2.3E-03	mg/kg		9.8E-07	5.9E-12	4.2E-07	2.0E-06	3.4E-06
			TOTAL				**8.1E-06**	**5.0E-02**	**3.3E-06**	**1.5E-05**	**5.E-02**

[a] These results are based on post-removal action contaminant concentrations as measured in final confirmation samples.

SECTION A3

PRL S-040

A3.1 Site Overview and Features

PRL S-040 is located in the northern portion of OU H and covers approximately 8 acres, which is located in the East McClellan District. PRL S-040 is bordered by James Way and PRL P-007 (a drainage ditch) to the north, AOC H-13 (former automobile hobby shop) to the east, AOC H-8 (former petroleum, oil, and lubricants [POL] storage facility) to the south, and PRL B-7 (former spoil area) to the southwest. PRL S-040 is the former location of an aircraft maintenance and engine test area. The site is the current location of the Base Commissary (Building 910) and commissary storage warehouse (Building 912).

PRL S-40 consists of a former aircraft maintenance and engine test area (Maintenance Apron Terminal [MAT] B) where aircraft were stored and maintained and engines were tested between 1946 and 1968. The exact location of the engine test stand is unknown (PA, 1995). Fuel tanks, fuel lines, and oil/water separators were also located at the site during the period of operation, but were removed by 1971. An abandoned portion of the industrial wastewater line (IWL) is located in the southern portion of the site. Buildings 910 (base commissary) and 912 (commissary storage warehouse) were constructed at the site in 1984 and 1987, respectively.

A3.2 Source of Contamination

Potential release locations included an aircraft engine test stand, aboveground fuel tanks and lines, oil/water separators, and the abandoned portion of the IWL. Potential contaminants identified in the RICS were metals, TPH, PCBs, SVOCs, and VOCs, from the distribution or use of fuels at the site. Soil at site PRL S-040 is only contaminated with fuel-related compounds and is proposed for no action under CERCLA. However, the fuel contamination is being remediated under State requirements.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Radian. 1995. *Final Operable Units E through H Preliminary Assessment Report*. Final. January. pgs. 3-6, 3-12, 3-13, PRL 1 through 12.
- Jacobs. 2000. *Operable Units E-H: Remedial Investigation Characterization Summaries 2*. Final. June.

  Text: Vol. 2, PRL S-40, pgs. 1-18
  Hits Table: Vol. 2, PRL S-40, Attachment 1, pgs. 1-12
  All Data: Vol. 4, Appendix A, PRLS40, pgs. 29-59, 73-111
  Human Health Risk Assessment Data: Vol. 6, Appendix C1, Section 9.18 pgs. 9-73 to 9-77, Tables 9.18.9 to 9.18.15

- AFRPA. 2004. *LRA Initial Parcel Record of Decision #1*. June. Vol. 2, Appendix B, pp. B-1 – B-10.
- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May. Vol. 2, Appendix D, pp. D2-1 – D2-4.

A3.3 Sampling Strategy and Type of Contamination

During the pre-RI and RI investigations, soil and groundwater samples were collected from 20 excavation locations and 35 soil borings from 1985 to 2000. Samples were analyzed for PCBs, SVOCs, VOCs, metals, TPH, and pesticides. Samples were collected mainly in the northern portion of PRL S-040 where contamination was suspected.

In 1985, prior to the RI, two investigations were performed to characterize contamination at the site. In the first effort, eight soil samples were collected from one excavation and analyzed for PCBs, SVOCs, VOCs, TPH, and pesticides. Only TPH-D was detected. In the second effort, an additional 54 soil samples were collected from 19 excavations and analyzed for TPH. Again, TPH-D was detected. A third investigation was performed in 1990. Sixty-three soil samples were obtained from 23 borings. However, sampling locations and analytical results were not well documented.

As a part of the RI investigation, 24 soil borings were drilled and sampled for TPH, SVOCs, and metals. TPH-G and TPH-D were detected; 11 SVOCs were detected above detection limits; and, 15 metals were detected at least once above background levels.

A3.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at PRL S-040 up to the RI in 2000 and before the 2005 remedial action. SVOCs, metals, TPH, and fuel-related VOCs were the primary contaminants. Figure A-3a identifies the site location and significant site features. Figure A-3b provides the data from the remedial investigation sampling for the primary contaminants.

A3.4.1 PCBs and SVOCs

PCBs were not detected in any of the 25 samples that were collected for PCB analysis.

SVOCs were analyzed in soil samples collected from 24 borings. Three contaminants, 2,6-dinitrotoluene (a single detection at 0.63 mg/kg at 6.25 feet in boring PS40SB005), naphthalene, and 2-methylnaphthalene were detected at concentrations above the screening level for protection of human health. 2,6-Dinitrotoluene was not detected in the 2-foot bgs sample, and no SVOCs were detected in the 9.5-foot bgs sample. Elevated levels of TPH-D were reported in the same samples as had detections of the three SVOCs. The naphthalene and 2-methylnaphthalene contamination is likely due to the distribution and use of fuels at the site.

Eight other SVOCs were detected at the maximum concentration indicated below, but at concentrations less than the chemical-specific screening levels for the protection of human health, surface water, and groundwater:

- DEHP (bis (2-ethylhexyl)phthalate at 0.44 mg/kg
- DEPH (diethylphthalate) at 0.034 mg/kg
- Benzo(a)anthracene at 0.021 mg/kg
- Fluorene at 1.3 mg/kg
- NNSPH (N-nitrosodiphenylamine) at 0.026 mg/kg
- Phenanthrene at 0.96 mg/kg
- DNBP (di-n-butylphthalate) at 0.89 mg/kg
- Di-n-octyl phthalate at 0.049 mg/kg

A3.4.2 Metals

Several metals exceeded the respective combined background concentrations, including arsenic, copper, iron, lead, vanadium, and zinc. The maximum concentrations of copper, lead, and zinc (all detected in PS40SB013 at 2 feet bgs) were less than the screening levels for the protection of human health, surface water, and groundwater. In addition, no metals were reported above background concentrations at 5.75 and 10 feet bgs in the same boring.

The maximum reported concentrations of arsenic, vanadium, and iron exceeded the screening levels for the protection of human health, and the concentration of arsenic also exceeded the screening level for the protection of groundwater.

Vanadium was detected at concentrations ranging from 38 to 87 mg/kg. The maximum concentration of vanadium is only slightly greater than the "combined" background level (75.7 mg/kg). There is no known source of vanadium at the site. The levels of vanadium at PRL S-040 appear to be representative of naturally occurring variations in background levels rather than indicative of site-related contamination.

A3.4.3 TPH

TPH-D was detected in 27 samples from 24 borings at PRL S-040 from 8.4 mg/kg to 11,000 mg/kg. The highest concentration was reported at boring PS40SB005 at a depth of 6.25 feet bgs. At 2 feet bgs, TPH-D was reported at 4,200 mg/kg and non-detect at 9.75 feet bgs in the same boring. Other borings where TPH-D was detected included PS40SB001, PS40SB007, PS40SB008, PS40SB0017, PS40SB021, and PS40SB023. There were no detections of TPH-D above 100 mg/kg below 11 feet bgs. The only detection below 11 feet bgs (i.e., 20 feet) was 10 mg/kg at boring PS40SB022. TPH-D is a significant contaminant at PRL S-040 and is likely limited to the upper 15 feet across the site.

Data collected from an EM investigation in 1985 were also used to define the extent of TPH contamination. Fifty-four samples were collected from 19 excavations. Samples were collected between 1 and 5 feet bgs and analyzed for TPH-D. Concentrations of TPH-D exceeded 1,000 mg/kg in 14 of the 54 samples. Seven of the samples had reported TPH concentrations between 10,000 and 30,000 mg/kg.

TPH-G was detected in 15 RI samples from 24 borings ranging from 0.17 mg/kg to 1,600 mg/kg. The highest detection was reported in the same sample with the highest

TPH-D concentration (boring PS40SB005 at a depth of 6.25 feet bgs). At 2 feet bgs, TPH-G was reported at 360 mg/kg and 16 mg/kg at 9.75 feet bgs. Other borings where TPH-G was detected included PS40SB001, PS40SB007, PS40SB008, and PS40SB0017. The maximum concentration in both TPH-D and TPH-G were detected in the same sample at a depth of 6.25 bgs. TPH-G is determined to be a significant contaminant at PRL S-040 and is likely limited to the upper 15 feet across the site.

TPH contaminated soils are being remediated with a bioventing treatment system that was constructed in 2005.

A3.4.4 VOCs

VOCs were reported in samples from 8 of 19 borings sampled for soil gas. Benzene, ethylbenzene, hexane, xylene, and Freon were reported above detection limits. The reported VOCs are fuel related constituents with the exception of Freon. Freon was reported above detection limits in only one boring at depths from 20 to 60 feet bgs. No other contaminants (e.g., VOCs or fuels) were detected in the samples with detections of Freon. There is no known source of the Freon contamination. Fuel-related VOCs are also being remediated with the bioventing treatment system.

In 1997, soil gas samples were collected from 12 borings (PS40SB001 and PS40SB005 to PS40SB015) between 19 and 96 feet. VOCs were primarily detected at depths of 40 feet in boring PS40SB005 with 2,3-dimethyl pentane; n-heptane; and 2,3,4-trimethyl pentane having the greatest VOC concentrations detected in that boring. Other VOCs in surrounding borings were detected, but at relatively low concentrations. Because these compounds were detected at a depth of 40 feet, the concentrations are not directly relevant to the evaluation of human health risks at the surface (CH2M HILL, 2005).

In 1998, six SSG samples were collected from four borings (PS40SB24, PS40SB25, PS40SB26, and PS40SB27) between 5 and 10 feet bgs. The greatest concentrations of VOCs were all detected in boring PS40SB25. Benzene, at a concentration of 200 J ppbv, exceeded the unrestricted and industrial use screening levels; it was detected in a sample from PS40SB025 at 9.7 feet bgs. In addition, m,p-xylene, at a concentration of 3,200 ppbv, exceeded the screening level for unrestricted use. Ethylbenzene (800 ppbv) was detected at levels exceeding unrestricted and industrial use screening levels based on carcinogenic effects (see Uncertainties section of Attachment A3 for discussion related to screening levels for ethylbenzene). Concentrations of o-xylene (200 J ppbv), cyclohexane (13,000 ppbv), and n-hexane (3,900 ppbv) were detected at levels below the unrestricted-use screening levels. A concentration of 2,2,4-trimethyl pentane (130,000 J ppbv) also was detected, but there are no established screening levels for this compound.

Fuel-related VOCs and TCE were also detected in groundwater samples at concentrations below their respective maximum contaminant levels (MCLs), and TPH-D exceeded the taste and odor threshold. The TCE contamination in groundwater is likely from source upgradient of PRL S-040. Predictive modeling concluded that VOCs in the vadose zone will not impact groundwater above MCLs.

A3.5 2005 Remedial Action

In 2005, a bioventing remediation system was installed to treat TPH and the fuel-related VOCs. Operation, maintenance, and monitoring of the bioventing system are ongoing. The system includes 15 air injection wells, each with a design radius of influence of 50 feet. In recent monitoring, airflow was determined to be sufficient to sustain biodegradation in the contaminated zone (Biovent O&M and VMP Report, 4Q07/Annual 2007, Environmental Quality Management, November 2007). Monitoring data from the ongoing (and nearly completed) operation of the bioventing system demonstrates that fuel contaminants (including the constituents such as benzene, ethylbenzene, naphthalene, and 2-methylnaphthalene) have been and continue to be remediated, therefore the risk to human health and threat of contaminant migration has been significantly reduced.

A3.6 Contamination Exposure and Migration

The likelihood of migration to other media is decreased due to the bioventing system. Continued operations of the system will reduce the potential threat to groundwater and surface water.

A3.7 Current and Potential Future Site and Resource Uses

The site currently serves as the Base commissary and commissary storage warehouse and a portion of the parking lot for customers of the Base Exchange and Commissary. An area, approximately 100 feet north of the site, provides dormitory housing for employees of McClellan Park tenants who require temporary housing while attending training sessions onbase. No parcels adjacent to this site are used for residential or other "sensitive" uses (i.e., day-cares, schools, or hospitals). In the future, the remaining portions of PRL S-040 will likely be used for commercial/ industrial or community support purposes.

A3.8 Human Health Risk Assessment

The baseline human health risk assessment estimates what risks the site would pose if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial actions. This section of the ROD summarizes the results of the updated baseline risk assessment for PRL S-040. This risk assessment was originally presented in the OU E-H RICS2 (Jacobs, 2000). This update uses the same risk assessment methodology as OU E-H for all exposure pathways except those involving indoor air. For indoor air pathways, the SSG screening levels that are presented in Appendix C of this ROD were used as the basis for inhalation cancer risk and noncancer hazard calculations. In addition, for chemicals that have had toxicity value updates since the OU E-H RICS2 was published, the most recent toxicity criteria have been used. This section of the ROD summarizes the results of the baseline risk assessment for PRL S-040.

A3.8.1 Risk Characterization

Cal-EPA and EPA toxicity values were used in the human health risk assessment along with the exposure information to estimate the potential risks from contacting potential COCs in soil, air, and groundwater at PRL S-040.

Both residential and occupational exposure scenarios were evaluated for PRL S-040 in the RICS. Only the residential results are presented in the risk summary tables for PRL S-040 because there is a large number of chemicals evaluated for PRL S-040, risks for the occupational scenarios were less than the residential scenarios and within EPA's risk management range, and a remedial action has already been implemented at this site to address the petroleum contamination. This approach is consistent with EPA ROD guidance that states the primary focus of the risk assessment summary should be on those exposure pathways found to pose actual or potential threats to human health.

The potential cumulative cancer risks (soil and groundwater risks) for PRL S-040 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 6×10^{-5}
- Future adult resident (0-to-10-foot-bgs depth interval): 6×10^{-5}
- Future adult resident (0-to-2-foot-bgs depth interval of soil plus groundwater): 1×10^{-4}
- Future adult resident (0-to-10-foot-bgs depth interval of soil plus groundwater): 1×10^{-4}

The risk estimates for soil for the residential scenarios are within EPA's risk management range. For the residential scenarios, benzene and ethylbenzene by the inhalation pathway are the primary contributors to the estimated soil risks. Presumed household uses of groundwater are the primary contributing pathways to the overall estimated risks.

The potential noncancer risks for PRL S-040 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 1
- Future adult resident (0-to-10-foot-bgs depth interval): 0.9
- Future adult resident (0-to-2-feet and 0-to-10-foot-bgs depth intervals excluding produce pathway): 0.5
- Future adult resident (groundwater only): 2
- Future child resident (0-to-2-foot-bgs depth interval): 3
- Future child resident (0-to-10-foot-bgs depth interval): 2
- Future child resident (0-to-2-foot and 0-to-10-foot-bgs depth intervals excluding produce pathway): 1
- Future child resident (groundwater only): 1

The potential COCs that contribute to the hazard indexes greater than 1 for soil are vanadium and 2-methylnaphthalene through the homegrown produce and incidental soil ingestion pathways. Inhalation of VOCs from presumed household uses of groundwater are the primary contributing pathways to the hazard index of 2 for the future adult resident. Table A3-4 presents the potential cancer risk estimates for the residential exposure scenarios

at PRL S-040. The risk estimates for groundwater have been revised from the RICS2 for OU E-H (Jacobs, 2000) based on comments from the Human and Ecological Risk Division (HERD) of the Department of Toxic Substances Control. In the RICS, benzo(a)anthracene was incorrectly included as a groundwater contaminant and the wrong concentration for benzene was used.

Based on the risk assessment, the potential cancer risk from groundwater exposure for future adult residents is 4×10^{-5}. The main contributor to the groundwater potential cancer risk is naphthalene. For groundwater, the noncancer hazard index for the future adult resident is 2 and the hazard index for the future child resident is 1. The main contributors to the hazard indexes are naphthalene; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; and TCE.

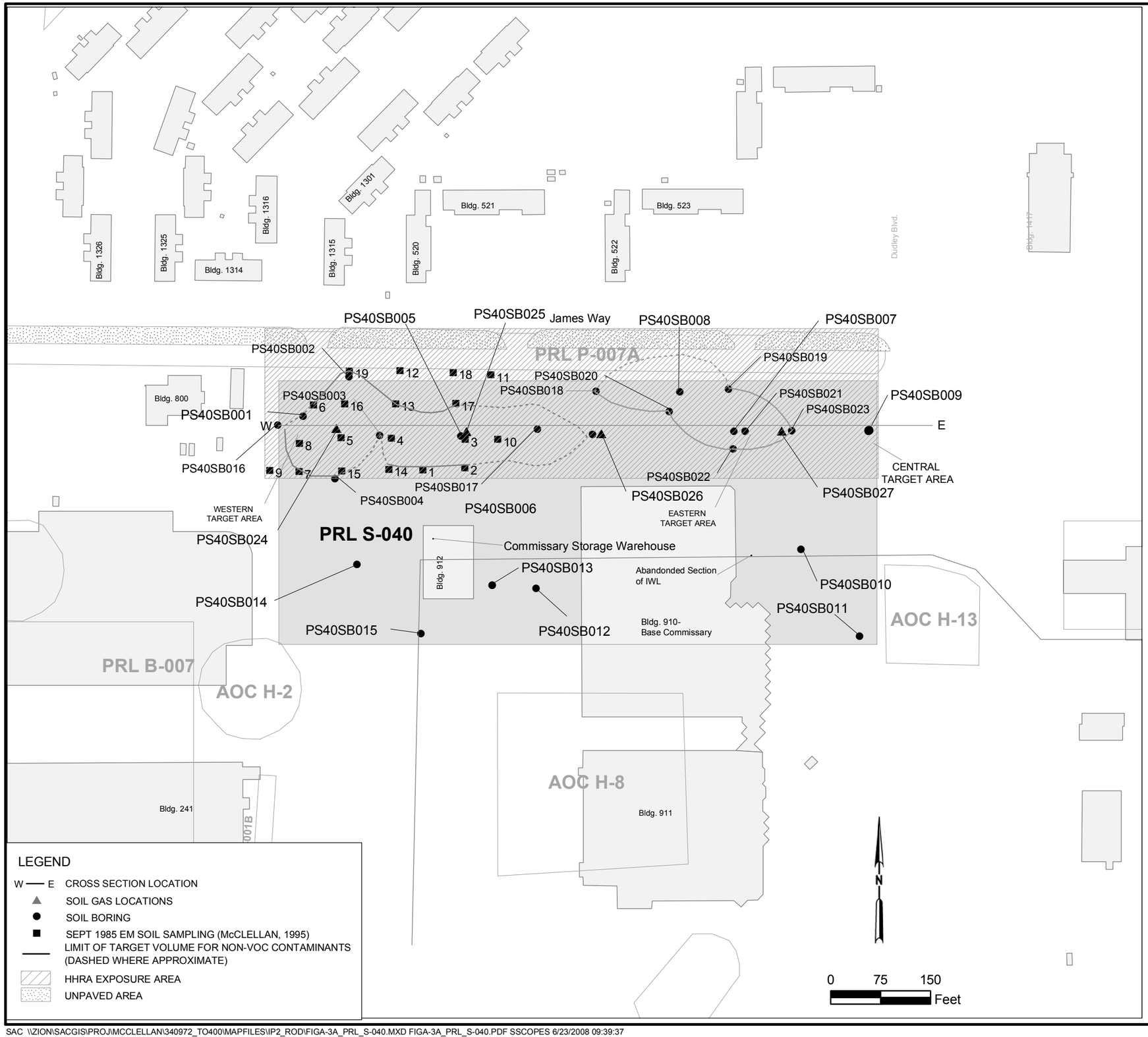
A3.8.2 Uncertainties

There are uncertainties associated with the risk estimates for PRL S-040. These are listed briefly below with additional discussion provided in an attachment at the end of this site summary:

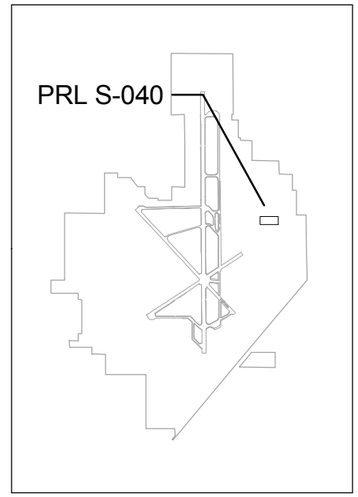
- EPCs for groundwater are based on the maximum reported concentrations from two samples collected in the A-zone. The productive yield of the A-zone is insufficient to support a typical well for domestic use, so the risk estimates for presumed household uses of groundwater based on these maximum concentrations are most likely overestimated.
- The indoor air exposure pathway was not evaluated for naphthalene and 2-methyl naphthalene in the human health risk assessment. Therefore, these are underestimate risks associated with these contaminants by not including the indoor air pathway for these two constituents.
- The EPCs for COCs are based on samples that were collected prior to May 2005 when a bioventing system began operating at the site. The bioventing system should reduce concentrations of VOCs and PAHs. Therefore, risks are probably overestimated for current conditions at the site.
- Cyclohexane was not included as a COC in the noncancer hazard indexes; however, it was detected in one boring at 13,000 ppbv at 9.7 feet bgs. The reported concentration is significantly less than the screening level for the protection of human health (170,000 ppbv). Therefore, it is not likely that risks are underestimated significantly by not including cyclohexane as a COC.
- Vanadium was detected at concentrations that appear greater than the "combined" background concentration at selected locations. The maximum concentration of vanadium is only slightly greater than the "combined" background level. There is no known source of vanadium at the site. The levels of vanadium at PRL S-014 appear to be representative of naturally occurring variations in background levels rather than indicative of site-related contamination. Therefore, the risk associated with vanadium at this site may be representative of background.

A3.8.3 Basis for No Action

This fuels-related contamination at PRL S-040 presents a threat to both human health and water quality; however, as the bioventing system continues to operate, the human health risk will decrease, as will the contaminant exposure and migration. The risk drivers at the sites prior to remediation were benzene and ethylbenzene in shallow soil gas, however neither of these contaminants were detected in soil gas samples from vapor monitoring wells and analyzed by TO-14 during August 2007. Also, because fuels-only contamination is exempt from CERCLA, the contaminants will be addressed under State requirements. Therefore, no action is warranted under CERCLA.



KEY MAP



LEGEND

- W — E CROSS SECTION LOCATION
- SOIL GAS LOCATIONS
- SOIL BORING
- SEPT 1985 EM SOIL SAMPLING (McCLELLAN, 1995)
- LIMIT OF TARGET VOLUME FOR NON-VOC CONTAMINANTS (DASHED WHERE APPROXIMATE)
- HHRA EXPOSURE AREA
- UNPAVED AREA

FIGURE A-3a
PRL S-040 FEATURES

LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

SAC \\ZION\SACGIS\PROJ\MCCLELLAN\340972_TO400\MAPFILES\IP2_ROD\FIGA-3A_PRL_S-040.MXD FIGA-3A_PRL_S-040.PDF SSCOPES 6/23/2008 09:39:37

Soil Boring	Depth (feet bgs)	2,6-Dinitrotoluene (mg/kg)	2-Methyl Nephthalene (mg/kg)	Napthalene (mg/kg)
PS40SB001	1.5	ND	ND	ND
	2	ND	**11J**	**5.6J**
	6	ND	ND	0.031J
	9.25	ND	ND	ND
	39.5	ND	ND	ND
PS40SB002	2	ND	ND	ND
	5.5	ND	ND	ND
	11.5	ND	ND	ND
PS40SB003	4.5	ND	ND	ND
	11.5	ND	ND	ND
PS40SB004	2	ND	ND	ND
	5	ND	ND	ND
	11.25	ND	ND	ND
PS40SB005	2	ND	2.1	1.2
	6.5	**0.63J**	**25**	ND
	9.5	ND	ND	ND
PS40SB006	3	ND	ND	ND
	6.5	ND	ND	ND
	11.5	ND	ND	ND
PS40SB007	2	ND	ND	ND
	4.25	ND	2.2	0.6J
	9.5	ND	0.86J	0.16J
PS40SB008	2.5	ND	4.6	2.4
	5.25	ND	5.1J	**3J**
	8.75	ND	ND	ND
PS40SB009	1.5	ND	ND	0.18J
	5.25	ND	0.55J	ND
	8.75	ND	ND	ND
PS40SB010	1.5	ND	ND	ND
	6	ND	ND	ND
	9.25	ND	ND	ND
PS40SB011	2	ND	ND	ND
	5.75	ND	ND	ND
	9.5	ND	ND	ND
	39.5	ND	ND	ND
PS40SB012	2.5	ND	ND	ND
	5.5	ND	ND	ND
	9.5	ND	ND	ND
PS40SB013	2	ND	ND	ND
	6	ND	ND	ND
	10.25	ND	ND	ND
PS40SB014	3	ND	ND	ND
	6.5	ND	ND	ND
	11.5	ND	ND	ND
PS40SB015	2.5	ND	ND	ND
	5.25	ND	ND	ND
	9.25	ND	ND	ND
PS40SB016	0.5	ND	ND	ND
	5.5	ND	ND	ND
	10.5	ND	ND	ND
PS40SB017	2	ND	1.7J	1.5J
	5.75	ND	1.3J	0.44J
	11	ND	0.34J	0.17J
	20	ND	3	ND
PS40SB018	1.5	ND	ND	ND
	6	ND	ND	ND
	10.75	ND	ND	ND
PS40SB019	1.25	ND	ND	ND
	6	ND	ND	ND
	11	ND	ND	ND
	20	ND	ND	ND
PS40SB020	1.5	ND	ND	ND
	5.25	ND	ND	ND
	9.75	ND	ND	ND
	20.5	ND	ND	ND
PS40SB021	11	ND	**5J**	1.3J
	22	ND	ND	ND
PS40SB022	1.5	ND	ND	ND
	6	ND	ND	ND
	11	ND	ND	ND
	20	ND	0.062J	ND
PS40SB023	1.5	ND	0.026J	ND
	5.5	ND	ND	ND
	10.5	ND	ND	ND
	20.5	ND	ND	ND

Bold Text-exceeds a screening level.
NA - Not Analyzed
ND - Not Detected

Soil Boring	Depth (feet bgs)	TPH-D Concentration (mg/kg)[a]	TPH-G Concentration (mg/kg)[b]
PS40SB001	**1.5**	**220**	ND
	2	**2,800**	**730**
	5.75	34	ND
	9	ND	ND
	39.25	ND	ND
PS40SB002	2	ND	ND
	5.25	ND	ND
	11.25	ND	ND
PS40SB003	4	48	ND
	11.25	ND	ND
PS40SB004	2	21	ND
	4.75	ND	ND
	11	ND	ND
PS40SB005	**2**	**4,200**	**360**
	6.25	**11,000**	**1,600J**
	9.25	ND	**15**
PS40SB006	3	ND	ND
	6.25	12J	ND
	11	18	ND
PS40SB007	2	45	ND
	4	**530**	**690/230J**
	9.25	**290**	**26**
PS40SB008	**2.5**	**6,300/5,900**	**510**
	5.5	8.8J	ND
	14	11J	ND
PS40SB009	**1.5**	89	**34**
	5	ND	ND
	9	ND	ND
PS40SB010	1.5	ND	ND
	5.75	ND	ND
PS40SB011	2	ND	ND
	5.5	ND	ND
	9.25	ND	ND
	39.25	ND	ND
PS40SB012	2.5	ND	ND
	5.25	ND	ND
	9.25	ND	ND
PS40SB013	2	ND	ND
	5.75	ND	ND
	10	ND	ND
PS40SB014	3	ND	ND
	6.25	ND	ND
	11.25	ND	ND
PS40SB015	2.5	11	ND
	5	ND	ND
	9	ND	ND
PS40SB016	0.5	ND	ND
	5.5	ND	ND
	10.5	ND	ND
PS40SB017	**2**	**3,800**	**180**
	6	**410**	**170**
	11	**59**	**280**
PS40SB018	1.5	ND	ND
	6	ND	ND
	10.75	9.2J	ND
	20.75	ND	ND
PS40SB019	1.25	ND	ND
	6	ND	ND
	11	ND	ND
	21	ND	ND
PS40SB020	1.5	ND	ND
	5.25	8.4J/8.8J	ND
	9.75	ND	0.17J
	20.5	ND	ND
PS40SB021	**11**	**270**	0.26J
	22	ND	ND
PS40SB022	1.5	42	ND
	6	ND	0.19J
	11	ND	ND
	20	10	ND
PS40SB023	**1.5**	**130**	0.58J
	5.5	ND	0.28J
	10.5	ND	ND
	20.5	ND	ND

Bold Text-exceeds preliminary cleanup goal.
NA - Not Analyzed
ND - Not Detected
[a]Preliminary cleanup goals for TPH-D in shallow and surface soil are 100 mg/kg (for the lower goal) and 3,900 mg/kg in shallow soil and 3,190 mg/kg in suface soil (for the upper goal).
[b]Preliminary cleanup goals for TPH-G in shallow and surface soil are 10 mg/kg (for the lower goal) and 220 mg/kg in shallow soil and 160 mg/kg in suface soil (for the upper goal).

PIT DATA

Soil Boring	Depth (feet bgs)	TPH-D Concentration (mg/kg)[a]
Pit 1	3	12
Pit 2	1	10.5
	2	1.2
	3	3.8
Pit 3	1	**13,000**
	2	**30,000**
	3	**21,000**
Pit 4	5	**17,000**
Pit 5	1	**14,000**
	2	**16,000**
	3	**4,000**
Pit 6	1	**1.6**
Pit 7	1	**9,200**
	2	1.8
Pit 8	1	68
	1	1.1
	3	4.7
Pit 9	1	1.9
	2	1.5
Pit 10	1	**314**
	2	**500**
	3	**18,000**
Pit 11	1	10
	2	11
Pit 12	1	1.0
	3	11
Pit 13	1	**1,400**
	2	**1,900**
	3	**1,200**
Pit 14	2	1.9
Pit 15	2	**9,284**
Pit 16	2	5.1
	4	**7,270**
Pit 17	2	**463**
	4	36.1
Pit 18	4	47.9
Pit 19	2	2.8
	4	78.5/**150**

[a]Preliminary cleanup goals for TPH-D in shallow and surface soil are 100 mg/kg (for the lower goal) and 3,900 mg/kg in shallow soil and 3,190 mg/kg in suface soil (for the upper goal).
Source: September 1985 EM Soil Sampling (Draft PA, 1995)

Boring ID	Analyte	Depth (ft bgs)	Concentration (ppbv)
VOCs (In shallow soil gas from 0-15 feet)			
PS40SB024	--	5.2	ND
PS40SB024	--	9.7	ND
PS40SB025	2,2,4-Trimethyl I	6.2	390 J
PS40SB025	**Benzene**	9.7	**200 J**
PS40SB025	Cyclohexane	9.7	13,000
PS40SB025	Ethylbenzene	9.7	880
PS40SB025	n-Hexane	9.7	3,900
PS40SB025	2,2,4-Trimethyl I	9.7	130,000 J
PS40SB025	m,p-xylene	9.7	3,200
PS40SB025	o-xylene	9.7	200 J
PS40SB026	--	7.0	ND
PS40SB027	2,2,4-Trimethyl I	7.1	930 J
PS40SB027	m,p-xylene	7.1	320 J

Note: Concentrations in **BOLD** exceed industrial screening levels established for the respective analyte (Table C-2)
Dataflags:
J = Estimated concentration

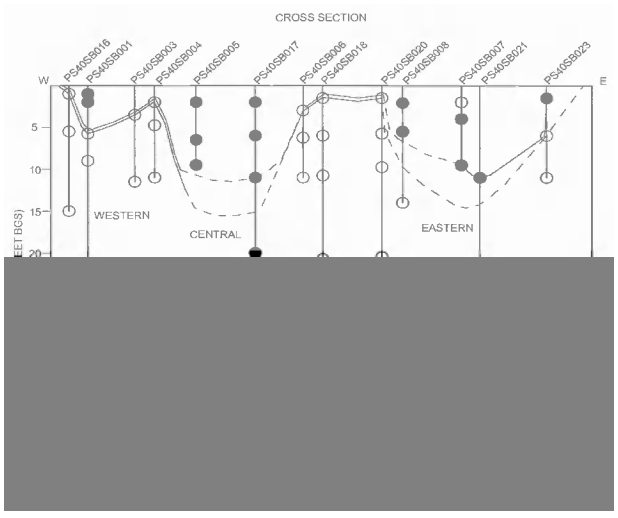


FIGURE A-3b
PRL S-040 DATA TABLES
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

Attachment A3
PRL S-040 Human Health Risk Assessment

ATTACHMENT A3

PRL S-040 Human Health Risk Assessment

The baseline human health risk assessment estimates what risks the site would pose if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial actions. This section of the ROD summarizes the results of the updated baseline risk assessment for PRL S-040. This risk assessment was originally presented in the OU E-H RICS2 (Jacobs, 2000). This update uses the same risk assessment methodology as OU E-H for all exposure pathways except those involving indoor air. For indoor air pathways (i.e., inhalation exposure route for VOCs for the residential and indoor occupational scenarios), the SSG screening levels that are presented in Appendix C of this ROD and the SSG EPCs (see Table A3-1a) were used as the basis for inhalation cancer risk and noncancer hazard calculations. In addition, for chemicals that have had toxicity value updates since the OU E-H RICS2 was published, the most recent toxicity criteria have been used.

Identification of Chemicals of Concern

Four metals and 21 organic chemicals were identified as potential COCs for PRL S-040. Tables A3-1a through A3-1d present the soil gas data summary, air concentration data summary, groundwater data summary, and soil data summary (0-to-2-foot-bgs and 0-to-10-foot-bgs depth intervals) for PRL S-040, respectively (tables are located at the end of this attachment). The tables for soil and groundwater include the range of concentrations for potential COCs, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the EPCs, and how the EPCs were derived. In general, the lower value of the maximum concentration or the upper 95th percent confidence limit on the mean was used as the EPC for potential COCs detected in more than one sample. The EPCs for ambient air were modeled from soil concentrations; both soil and modeled air concentrations are shown in Table A3-1b.

Exposure Assessment

A conceptual model was developed that describes the potential exposure pathways associated with soil and groundwater at PRL S-040 (see Figure 2-3 in Section 2.4 of the ROD). The exposure area is limited to 2 acres of the northern portion of the site. Although PRL S-040 will likely be used for commercial/industrial or community-support purposes in the future, several exposure scenarios were evaluated in the human health risk assessment to provide information for future risk-management decisions.

The following exposure scenarios were quantitatively evaluated in the human health risk assessment:

- Exposure of hypothetical future residents (adults and children) to soil (0 to 2 feet bgs)
- Exposure of hypothetical future residents (adults and children) to soil (0 to 10 feet bgs)
- Exposure of hypothetical future residents (adults and children) to groundwater

- Exposure of outdoor workers to soil (0 to 2 feet bgs)
- Exposure of construction workers to soil (0 to 15 feet bgs)
- Exposure of indoor workers to VOCs in indoor air

The exposure routes that were considered in the risk assessment include incidental soil ingestion, inhalation of VOCs (indoor air for residents and ambient air for outdoor workers and construction workers) and resuspended particulates, and dermal contact with soil. For the residential scenarios, the ingestion of homegrown produce was included. For groundwater, the ingestion, inhalation of VOCs, and dermal contact exposure routes were considered. For the indoor worker, potential risk associated with inhalation of VOCs in indoor air was evaluated.

Toxicity Assessment

The toxicity data that were used in the human health risk assessment are summarized in Tables A3-2 and A3-3. Health effects are divided into two categories: cancer and non-cancer effects. Although significant concentrations of fuel products are present, the risk assessment does not include the TPH data, as there are no definitive means of assessing toxicity from exposure to fuel mixtures.

Table A3-2 presents the slope factors used to estimate potential excess lifetime cancer risks associated with exposure to soil, air, and groundwater at PRL S-040. As shown in Table B-4, the oral slope factor was used to estimate potential risks associated with dermal exposure.

Table A3-3 presents the RfDs used to evaluate the potential for non-cancer health effects. The oral RfD was used to estimate potential health effects associated with dermal exposure. The RfDs shown in Table B-5 were obtained from various sources as noted on the table. For some of the potential COCs, inhalation RfDs are not available so oral RfDs were used to evaluate the inhalation exposure route.

The hierarchy of sources for toxicity values follows EPA and Air Force guidance (EPA, 2003; USAF, 2006); the sources are listed below in order of preference:

1. EPA IRIS – online database (EPA, 2007)
2. EPA's Provisional Peer Reviewed Toxicity Values (as cited in the 2004 EPA Region 9 PRG table [EPA, 2004])
3. Cal-EPA cancer potency factors and RELs online database (Cal-EPA, 2007)
4. Other EPA sources (including HEAST, NCEA provisional toxicity values, and route-extrapolated toxicity values as cited in the 2004 EPA Region 9 PRG table [EPA, 2004])

Toxicity criteria for some of the contaminants have changed since the human health risk assessment was conducted. The risk estimates have been updated with the most current values.

The following cancer toxicity slope factors were changed from the RICS:

- 2,6-Dinitrotoluene – Oral: 0.0 to 0.68 $(mg/kg\text{-}day)^{-1}$. Inhalation: 0.0 to 0.68 $(mg/kg\text{-}day)^{-1}$
- Naphthalene – Inhalation: 0.0 to 0.12 $(mg/kg\text{-}day)^{-1}$
- TCE – Oral: 0.015 to 0.013 $(mg/kg\text{-}day)^{-1}$. Inhalation: 0.01 to 0.007 $(mg/kg\text{-}day)^{-1}$

- Benzene – Oral: 0.1 to 0.055 $(mg/kg\text{-}day)^{-1}$. Inhalation: 0.1 to 0.027 $(mg/kg\text{-}day)^{-1}$
- N-nitrosodiphenylamine – Oral: 0.009 to 0.0049 $(mg/kg\text{-}day)^{-1}$
- Ethylbenzene – Oral: 0.0 to 0.011 $(mg/kg\text{-}day)^{-1}$. Inhalation: 0.0 to 0.0087 $(mg/kg\text{-}day)^{-1}$

The following non-cancer toxicity RfDs were changed from the RICS:

- Copper – Oral: 0.037 to 0.040 mg/kg-day. Inhalation: 0.037 to 0.040 mg/kg-day
- Acetone – Oral: 0.1 to 0.9 mg/kg-day. Inhalation: 0.1 to 0.9 mg/kg-day
- Benzene – Inhalation: 0.0017 to 0.0086 mg/kg-day
- sec-Butylbenzene – Oral: 0.01 to 0.04 mg/kg-day. Inhalation: 0.01 to 0.04 mg/kg-day
- n-Hexane – Oral: 0.06 to 11 mg/kg-day. Inhalation: 0.057 to 0.2 mg/kg-day
- p-Isopropyltoluene – Oral: 0.1 to 0.04 mg/kg-day. Inhalation: 0.11 to 0.04 mg/kg-day; n-butylbenzene was used as a surrogate
- 2-Methylnaphthalene – Oral: 0.02 to 0.004 mg/kg-day
- n-Nitrosodiphenylamine – Oral: 0.0 to 0.02 mg/kg-day. Inhalation: 0.0 to 0.02 mg/kg-day
- n-Propylbenzene – Inhalation: 0.00 to 0.04 mg/kg-day
- Toluene – Oral: 0.2 to 0.08 mg/kg-day. Inhalation: 0.11 to 1.4 mg/kg-day
- TCE – Oral: 0.006 to 0.0003 mg/kg-day. Inhalation: 0.006 to 0.17 mg/kg-day
- 2,2,4-Trimethylpentane – Oral: 0.06 to 11 mg/kg-day. Inhalation: 0.057 to 0.2 mg/kg-day; n-hexane was used as a surrogate
- Xylenes – Oral: 2.0 to 0.2 mg/kg-day. Inhalation: 2.0 to 0.029 mg/kg-day
- Vanadium – Oral: 0.007 to 0.001 mg/kg-day. Inhalation: 0.007 to 0.001 mg/kg-day
- Benzene – Oral: 0.003 to 0.004 mg/kg-day

Risk Characterization

Cal-EPA and EPA toxicity values described above were used in the human health risk assessment along with the exposure information to estimate the potential risks from contacting potential COCs in soil, air, and groundwater at PRL S-040. For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$Risk = CDI \times SF \quad (1)$$

Where:

Risk = a unitless probability (e.g., 1×10^{-6}) of an individual developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in a million chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer that individuals face from other causes such as smoking or exposure to too much sun. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with an RfD derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of the receptor average daily exposure to the route-specific RfD is called a hazard quotient (HQ). An HQ less than 1 indicates that the receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index is generated by adding the HQs over the exposure routes. A hazard index less than 1 indicates that, based on the sum of all HQs from different exposure routes, toxic noncarcinogenic effects are unlikely. A hazard index greater than 1 indicates that site-related exposure may present a risk to human health.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD} \qquad (2)$$

Where:

CDI = chronic daily intake (mg/kg-day)
RfD = reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

Both residential and occupational exposure scenarios were evaluated for PRL S-040 in the RICS. Because there is a large number of chemicals evaluated for PRL S-040, and the risks for the occupational scenarios were less than the residential scenarios and within EPA's risk management range, only the residential results are presented in the risk summary tables for PRL S-040. This approach is consistent with EPA ROD guidance that states the primary focus of the risk assessment summary should be on those exposure pathways found to pose actual or potential threats to human health.

The potential cumulative cancer risks (soil and groundwater risks) for PRL S-040 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 6×10^{-5}
- Future adult resident (0-to-10-foot-bgs depth interval): 6×10^{-5}
- Future adult resident (0-to-2-foot-bgs depth interval of soil plus groundwater): 1×10^{-4}
- Future adult resident (0-to-10-foot-bgs depth interval of soil plus groundwater): 1×10^{-4}

The risk estimates for soil for the residential scenarios are within EPA's risk management range. For the residential scenarios, benzene and ethylbenzene by the inhalation pathway are the primary contributors to the estimated soil risks. Presumed household uses of groundwater are the primary contributing pathways to the overall estimated risks.

The potential noncancer risks for PRL S-040 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 1
- Future adult resident (0-to-10-foot-bgs depth interval): 0.9
- Future adult resident (0-to-2-foot and 0-to-10-foot-bgs depth intervals excluding produce pathway): 0.5
- Future adult resident (groundwater only): 2
- Future child resident (0-to-2-foot-bgs depth interval): 3
- Future child resident (0-to-10-foot-bgs depth interval): 2
- Future child resident (0-to-2-foot and 0-to-10-foot-bgs depth intervals excluding produce pathway): 1
- Future child resident (groundwater only): 1

The potential COCs that contribute to the hazard indexes greater than 1 for soil are vanadium and 2-methylnaphthalene through the homegrown produce and incidental soil ingestion pathways. Inhalation of VOCs from presumed household uses of groundwater are the primary contributing pathways to the hazard index of 2 for the future adult resident. Table A3-4 presents the potential cancer risk estimates for the residential exposure scenarios at PRL S-040. The risk estimates for groundwater have been revised from the RICS2 for OU E-H (Jacobs, 2000) based on comments from the Human and Ecological Risk Division (HERD) of the Department of Toxic Substances Control. In the RICS, benzo(a)anthracene was incorrectly included as a groundwater contaminant and the wrong concentration for benzene was used.

Table A3-5 presents the non-cancer hazard indexes for the residential exposure scenarios at PRL S-040. These risk estimates are based on reasonable maximum exposure and were developed taking into account various conservative assumptions about the frequency and duration of the receptors' exposure to soil and groundwater and the toxicity of the potential COCs.

Based on the risk assessment, the potential cancer risk from groundwater exposure for future adult residents is 4×10^{-5}. The main contributor to the groundwater potential cancer risk is naphthalene. For groundwater, the noncancer hazard index for the future adult resident is 2, and the hazard index for the future child resident is 1. The main contributors to the hazard indexes are naphthalene; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; and TCE.

Uncertainties

There are uncertainties associated with the risk estimates for PRL S-040. The main uncertainties are as follows:

The EPCs for potential COCs are based on samples that were collected prior to May 2005 when a bioventing system began operating at the site. The bioventing system should reduce concentrations of VOCs and PAHs. Therefore, risks are probably overestimated for current conditions at the site.

Arsenic was detected above combined background values at PRL S-040 but was eliminated as a COC based on the statistical background comparison. There is some uncertainty associated with eliminating metals as COCs based on the background comparisons. For arsenic, the potential cancer risk associated with background levels is approximately 4×10^{-5} and the HQ is less than 1.

EPCs for groundwater are based on the maximum reported concentrations from two samples collected in the A-zone. The productive yield of the A-zone is insufficient to support a typical well for domestic use, so the risk estimates for presumed household uses of groundwater based on these maximum concentrations are most likely overestimated.

The indoor air exposure pathway was not evaluated for naphthalene and 2-methyl naphthalene in the human health risk assessment. Therefore, these underestimate risks associated with these contaminants by not including the indoor air pathway for these two constituents.

Cyclohexane was not included as a potential COC in the noncancer hazard indexes; however, it was detected in one boring at 13,000 ppbv at 9.7 feet bgs. The reported concentration is significantly less than the screening level for the protection of human health (170,000 ppbv). Therefore, it is not likely that risks are underestimated significantly by not including cyclohexane as a potential COC.

The homegrown produce pathway is the major contributor to the hazard index estimates for the site; the uncertainties from this pathway are reflected in the risk estimates, which may be overestimated or underestimated because of the uncertainties with the plant partition coefficients. In addition, the main chemical driver for the HQs is vanadium. Although vanadium was retained as a COC, the concentrations at PRL S-040 are similar to the background concentrations. The concentrations of vanadium in soil at PRL S-040 range from 38 to 87 mg/kg. The surface soil background level for vanadium is 61.7 mg/kg; the subsurface soil background level is 80.5 mg/kg for silts and clays, and 75.7 mg/kg for sands. The levels of vanadium at PRL S-040 appear to be representative of naturally occurring variations in background levels rather than indicative of site-related contamination. Therefore, hazard indexes that include vanadium are likely to overestimate site-related conditions.

For several compounds, Cal-EPA presents more conservative toxicity values than the EPA values used in the risk calculations presented in Table A3-4. The following chemicals have more conservative cancer slope factors:

- Benzene – Oral slope factor: 1.0E-01 $(mg/kg\text{-}day)^{-1}$. Inhalation slope factor: 1.0E-01 $(mg/kg\text{-}day)^{-1}$
- N-nitrosodiphenylamine – Oral slope factor: 9.0E-03 $(mg/kg\text{-}day)^{-1}$

Use of these toxicity values would yield more conservative estimates. Total cumulative risk estimates using Cal-EPA toxicity factors are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 1×10^{-4}
- Future adult resident (0-to-10-foot-bgs depth interval): 1×10^{-4}
- Future adult resident (0-to-2-foot-bgs depth interval of soil plus groundwater): 2×10^{-4}
- Future adult resident (0-to-10-foot-bgs depth interval of soil plus groundwater): 2×10^{-4}

The cancer risk estimates using the Cal-EPA toxicity factors are at the upper end or above EPA's risk management range, with benzene as the main risk driver in soil.

An additional uncertainty relates to the classification of naphthalene and ethylbenzene as carcinogens. EPA does not classify naphthalene or ethylbenzene as carcinogens, whereas Cal-EPA considers naphthalene a carcinogen by the inhalation route and ethylbenzene carcinogenic by the oral and inhalation exposure routes. The cumulative cancer risk calculations presented for PRL S-040 (Table A3-4) include naphthalene and ethylbenzene. If naphthalene and ethylbenzene are excluded from the cancer risk calculations, the cumulative risks are approximately 2×10^{-5} for soil and 1×10^{-6} for groundwater for the residential scenarios. In addition, SSG concentrations at PRL S-040 exceed the SSG screening level for ethylbenzene based on carcinogenic effects (i.e., 22 ppbv for unrestricted use and 360 ppbv for industrial land use), but do not exceed the SSG screening levels based on noncarcinogenic effects (i.e., 23,000 ppbv for unrestricted use and 330,000 ppbv for industrial land use).

References

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Text: Vol. 2, PRL S-40, pgs. 1-18
Hits Table: Vol. 2, PRL S-40, Attachment 1, pgs. 1-12
All Data: Vol. 4, Appendix A, PRLS40, pgs. 29-59, 73-111
Human Health Risk Assessment Data: Vol. 6, Appendix C1, Section 9.18 pgs. 9-73 to 9-77, Tables 9.18.9 to 9.18.15

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Table A3-1a
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
PRL S-040

Scenario Timeframe:	**Future**							
Medium	**Soil Gas**							
Exposure Medium	**Soil Gas**							
Exposure Point	**Chemical of Concern**	**Concentration Detected (ppbv)**		**Frequency of Detection**	**95th UCL Concentration (ppbv)**	**Statistical Measure[a]**	**Exposure Point Concentration[b] (ppbv)**	**Exposure Point Concentration in Soil[c,d] (mg/kg)**
		Min	**Max**					
PRL S-040 - Soil Gas	Benzene	2.0E+02	2.0E+02	1/6	1.6E+02	95UCL Lognormal	1.6E+02	6.0E-04
	Ethylbenzene	1.0E+02	8.8E+02	1/2	1.0E+03	Max Detect	8.8E+02	4.0E-03
	n-Hexane	3.9E+03	3.9E+03	1/2	>1.0E+06	Max Detect	3.9E+03	3.0E-03
	2,2,4-Trimethylpentane	3.9E+02	1.3E+05	3/6	>1.0E+06	Max Detect	1.3E+05	1.0E-01
	Xylenes	3.2E+02	3.4E+03	2/6	2.5E+04	Max Detect	3.4E+03	6.0E-02

[a] The statistical measure indicates the basis for the exposure point concentration.

[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.

[c] Exposure point concentrations for these VOCs in soil are modeled from measured shallow soil gas concentrations.

[d] Modeled VOC concentrations in soil were used to evaluate the ingestion, dermal contact, and inhalation exposure pathways.

95th UCL = 95 percent upper confidence limit on the mean.

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Table A3-1b
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
PRL S-040

Scenario Timeframe:	**Future**					
Medium	**Air**					
Exposure Medium	**Air**					
			Construction Worker Air Exposure		**Occupational Worker Air Exposure**	
Exposure Point	**Chemical of Concern**	**Exposure Point Concentration in Soil[a] (mg/kg)**	**1-Year Flux Rate (g/m^2-s)**	**Exposure Point Concentration Construction Worker Outdoor Air (mg/m^3)[b]**	**30-Year Flux Rate (g/m^2-s)**	**Exposure Point Concentration Occupational Outdoor Air (mg/m^3)[b]**
PRL S-040 - VOCs in Air	Benzene	6.0E-04	2.26E-11	2.0E-07	4.03E-12	3.00E-08
	Ethylbenzene	4.0E-03	1.21E-10	9.0E-07	2.68E-11	2.00E-07
	n-Hexane	3.0E-03	6.59E-10	5.0E-06	1.84E-11	1.00E-07
	2,2,4-Trimethylpentane	1.0E-01	1.31E-08	1.0E-04	7.00E-10	5.00E-06
	Xylenes	6.0E-02	1.79E-11	1.0E-07	1.50E-10	1.00E-06

[a] Exposure point concentrations for these VOCs in soil are modeled from measured shallow soil gas concentrations.

[b] Emissions from soil and resulting air concentrations were estimated from models using the exposure point concentration modeled in soil.

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Table A3-1c
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
PRL S-040

Scenario Timeframe:	**Future**						
Medium	**Groundwater**						
Exposure Medium	**Groundwater**						
		Concentration Detected (µg/L)					
Exposure Point	**Chemical of Concern**	**Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration[a] (µg/L)**	**Statistical Measure[b]**	**Exposure Point Concentration[c] (µg/L)**
PRL S-040 - Groundwater On-site Direct Contact	Acetone	9.4E+00	9.4E+00	1/2	--	Max Detect	9.4E+00
	Benzene	1.2E-01	4.6E-01	2/2	--	Max Detect	4.6E-01
	sec- Butylbenzene	2.7E-01	2.7E-01	1/2	--	Max Detect	2.7E-01
	Ethylbenzene	1.3E+00	1.3E+00	1/2	--	Max Detect	1.3E+00
	p- Isopropyltoluene	1.1E-01	1.1E-01	1/2	--	Max Detect	1.1E-01
	Naphthalene	1.4E+00	1.4E+00	1/2	--	Max Detect	1.4E+00
	n- Propylbenzene	3.1E-01	3.1E-01	1/2	--	Max Detect	3.1E-01
	Toluene	2.5E-01	2.8E-01	2/2	--	Max Detect	2.8E-01
	Trichloroethene	4.6E-01	4.6E-01	1/2	--	Max Detect	4.6E-01
	1,2,4-Trimethylbenzene	1.6E+00	1.6E+00	1/2	--	Max Detect	1.6E+00
	1,3,5-Trimethylbenzene	7.2E-01	7.2E-01	1/2	--	Max Detect	7.2E-01
	Xylenes	6.6E+00	6.6E+00	1/2	--	Max Detect	6.6E+00

[a] Due to the limited data set, a statistical analysis could not be conducted to determine the 95th UCL concentration.
[b] The statistical measure indicates the basis for the exposure point concentration.
[c] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.

95th UCL = 95 percent upper confidence limit on the mean.

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Table A3-1d
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
PRL S-040

Scenario Timeframe:	**Future**						
Medium	**Soil**						
Exposure Medium	**Soil**						
Exposure Point	**Chemical of Concern**	**Concentration Detected (mg/kg) Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration (mg/kg)**	**Statistical Measure[a]**	**Exposure Point Concentration[b] (mg/kg)**
PRL S-040 - Soil On-site Direct Contact (0-2 ft bgs)	Copper	1.4E+01	3.7E+01	12/12	2.5E+01	95UCL Lognormal	2.5E+01
	Lead	3.4E+00	1.3E+01	11/12	7.8E+00	95UCL Normal	7.8E+00
	Vanadium	3.8E+01	8.7E+01	12/12	6.5E+01	95UCL Normal	6.5E+01
	Zinc	2.8E+01	7.9E+01	11/11	5.3E+01	95UCL Lognormal	5.3E+01
	Benzo(a)anthracene	2.0E-02	2.0E-02	1/19	6.0E-02	Max Detect	2.0E-02
	Benzo(g,h,i)perylene	2.0E-02	2.0E-02	1/19	6.0E-02	Max Detect	2.0E-02
	2-Methylnaphthalene	2.6E-02	1.1E+01	6/19	2.2E+01	Max Detect	1.1E+01
	Naphthalene	1.8E-01	5.6E+00	5/19	6.7E+00	Max Detect	5.6E+00
	N- nitrosodiphenylamine	2.6E-02	2.6E-02	1/19	5.9E-02	Max Detect	2.6E-02
	Phenanthrene	1.9E-01	1.9E-01	1/19	1.1E-01	95UCL Lognormal	1.1E-01
PRL S-040 - Soil On-site Direct Contact (0-10 ft bgs)	Copper	1.2E+01	4.4E+01	30/30	2.6E+01	95UCL Lognormal	2.6E+01
	Lead	2.9E+00	1.3E+01	28/30	7.9E+00	95UCL Normal	7.9E+00
	Vanadium	3.8E+01	8.7E+01	29/29	6.0E+01	95UCL Normal	6.0E+01
	Zinc	2.8E+01	1.0E+02	27/27	5.6E+01	95UCL Lognormal	5.6E+01
	Benzo(a)anthracene	2.1E-02	2.1E-02	1/52	2.2E-02	Max Detect	2.1E-02
	Benzo(g,h,i)perylene	2.1E-02	2.1E-02	1/52	2.2E-02	Max Detect	2.1E-02
	2,6-Dinitrotoluene	6.3E-01	6.3E-01	1/52	2.5E-02	95UCL Lognormal	2.5E-02
	Fluorene	5.1E-02	1.3E+00	2/52	3.9E-02	95UCL Lognormal	3.9E-02
	2-Methylnaphthalene	2.6E-02	2.5E+01	13/52	1.6E+00	95UCL Lognormal	1.6E+00
	Naphthalene	3.1E-02	5.6E+00	11/52	2.8E-01	95UCL Lognormal	2.8E-01
	N- nitrosodiphenylamine	2.6E-02	2.6E-02	1/52	2.3E-02	95UCL Lognormal	2.3E-02
	Phenanthrene	3.2E-02	9.6E-01	4/52	4.1E-02	95UCL Lognormal	4.1E-02

[a] The statistical measure indicates the basis for the exposure point concentration.

[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.

95th UCL = 95 percent upper confidence limit on the mean.

Table A3-2
Cancer Toxicity Data Summary
PRL S-040

Pathway: Ingestion, Dermal						
Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence[a]	Source	Date
Copper						
Lead				B2		
Vanadium						
Zinc						
Acetone						
Benzene	5.5E-02	5.5E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Benzo(a)anthracene	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Benzo(g,h,i)perylene						
sec-Butylbenzene						
2,6-Dinitrotoluene	6.8E-01	6.8E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Ethylbenzene	1.1E-02	1.1E-02	$(mg/kg\text{-}day)^{-1}$		Cal-EPA	2007
Fluorene						
n-Hexane						
p-Isopropyltoluene						
2-Methylnaphthalene						
Naphthalene			$(mg/kg\text{-}day)^{-1}$	B2		
N-nitrosodiphenylamine	4.9E-03	4.9E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Phenanthrene						
n-Propylbenzene						
Toluene						
Trichloroethene	1.3E-02	1.3E-02	$(mg/kg\text{-}day)^{-1}$	B2/C	Cal-EPA	2007
1,2,4-Trimethylbenzene						
1,3,5-Trimethylbenzene						
2,2,4-Trimethylpentane						
Xylenes						

Pathway: Inhalation					
Chemical of Concern	Inhalation Cancer Slope Factor	Slope Factor Units	Weight of Evidence[a]	Source	Date
Copper					
Lead			B2		
Vanadium					
Zinc					
Acetone					
Benzene	2.7E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Benzo(a)anthracene	3.9E-01	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Benzo(g,h,i)perylene					
sec-Butylbenzene					
2,6-Dinitrotoluene	6.8E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Ethylbenzene	8.7E-03	$(mg/kg\text{-}day)^{-2}$		Cal-EPA	2007
Fluorene					
n-Hexane					
p-Isopropyltoluene					
2-Methylnaphthalene					
Naphthalene	1.2E-01	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
N-nitrosodiphenylamine	9.0E-03	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Phenanthrene					
n-Propylbenzene					
Toluene					
Trichloroethene	7.0E-03	$(mg/kg\text{-}day)^{-1}$	B2/C	Cal-EPA	2007
1,2,4-Trimethylbenzene					
1,3,5-Trimethylbenzene					
2,2,4-Trimethylpentane					
Xylenes					

[a]Weight of Evidence Classification

A - human carcinogen
B1 and B2 - probable human carcinogen
C - possible human carcinogen
D - not classifiable as a human carcinogen
E - evidence of noncarcinogenicity for humans
Reference = USEPA 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December.

Cal-EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System

Table A3-3
Non-Cancer Toxicity Data Summary
PRL S-040

Pathway: Ingestion, Dermal

Chemical of Concern	Chronic/ subchronic	Oral RfD	Oral RfD Units	Dermal RfD	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Copper	Chronic	4.0E-02	(mg/kg-day)	4.0E-02	(mg/kg-day)	Gastro-intestinal system		HEAST	1997
Lead									
Vanadium	Chronic	1.0E-03	(mg/kg-day)	1.0E-03	(mg/kg-day)	Liver and kidney	100	NCEA	2004
Zinc	Chronic	3.0E-01	(mg/kg-day)	3.0E-01	(mg/kg-day)	Blood-forming system	3	IRIS	2007
Acetone	Chronic	9.0E-01	(mg/kg-day)	9.0E-01	(mg/kg-day)	Kidney	1000	IRIS	2007
Benzene	Chronic	4.0E-03	(mg/kg-day)	4.0E-03	(mg/kg-day)	Blood-forming system	3000	IRIS	2007
Benzo(a)anthracene	Chronic	3.0E-02	(mg/kg-day)	3.0E-02	(mg/kg-day)			IRIS	2007
Benzo(g,h,i)perylene	Chronic	3.0E-02	(mg/kg-day)	3.0E-02	(mg/kg-day)			IRIS	2007
sec- Butylbenzene	Chronic	4.0E-02	(mg/kg-day)	4.0E-02	(mg/kg-day)	Kidney	10000	NCEA	2004
2,6-Dinitrotoluene	Chronic	1.0E-03	(mg/kg-day)	1.0E-03	(mg/kg-day)	Nervous system	3000	HEAST	1997
Ethylbenzene	Chronic	1.0E-01	(mg/kg-day)	1.0E-01	(mg/kg-day)	Liver and kidney	1000	IRIS	2007
Fluorene	Chronic	4.0E-02	(mg/kg-day)	4.0E-02	(mg/kg-day)	Blood-forming system	3000	IRIS	2007
n -Hexane	Chronic	1.1E+01	(mg/kg-day)	1.1E+01	(mg/kg-day)			PPRTV	2004
p -Isopropyltoluene	Chronic	4.0E-02	(mg/kg-day)	4.0E-02	(mg/kg-day)			SURROGATE	
2-Methylnaphthalene	Chronic	4.0E-03	(mg/kg-day)	4.0E-03	(mg/kg-day)			IRIS	2007
Naphthalene	Chronic	2.0E-02	(mg/kg-day)	2.0E-02	(mg/kg-day)	Decreased body weight	3000	IRIS	2007
N- nitrosodiphenylamine	Chronic	2.0E-02	(mg/kg-day)	2.0E-02	(mg/kg-day)			PPRTV	2004
Phenanthrene	Chronic	3.0E-02	(mg/kg-day)	3.0E-02	(mg/kg-day)			IRIS	2007
n -Propylbenzene	Chronic	4.0E-02	(mg/kg-day)	4.0E-02	(mg/kg-day)	Nervous system		NCEA	2004
Toluene	Chronic	8.0E-02	(mg/kg-day)	8.0E-02	(mg/kg-day)	Liver and kidney	1000	IRIS	2007
Trichloroethene	Chronic	3.0E-04	(mg/kg-day)	3.0E-04	(mg/kg-day)			NCEA	2004
1,2,4-Trimethylbenzene	Chronic	5.0E-02	(mg/kg-day)	5.0E-02	(mg/kg-day)	Blood-forming system		PPRTV	2004
1,3,5-Trimethylbenzene	Chronic	5.0E-02	(mg/kg-day)	5.0E-02	(mg/kg-day)	Blood-forming system		PPRTV	2004
2,2,4-Trimethylpentane	Chronic	1.1E+01	(mg/kg-day)	1.1E+01	(mg/kg-day)			SURROGATE	
Xylenes	Chronic	2.0E-01	(mg/kg-day)	2.0E-01	(mg/kg-day)	Decreased body weight	1000	IRIS	2007

Pathway: Inhalation

Chemical of Concern	Chronic/ subchronic	Inhalation RfD	Inhalation RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Copper	Chronic	4.0E-02	mg/kg-day	Gastro-intestinal system		HEAST	1997
Lead							
Vanadium	Chronic	1.0E-03	mg/kg-day	Liver and kidney	100	NCEA	2004
Zinc	Chronic	3.0E-01	mg/kg-day	Blood-forming system	3	IRIS	2007
Acetone	Chronic	9.0E-01	mg/kg-day	Kidney	1000	ROUTE	
Benzene	Chronic	8.6E-03	mg/kg-day	Blood-forming system	3000	IRIS	2007
Benzo(a)anthracene	Chronic	3.0E-02	mg/kg-day			ROUTE	
Benzo(g,h,i)perylene	Chronic	3.0E-02	mg/kg-day			ROUTE	
sec- Butylbenzene	Chronic	4.0E-02	mg/kg-day	Kidney	10000	ROUTE	
2,6-Dinitrotoluene	Chronic	1.0E-03	mg/kg-day	Nervous system	3000	ROUTE	
Ethylbenzene	Chronic	2.9E-01	mg/kg-day	Liver and kidney	1000	ROUTE	
Fluorene	Chronic	4.0E-02	mg/kg-day	Blood-forming system	3000	ROUTE	
n -Hexane	Chronic	2.0E-01	mg/kg-day	Nervous system	10000	IRIS	2007
p -Isopropyltoluene	Chronic	4.0E-02	mg/kg-day			SURROGATE	
2-Methylnaphthalene	Chronic	8.6E-04	mg/kg-day			IRIS	2007
Naphthalene	Chronic	8.6E-04	mg/kg-day	Decreased body weight	3000	IRIS	2007
N- nitrosodiphenylamine	Chronic	2.0E-02	mg/kg-day			ROUTE	
Phenanthrene	Chronic	3.0E-02	mg/kg-day			ROUTE	
n -Propylbenzene	Chronic	4.0E-02	mg/kg-day	Nervous system		ROUTE	
Toluene	Chronic	1.4E+00	mg/kg-day	Nervous system	300	IRIS	2007
Trichloroethene	Chronic	1.7E-01	mg/kg-day			Cal-EPA	2007
1,2,4-Trimethylbenzene	Chronic	1.7E-03	mg/kg-day	Blood-forming system		PPRTV	2004
1,3,5-Trimethylbenzene	Chronic	1.7E-03	mg/kg-day	Blood-forming system		PPRTV	2004
2,2,4-Trimethylpentane	Chronic	2.0E-01	mg/kg-day			SURROGATE	
Xylenes	Chronic	2.9E-02	mg/kg-day	Impaired motor coordination	300	IRIS	2007

Notes:
Toxicity values used were accurate as of the date of report submittal and are not necessarily the most current values.
Blank cells indicate information is not available or not applicable.

Cal-EPA = California Environmental Protection Agency
HEAST = Health Effects Assessment Summary Table
IRIS = Integrated Risk Information System
NCEA = National Center for Environmental Assessment, USEPA
PEF = Potency equivalency factor (USEPA 1993)
ROUTE = route-to-route extrapolated value (e.g., oral RfD used for inhalation RfD)
SURROGATE =
RfDs for pyrene used for benzo(a)anthracene, benzo(g,h,I)perylene; and phenanthrene.
RfDs for n-butylbenzene used for isopropyltoluene.
RfDs for n-hexane used for 2,2,4-trimethylpentane.

Table A3-4
Risk Characterization Summary - Carcinogens
PRL S-040

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Carcinogenic Risk				
						Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-040 - Soil On-site Direct Contact (0-2 ft bgs)	Benzene	6.0E-04	mg/kg	5.2E-11	1.6E-05	1.7E-11	--	1.6E-05
			Benzo(a)anthracene	6.0E-02	mg/kg	3.8E-08	1.3E-13	1.8E-08	1.7E-07	2.3E-07
			Naphthalene	5.6E+00	mg/kg	--	1.2E-12	--	--	1.2E-12
			Ethylbenzene	4.0E-03	mg/kg	6.9E-11	4.0E-05	2.2E-11	--	4.0E-05
			N- nitrosodiphenylamine	2.6E-02	mg/kg	2.0E-10	3.9E-15	6.5E-11	4.2E-10	6.9E-10
			TOTAL			**3.8E-08**	**5.6E-05**	**1.8E-08**	**1.7E-07**	**6.E-05**
		PRL S-040 - Soil On-site Direct Contact (0-10 ft bgs)	Benzene	6.0E-04	mg/kg	5.2E-11	1.6E-05	1.7E-11	--	1.6E-05
			Benzo(a)anthracene	2.1E-02	mg/kg	3.9E-08	1.4E-13	1.9E-08	1.8E-07	2.4E-07
			2,6-Dinitrotoluene	2.5E-02	mg/kg	2.6E-08	9.4E-14	1.3E-08	1.2E-07	1.6E-07
			Naphthalene	2.8E-01	mg/kg	--	1.9E-13	--	--	1.9E-13
			Ethylbenzene	4.0E-03	mg/kg	6.9E-11	4.0E-05	2.2E-11	--	4.0E-05
			N- nitrosodiphenylamine	2.3E-02	mg/kg	1.7E-10	3.4E-16	5.4E-11	3.7E-10	6.0E-10
			TOTAL			**6.6E-08**	**5.6E-05**	**3.2E-08**	**3.0E-07**	**6.E-05**
Groundwater	Groundwater	PRL S-040 - Groundwater On-site Direct Contact	Benzene	4.6E-01	µg/L	3.7E-07	9.2E-07	5.5E-08	--	1.3E-06
			Naphthalene	1.4E+00	µg/L	--	2.7E-05	--	--	2.7E-05
			Ethylbenzene	1.3E+00	µg/L	5.0E-07	1.2E-05	7.3E-08	--	1.3E-05
			Trichloroethene	4.6E-01	µg/L	8.7E-08	2.4E-07	1.5E-08	--	3.4E-07
			TOTAL			**9.6E-07**	**4.1E-05**	**1.4E-07**	**--**	**4.E-05**

TOTAL Soil (0-2 ft bgs) + Groundwater Risks = 1.E-04
TOTAL Soil (0-10 ft bgs) + Groundwater Risks = 1.E-04

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Table A3-5
Risk Characterization Summary - Non-Carcinogens
PRL S-040

Scenario Timeframe:	**Future**										
Receptor Population:	**Resident**										
Receptor Age:	**Adult**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-040 - SoilOn-site Direct Contact (0-2 ft bgs)	Copper	2.5E+01	mg/kg	Gastro-intestinal system	6.8E-03	6.3E-08	1.9E-04	1.3E-02	2.0E-02
			Lead	7.8E+00	mg/kg	--	--	--	--	--	--
			Vanadium	6.5E+01	mg/kg	Liver and kidney	8.9E-02	3.5E-03	1.1E-06	3.7E-01	4.6E-01
			Zinc	5.3E+01	mg/kg	Blood-forming system	2.0E-03	1.8E-08	5.4E-05	3.7E-03	5.8E-03
			Acetone	--	--	Kidney	--	--	--	--	--
			Benzene	6.0E-04	mg/kg	Blood-forming system	1.7E-06	1.6E-01	4.7E-07	--	1.6E-01
			Benzo(a)anthracene	6.0E-02	mg/kg	--	7.3E-06	6.8E-11	3.1E-06	3.1E-05	4.1E-05
			Benzo(g,h,i)perylene	6.0E-03	mg/kg	--	7.3E-06	6.0E-11	3.1E-06	2.0E-05	3.0E-05
			sec- Butylbenzene	--	--	Kidney	--	--	--	--	--
			2,6-Dinitrotoluene	--	--	Nervous system	--	--	--	--	--
			Ethylbenzene	4.0E-03	mg/kg	Liver and kidney	4.4E-07	3.9E-02	1.2E-07	--	3.9E-02
			Fluorene	--	--	Blood-forming system	--	--	--	--	--
			n -Hexane	3.0E-03	mg/kg	Nervous system	3.0E-09	2.0E-01	8.2E-10	--	2.0E-01
			p -Isopropyltoluene	--	--	--	--	--	--	--	--
			2-Methylnaphthalene	1.1E+01	mg/kg	--	3.8E-03	2.3E-03	8.1E-02	1.6E-01	2.5E-01
			Naphthalene	5.6E+00	mg/kg	Decreased body weight	3.1E-03	--	8.7E-04	--	4.0E-03
			N- nitrosodiphenylamine	2.6E-02	mg/kg	--	--	--	--	--	--
			Phenanthrene	1.1E-01	mg/kg	--	4.0E-05	3.7E-10	1.7E-05	4.7E-04	5.3E-04
			n -Propylbenzene	--	--	Nervous system	--	--	--	--	--
			Toluene	--	--	Liver and kidney	--	--	--	--	--
			Trichloroethene	--	--	Nervous system	--	--	--	--	--
			1,2,4-Trimethylbenzene	--	--	Blood-forming system	--	--	--	--	--
			1,3,5-Trimethylbenzene	--	--	Blood-forming system	--	--	--	--	--
			2,2,4-Trimethylpentane	1.0E-01	mg/kg	--	9.8E-08	1.8E-03	2.8E-08	--	1.8E-03
			Xylenes	6.0E-02	mg/kg	Decreased body weight	3.3E-06	2.8E-03	9.3E-07	--	2.8E-03
			TOTAL				**1.0E-01**	**4.1E-01**	**8.3E-02**	**5.5E-01**	**1.E+00**

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Table A3-5
Risk Characterization Summary - Non-Carcinogens
PRL S-040

	(cont...)	PRL S-040 - Soil On-site Direct Contact (0-10 ft bgs)	Copper	2.6E+01	mg/kg	Gastro-intestinal system	7.2E-03	6.7E-08	2.0E-04	1.4E-02	2.1E-02
			Lead	7.9E+00	mg/kg	--	--	--	--	--	--
			Vanadium	6.0E+01	mg/kg	Liver and kidney	8.3E-02	3.3E-03	1.0E-06	3.4E-01	4.3E-01
			Zinc	5.6E+01	mg/kg	Blood-forming system	2.1E-03	1.9E-08	5.8E-05	4.0E-03	6.2E-03
			Acetone	--	--	Kidney	--	--	--	--	--
			Benzene	6.0E-04	mg/kg	Blood-forming system	1.7E-06	1.6E-01	4.7E-07	--	1.6E-01
			Benzo(a)anthracene	2.1E-01	mg/kg	--	7.7E-06	7.1E-11	3.2E-06	3.3E-05	4.4E-05
			Benzo(g,h,i)perylene	2.1E-02	mg/kg	--	7.7E-06	7.1E-11	3.2E-06	2.1E-05	3.2E-05
			sec- Butylbenzene	--	--	Kidney	--	--	--	--	--
			2,6-Dinitrotoluene	2.5E-02	mg/kg	Nervous system	2.7E-04	2.5E-09	7.7E-05	5.3E-04	8.8E-04
			Ethylbenzene	4.0E-03	mg/kg	Liver and kidney	4.4E-07	3.9E-02	1.2E-07	--	3.9E-02
			Fluorene	3.9E-02	mg/kg	Blood-forming system	1.1E-05	--	4.5E-06	--	1.6E-05
			n -Hexane	3.0E-03	mg/kg	Nervous system	3.0E-09	2.0E-01	8.2E-10	--	2.0E-01
			p -Isopropyltoluene	--	--	--	--	--	--	--	--
			2-Methylnaphthalene	1.6E+00	mg/kg	--	5.3E-04	3.2E-04	1.1E-02	2.3E-02	3.5E-02
			Naphthalene	2.8E-01	mg/kg	Decreased body weight	1.5E-04	--	4.3E-05	--	1.9E-04
			N- nitrosodiphenylamine	2.3E-02	mg/kg	--	--	--	--	--	--
			Phenanthrene	4.1E-02	mg/kg	--	1.5E-05	1.4E-10	6.3E-06	1.8E-04	2.0E-04
			n -Propylbenzene	--	--	Nervous system	--	--	--	--	--
			Toluene	--	--	Liver and kidney	--	--	--	--	--
			Trichloroethene	--	--	Nervous system	--	--	--	--	--
			1,2,4-Trimethylbenzene	--	--	Blood-forming system	--	--	--	--	--
			1,3,5-Trimethylbenzene	--	--	Blood-forming system	--	--	--	--	--
			2,2,4-Trimethylpentane	1.0E-01	mg/kg		9.8E-08	1.8E-03	2.8E-08	--	1.8E-03
			Xylenes	6.0E-02	mg/kg	Decreased body weight	3.3E-06	2.8E-03	9.3E-07	--	2.8E-03
			TOTAL				**9.3E-02**	**4.1E-01**	**1.2E-02**	**3.8E-01**	**9.E-01**

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Table A3-5
Risk Characterization Summary - Non-Carcinogens
PRL S-040

Scenario Timeframe:	**Future**										
Receptor Population:	**Resident**										
Receptor Age:	**Adult**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Groundwater	Groundwater	PRL S-040 - Groundwater On-site Direct Contact	Copper	--	--	Gastro-intestinal system	--	--	--	--	--
			Lead	--	--	--	--	--	--	--	--
			Vanadium	--	--	Liver and kidney	--	--	--	--	--
			Zinc	--	--	Blood-forming system	--	--	--	--	--
			Acetone	9.4E+00	µg/L	Kidney	9.6E-04	4.8E-03	3.2E-06	--	5.7E-03
			Benzene	4.6E-01	µg/L	Blood-forming system	1.1E-02	2.4E-02	1.4E-03	--	3.6E-02
			Benzo(a)anthracene	--	--	--	--	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	--	--	--
			sec- Butylbenzene	2.7E-01	µg/L	Kidney	6.3E-04	3.0E-03	--	--	3.6E-03
			2,6-Dinitrotoluene	--	--	Nervous system	--	--	--	--	--
			Ethylbenzene	1.3E+00	µg/L	Liver and kidney	1.2E-03	2.1E-03	6.9E-04	--	4.0E-03
			Fluorene	--	--	Blood-forming system	--	--	--	--	--
			n -Hexane	--	--	Nervous system	--	--	--	--	--
			p -Isopropyltoluene	1.1E-01	µg/L		1.0E-04	1.3E-03	--	--	1.4E-03
			2-Methylnaphthalene	--	--	--	--	--	--	--	--
			Naphthalene	1.4E+00	µg/L	Decreased body weight	6.4E-03	7.4E-01	4.0E-03	--	7.5E-01
			N- nitrosodiphenylamine	--	--	--	--	--	--	--	--
			Phenanthrene	--	--	--	--	--	--	--	--
			n -Propylbenzene	3.1E-01	µg/L	Nervous system	--	--	--	--	--
			Toluene	2.8E-01	µg/L	Liver and kidney	3.3E-04	8.4E-05	1.0E-04	--	5.1E-04
			Trichloroethene	4.6E-01	µg/L	Nervous system	1.4E-01	1.2E-03	2.0E-02	--	1.6E-01
			1,2,4-Trimethylbenzene	1.6E+00	µg/L	Blood-forming system	2.9E-03	4.3E-01	3.2E-03	--	4.4E-01
			1,3,5-Trimethylbenzene	7.2E-01	µg/L	Blood-forming system	1.3E-03	1.9E-01	1.7E-03	--	1.9E-01
			2,2,4-Trimethylpentane	--	--	--	--	--	--	--	--
			Xylenes	6.6E+00	µg/L	Decreased body weight	3.0E-03	1.0E-01	1.9E-03	--	1.1E-01
			TOTAL				**1.7E-01**	**1.5E+00**	**3.3E-02**	**--**	**2.E+00**

TOTAL Soil (0-2 ft bgs) + Groundwater Risks = 3.E+00
TOTAL Soil (0-10 ft bgs) + Groundwater Risks = 3.E+00

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Table A3-5
Risk Characterization Summary - Non-Carcinogens
PRL S-040

Scenario Timeframe:	**Future**										
Receptor Population:	**Resident**										
Receptor Age:	**Child**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-040 - Soil On-site Direct Contact (0-2 ft bgs)	Copper	2.5E+01	mg/kg	Gastro-intestinal system	5.9E-03	1.3E-08	1.6E-04	9.3E-03	1.5E-02
			Lead	7.8E+00	mg/kg	--	--	--	--	--	--
			Vanadium	6.5E+01	mg/kg	Liver and kidney	8.3E-01	2.4E-02	2.6E-06	1.0E+00	1.9E+00
			Zinc	5.3E+01	mg/kg	Blood-forming system	1.5E-03	1.2E-08	4.5E-05	2.7E-03	4.2E-03
			Acetone	--	--	Kidney	--	--	--	--	--
			Benzene	6.0E-04	mg/kg	Blood-forming system	1.4E-06	1.6E-01	3.8E-07	--	1.6E-01
			Benzo(a)anthracene	6.0E-02	mg/kg	--	6.4E-06	1.5E-11	2.5E-06	2.3E-05	3.2E-05
			Benzo(g,h,i)perylene	6.0E-03	mg/kg	--	6.4E-06	1.5E-11	2.5E-06	1.4E-05	2.3E-05
			sec- Butylbenzene	--	--	Kidney	--	--	--	--	--
			2,6-Dinitrotoluene	--	--	Nervous system	--	--	--	--	--
			Ethylbenzene	4.0E-03	mg/kg	Liver and kidney	3.8E-07	3.9E-02	1.0E-07	--	3.9E-02
			Fluorene	--	--	Blood-forming system	--	--	--	--	--
			n -Hexane	3.0E-03	mg/kg	Nervous system	2.6E-09	2.0E-01	7.1E-10	--	2.0E-01
			p -Isopropyltoluene	--	--	--	--	--	--	--	--
			2-Methylnaphthalene	1.1E+01	mg/kg		3.5E-02	1.5E-02	1.9E-01	4.4E-01	6.8E-01
			Naphthalene	5.6E+00	mg/kg	Decreased body weight	2.8E-03	--	7.1E-04	--	3.5E-03
			N- nitrosodiphenylamine	2.6E-02	mg/kg	--	--	--	--	--	--
			Phenanthrene	1.1E-01	mg/kg	--	3.4E-05	8.0E-11	1.4E-05	3.5E-04	4.0E-04
			n -Propylbenzene	--	--	Nervous system	--	--	--	--	--
			Toluene	--	--	Liver and kidney	--	--	--	--	--
			Trichloroethene	--	--	Nervous system	--	--	--	--	--
			1,2,4-Trimethylbenzene	--	--	Blood-forming system	--	--	--	--	--
			1,3,5-Trimethylbenzene	--	--	Blood-forming system	--	--	--	--	--
			2,2,4-Trimethylpentane	1.0E-01	mg/kg	--	8.7E-08	4.0E-04	2.3E-08	--	4.0E-04
			Xylenes	6.0E-02	mg/kg	Decreased body weight	2.9E-06	6.1E-04	7.6E-07	--	6.1E-04
			TOTAL	--	--		**8.7E-01**	**4.4E-01**	**1.9E-01**	**1.5E+00**	**3.E+00**

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Table A3-5
Risk Characterization Summary - Non-Carcinogens
PRL S-040

	(cont...)	PRL S-040 - Soil On-site Direct Contact (0-10 ft bgs)	Copper	2.6E+01	mg/kg	Gastro-intestinal system	6.3E-03	4.7E-08	1.7E-04	1.0E-02	1.7E-02
			Lead	7.9E+00	mg/kg	--	--	--	--	--	--
			Vanadium	6.0E+01	mg/kg	Liver and kidney	7.7E-01	2.2E-02	2.4E-06	9.5E-01	1.7E+00
			Zinc	5.6E+01	mg/kg	Blood-forming system	1.6E-03	1.3E-08	4.8E-05	2.9E-03	4.5E-03
			Acetone	--	--	Kidney	--	--	--	--	--
			Benzene	6.0E-04	mg/kg	Blood-forming system	1.4E-06	1.6E-01	3.8E-07	--	1.6E-01
			Benzo(a)anthracene	2.1E-01	mg/kg	--	6.7E-06	5.0E-11	2.7E-06	2.4E-05	3.3E-05
			Benzo(g,h,i)perylene	2.1E-02	mg/kg	--	6.7E-06	5.0E-11	2.7E-06	1.5E-05	2.4E-05
			sec- Butylbenzene	--	--	Kidney	--	--	--	--	--
			2,6-Dinitrotoluene	2.5E-02	mg/kg	Nervous system	2.4E-04	1.8E-09	6.4E-05	3.9E-04	6.9E-04
			Ethylbenzene	4.0E-03	mg/kg	Liver and kidney	3.8E-07	3.9E-02	1.0E-07	--	3.9E-02
			Fluorene	3.9E-02	mg/kg	Blood-forming system	9.4E-06	--	3.7E-06	--	1.3E-05
			n -Hexane	3.0E-03	mg/kg	Nervous system	2.6E-09	2.0E-01	7.1E-10	--	2.0E-01
			p -Isopropyltoluene	--	--	--	--	--	--	--	--
			2-Methylnaphthalene	1.6E+00	mg/kg	--	5.0E-03	2.2E-03	2.7E-02	6.3E-02	9.7E-02
			Naphthalene	2.8E-01	mg/kg	Decreased body weight	1.3E-04	--	3.6E-05	--	1.7E-04
			N- nitrosodiphenylamine	2.3E-02	mg/kg	--	--	--	--	--	--
			Phenanthrene	4.1E-02	mg/kg	--	1.3E-05	9.7E-11	5.2E-06	1.3E-04	1.5E-04
			n -Propylbenzene	--	--	Nervous system	--	--	--	--	--
			Toluene	--	--	Liver and kidney	--	--	--	--	--
			Trichloroethene	--	--	Nervous system	--	--	--	--	--
			1,2,4-Trimethylbenzene	--	--	Blood-forming system	--	--	--	--	--
			1,3,5-Trimethylbenzene	--	--	Blood-forming system	--	--	--	--	--
			2,2,4-Trimethylpentane	1.0E-01	mg/kg		8.7E-08	1.3E-03	2.3E-08	--	1.3E-03
			Xylenes	6.0E-02	mg/kg	Decreased body weight	2.9E-06	2.0E-03	7.6E-07	--	2.0E-03
			TOTAL				**7.9E-01**	**4.3E-01**	**2.7E-02**	**1.0E+00**	**2.E+00**

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Table A3-5
Risk Characterization Summary - Non-Carcinogens
PRL S-040

Scenario Timeframe:	**Future**										
Receptor Population:	**Resident**										
Receptor Age:	**Child**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Groundwater	Groundwater	PRL S-040 - Groundwater On-site Direct Contact	Copper	--	--	Gastro-intestinal system	--	--	--	--	--
			Lead	--	--	--	--	--	--	--	--
			Vanadium	--	--	Liver and kidney	--	--	--	--	--
			Zinc	--	--	Blood-forming system	--	--	--	--	--
			Acetone	9.4E+00	µg/L	Kidney	6.7E-04	3.3E-03	2.0E-06	--	4.0E-03
			Benzene	4.6E-01	µg/L	Blood-forming system	7.4E-03	1.7E-02	9.0E-04	--	2.5E-02
			Benzo(a)anthracene	--	--	--	--	--	--	--	--
			Benzo(g,h,i)perylene	--	--	--	--	--	--	--	--
			sec- Butylbenzene	2.7E-01	µg/L	Kidney	4.3E-04	2.2E-03	--	--	2.6E-03
			2,6-Dinitrotoluene	--	--	Nervous system	--	--	--	--	--
			Ethylbenzene	1.3E+00	µg/L	Liver and kidney	8.3E-04	1.5E-03	4.2E-04	--	2.8E-03
			Fluorene	--	--	Blood-forming system	--	--	--	--	--
			n -Hexane	--	--	Nervous system	--	--	--	--	--
			p -Isopropyltoluene	1.1E-01	µg/L	--	1.8E-04	8.8E-04	--	--	1.1E-03
			2-Methylnaphthalene	--	--	--	--	--	--	--	--
			Naphthalene	1.4E+00	µg/L	Decreased body weight	4.5E-03	5.2E-01	2.5E-03	--	5.3E-01
			N- nitrosodiphenylamine	--	--	--	--	--	--	--	--
			Phenanthrene	--	--	--	--	--	--	--	--
			n -Propylbenzene	3.1E-01	µg/L	Nervous system	--	--	--	--	--
			Toluene	2.8E-01	µg/L	Liver and kidney	2.2E-04	6.0E-05	6.3E-05	--	3.4E-04
			Trichloroethene	4.6E-01	µg/L	Nervous system	9.8E-02	8.8E-04	1.3E-02	--	1.1E-01
			1,2,4-Trimethylbenzene	1.6E+00	µg/L	Blood-forming system	2.0E-03	3.0E-01	2.0E-03	--	3.0E-01
			1,3,5-Trimethylbenzene	7.2E-01	µg/L	Blood-forming system	9.2E-04	1.4E-01	1.0E-03	--	1.4E-01
			2,2,4-Trimethylpentane	--	--	--	--	--	--	--	--
			Xylenes	6.6E+00	µg/L	Decreased body weight	2.1E-03	7.6E-02	1.2E-03	--	7.9E-02
			TOTAL				**1.2E-01**	**1.1E+00**	**2.1E-02**	**--**	**1.E+00**

TOTAL Soil (0-2 ft bgs) + Groundwater Risks = 4.E+00
TOTAL Soil (0-10 ft bgs) + Groundwater Risks = 2.E+00

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SECTION A4

SA 003

A4.1 Site Overview and Features

SA 003 is in the northern portion of IC 3, immediately south of Magpie Creek near the OU C boundary in the north-central portion of OU B. It is located in the southwest corner of the Core Airfield/Industrial District, adjacent to the West McClellan District. SA 003 consists of an uncovered vehicle washrack that is connected to a portion of the industrial wastewater line (PRL L-005E) and a former hazardous waste storage area. The site is approximately 0.5 acre in extent. Within IC 3, SA 003 is surrounded by SA 010 to the southwest, SA 017 to the southeast, and SA 019 to the south. The aircraft painting facility (PRL S-031) and the hazardous waste storage area (PRL S-032) are located north of Magpie Creek in OU C. These sites are believed to be the source of groundwater VOC contamination beneath IC 3.

Operations at the washrack and hazardous waste storage area began in the mid-1960s. The hazardous waste storage area and washrack were used to support civil engineering construction and maintenance activities, but are no longer used.

A4.2 Source of Contamination

Past activities that contributed to the contamination at SA 003 were spills in the hazardous waste storage area, overflows at the washrack, and leaks from the IWL or the lift station. SVOCs, TPH, metals, and VOCs were identified as contaminants. Based on the analytical results from several previous investigations, two areas of contamination were defined: an area of inorganic surface and subsurface soil contamination adjacent to the hazardous waste storage area and washrack, and an area of TPH subsurface soil contamination adjacent to the IWL/IWL lift station. A remedial action was conducted at SA 003 in November 2005 to remove the soil contamination. The remedial action consisted of demolition of the waste storage area and lift station, excavation, confirmation sampling, characterization of the excavated soils, and off-site disposal of approximately 4,250 yards of contaminated soil.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Radian. 1995. *Operable Unit B Remedial Investigation Characterization Summaries*. Final. December.

  Text: Vol. 1, IC 3, pp. 1-43
  All Data: Vol. 3, Appendix A, IC 3, pp. 1-65

- URS. 2004. *Operable Unit B Data Gaps Remedial Investigation Characterization Summaries Addendum*. Final. April.

  Text: Vol. 1, IC 3, SA 3, pp. 1-45
  Hits Table: Vol. 1, IC 3, SA 3, Attachment 1, pp. 1-11

All Data: Vol. 2, Appendix A, SA 3, pp. 1-18
Human Health Risk Assessment Data: Vol. 3, Appendix C, Section 9.3 pp. C9.3-1 to C9.3-16, Tables 9.3-43 & 9.3-44

- URS. 2002. *OU B Phase 1 Petroleum, Oils and Lubricants (POL) and Shallow Soil Gas (SSG) Remedial Investigation Characterization Summaries Addenda for Selected Sites*. Volumes 1 and 2. November.
- CH2M HILL. 2003. *LRA Initial Parcel Feasibility Study #1*. Final. August.

  Data Summary and ESF excerpts, Vol. 1, Appendix H, Section 5, pp. H5-1 – H5-10
  May 2003 data from AFRPA: Vol. 1, Appendix H, Section 5, SA 003 Attachment 2
- AFRPA. 2004. *LRA Initial Parcel Record of Decision #1*. June.
- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study #2*. Final. May. Vol. 2, Appendix D, pp. D5-1 – D5-4.
- EQM. 2006. LRA *Initial Parcel #1 Remedial Action Completion Report*. Final. October.

A4.3 Sampling Strategy and Type of Contamination

Several field investigations were performed at SA 003 to evaluate surface-soil, vadose-zone, and groundwater contamination. Based on the results from the previous investigations, soil contamination was identified. A remedial action was conducted and approximately 4,250 cubic yards of soil contamination was excavated from the site. Analytical data collected prior to the remedial action in November 2005 are no longer representative of current site conditions because all soil contamination has been removed. However, four soil gas sample locations (SA3SB008U, SA3SB010U, SA3SB011U, and SA3SB012U) were sampled during the POL/SSG Phase 1 sampling effort in 2002. These samples were collected at depths that were not excavated during the remedial action. Therefore, the soil gas data collected from these locations were used to evaluate the current soil gas conditions at SA 003.

In addition, three soil gas samples (SA003SG-13, SA003SG-14, and SA003SG-21) were collected from the bottom of the excavated area during the remedial action. These borings were placed to confirm VOC concentrations below the floor of the excavation in the most contaminated area (near the IWL lift station and SA3SB009U where an elevated detection of 1,4-dichlorobenzene was reported at 10 feet bgs in 2002). These samples were analyzed for VOCs by Method TO-15. The analytical data from these samples were also used to evaluate the site.

A4.4 Location of Contamination

The remedial action conducted in 2005 removed all soil contamination identified at SA 003. The following sections focus on the current soil gas conditions at SA 003, based on soil gas samples collected during the POL/SSG investigation and the remedial action at SA 003. Figure A-4a identifies the site location and significant site features. Figure A-4b provides the results of the soil gas samples used evaluate the site.

A4.4.1 VOCs in Soil Gas

Three VOCs (PCE, chloroform, and 1,4-dichlorobenzene) were reported at concentrations exceeding unrestricted use screening levels in SSG samples collected from SA 003. PCE was detected in two soil gas samples at a maximum concentration of 12 ppbv from SA3SB010U at 15 feet bgs. Chloroform also was detected in the 15-foot sample from SA3SB010U at a concentration of 2.9 ppbv. 1,4-Dichlorobenzene was detected in the 5-foot bgs soil gas sample from SA3SB008U at a concentration of 5.8 ppbv.

It should be noted that concentrations of benzene at 12 ppbv and chloroform at 4.4 ppbv, in a soil gas sample from SA003SG-14, exceed screening levels for unrestricted use. However, this sample was collected at 20 feet bgs, where unrestricted use screening levels may not be applicable.

No VOC concentrations exceeded screening levels for industrial use.

A4.5 2005 Remedial Action

In 2005, a remedial action was completed at SA 003. Approximately 4,250 cubic yards of non-VOC and VOC contaminated soil was excavated and disposed of at an offsite facility. Post-remedial action sampling confirmed that all non-VOC contaminated soil with concentrations exceeding unrestricted use screening levels was removed (EQM, 2006). Confirmation soil samples were analyzed for TPH (SW8015), metals (SW6010 and 7000 series), PCBs (SW8082), pesticides (SW8081), and PAHs (SW8310).

A4.6 Contamination Exposure and Migration

VOCs and non-VOC contamination at the site presented a threat to human health, surface water, and groundwater. However, the contamination was removed from the site during the 2005 remedial action.

A4.7 Current and Potential Future Site and Resource Uses

SA 003 included an uncovered vehicle washrack and a former hazardous waste storage area to support civil engineering maintenance and construction activities. Currently the site is unused. In the future, SA 003 will likely be used for commercial/industrial purposes.

A4.8 Human Health Risk Assessment

Three VOCs (PCE, chloroform, and 1,4-dichlorobenzene) were reported at concentrations slightly exceeding unrestricted use screening levels in SSG samples collected from SA 003. Risks at SA 003 were estimated for the detected VOCs. The shallow soil gas data includes 10 samples collected from 4 borings during the POL/SSG field effort representing depth intervals that were not subsequently excavated and two post-excavation confirmation samples (see Figure A-4). The risk estimates are shown in the risk summary tables for SA 003 (Attachment A4). The estimated cancer risk is 6×10^{-6} for the residential scenario, and the noncarcinogenic risk is less than 1. For the industrial scenario, the estimated cancer

risk is 4×10^{-7} and the noncarcinogenic risk is less than one. The VOC contaminants at the site do not present a significant threat to human health.

A4.8.1 Basis for No Action

Subsequent to the 2005 remedial action, residual contamination in soil and soil gas does not present a threat to human health or the environment. Therefore, no further action is required for soils at this site.

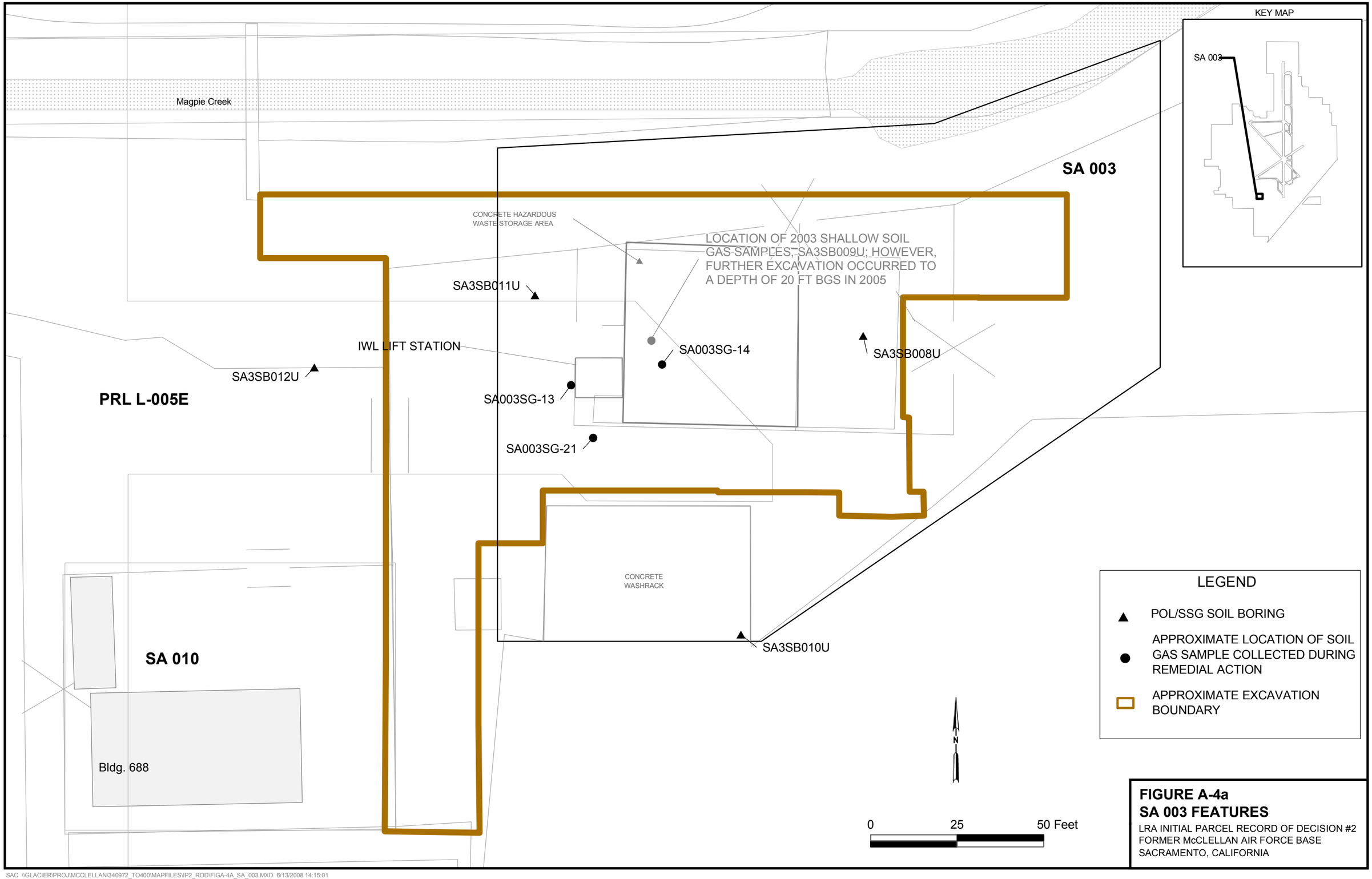

FIGURE A-4a
SA 003 FEATURES
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

SAC \\GLACIER\PROJ\MCCLELLAN\340972_TO400\MAPFILES\IP2_ROD\FIGA-4A_SA_003.MXD 6/13/2008 14:15:01

Boring ID	Analyte	Depth (ft bgs)	Concentration (ppbv)
VOCs (In shallow soil gas from 0-15 feet)			
SA3SB008U	1,2,4-Trimethylbenzene	5	4.4
SA3SB008U	1,2-Dichlorobenzene	5	32
SA3SB008U	**1,4-Dichlorobenzene**	**5**	**5.8**
SA3SB008U	Benzene	5	5.1
SA3SB008U	Chlorobenzene	5	12
SA3SB008U	Methylene Chloride	5	2
SA3SB008U	Toluene	5	4.9
SA3SB008U	TCE	5	4.8
SA3SB008U	1,2-Dichlorobenzene	10	15
SA3SB008U	1,4-Dichlorobenzene	10	2.8
SA3SB008U	Benzene	10	2 J
SA3SB008U	Chlorobenzene	10	4
SA3SB008U	Toluene	10	3.1
SA3SB008U	1,2-Dichlorobenzene	15	2.9
SA3SB008U	PCE	15	2.2
SA3SB010U	Chlorobenzene	15	2.3
SA3SB010U	**Chloroform**	**15**	**2.9**
SA3SB010U	Methylene Chloride	15	2.5
SA3SB010U	**PCE**	**15**	**12**
SA3SB010U	Toluene	15	5.3
SA3SB010U	TCE	15	2.9
SA3SB011U	Toluene	5	4.9
SA3SB011U	Benzene	10	4
SA3SB011U	Toluene	10	7.6
SA3SB011U	**PCE**	**15**	**7.8**
SA3SB011U	Toluene	15	2.4
SA3SB012U	Benzene	5	7
SA3SB012U	Toluene	5	7.4
SA3SB012U	m,p-xylene	5	2.6
SA3SB012U	Benzene	10	2.1
SA3SB012U	Toluene	10	3.2
SA3SB012U	Benzene	15	3.8
SA3SB012U	Toluene	15	59
SA003SG-13	Acetone	15	140
SA003SG-13	Benzene	15	2.2
SA003SG-13	Bromomethane	15	ND
SA003SG-13	Chlorobenzene	15	27
SA003SG-13	Chloroform	15	ND
SA003SG-13	Cyclohexane	15	ND
SA003SG-13	1,2-Dichlorobenzene	15	ND
SA003SG-13	1,3-Dichlorobenzene	15	ND
SA003SG-13	1,4-Dichlorobenzene	15	ND
SA003SG-13	1,1-Dichloroethane	15	ND
SA003SG-13	1,1-Dichloroethene	15	ND
SA003SG-13	cis-1,2-Dichloroethene	15	ND
SA003SG-13	Ethyl benzene	15	2.2
SA003SG-13	Freon 11	15	ND
SA003SG-13	Freon 12	15	ND
SA003SG-13	Methylene chloride	15	ND
SA003SG-13	2-methylnaphthalene	15	NS
SA003SG-13	Naphthalene	15	ND
SA003SG-13	PCE	15	ND
SA003SG-13	Propene	15	ND
SA003SG-13	TCE	15	ND
SA003SG-13	Toluene	15	9.1
SA003SG-13	1,2,4-Trimethylbenzene	15	3.3
SA003SG-13	1,3,5-Trimethylbenzene	15	ND
SA003SG-13	m, p-xylene	15	9.1
SA003SG-13	o-xylene	15	3.1

Boring ID	Analyte	Depth (ft bgs)	Concentration (ppbv)
VOCs (In shallow soil gas from 0-15 feet)			
SA003SG-14	Acetone	20	100
SA003SG-14	**Benzene**	**20**	**12**
SA003SG-14	Bromomethane	20	ND
SA003SG-14	Chlorobenzene	20	ND
SA003SG-14	**Chloroform**	**20**	**4.4**
SA003SG-14	Cyclohexane	20	3.6
SA003SG-14	1,2-Dichlorobenzene	20	ND
SA003SG-14	1,3-Dichlorobenzene	20	ND
SA003SG-14	1,4-Dichlorobenzene	20	ND
SA003SG-14	1,1-Dichloroethane	20	ND
SA003SG-14	1,1-Dichloroethene	20	ND
SA003SG-14	cis-1,2-Dichloroethene	20	ND
SA003SG-14	Ethyl benzene	20	9
SA003SG-14	Freon 11	20	ND
SA003SG-14	Freon 12	20	ND
SA003SG-14	Methylene chloride	20	ND
SA003SG-14	2-methylnaphthalene	20	NS
SA003SG-14	Naphthalene	20	ND
SA003SG-14	PCE	20	ND
SA003SG-14	Propene	20	ND
SA003SG-14	TCE	20	ND
SA003SG-14	Toluene	20	61
SA003SG-14	1,2,4-Trimethylbenzene	20	3.4
SA003SG-14	1,3,5-Trimethylbenzene	20	ND
SA003SG-14	m, p-xylene	20	30
SA003SG-14	o-xylene	20	8.4
SA003SG-21	Acetone	12	100
SA003SG-21	Benzene	12	ND
SA003SG-21	Bromomethane	12	ND
SA003SG-21	Chlorobenzene	12	2.8
SA003SG-21	Chloroform	12	ND
SA003SG-21	Cyclohexane	12	ND
SA003SG-21	1,2-Dichlorobenzene	12	ND
SA003SG-21	1,3-Dichlorobenzene	12	ND
SA003SG-21	1,4-Dichlorobenzene	12	ND
SA003SG-21	1,1-Dichloroethane	12	ND
SA003SG-21	1,1-Dichloroethene	12	ND
SA003SG-21	cis-1,2-Dichloroethene	12	ND
SA003SG-21	Ethyl benzene	12	2.2
SA003SG-21	Freon 11	12	ND
SA003SG-21	Freon 12	12	ND
SA003SG-21	Methylene chloride	12	ND
SA003SG-21	2-methylnaphthalene	12	NS
SA003SG-21	Naphthalene	12	ND
SA003SG-21	PCE	12	ND
SA003SG-21	Propene	12	ND
SA003SG-21	TCE	12	ND
SA003SG-21	Toluene	12	9.5
SA003SG-21	1,2,4-Trimethylbenzene	12	3.1
SA003SG-21	1,3,5-Trimethylbenzene	12	ND
SA003SG-21	m, p-xylene	12	11
SA003SG-21	o-xylene	12	3.5

Note: Bolded compounds exceed the Unrestricted Use Screening Level established for the respective analyte (Table C-2).
Dataflags: J = Estimated concentration
ND = Not Detected
NS = Not Sampled
Boring SA003SG-14 was drilled beneath the floor of the excavation.

FIGURE A-4b
SA 003 DATA TABLES
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

Attachment A4
SA 003 Risk Summary Tables

SA 003 ATTACHMENT A4

Risk Summary Table for SA 003, Unrestricted Use Scenario

Initial Parcel #2 Feasibility Study, Former McClellan Air Force Base, California

Analyte	Frequency of Detection	Units	Minimum Detected Concentration	Maximum Detected Concentration	EPC*	EPC basis*	AFRPA Preliminary Cleanup Goals (PCGs)		Estimated Risk Based on AFRPA PCGs	
							Cancer Target Risk = 1.0×10^{-6}	Non-Cancer Target HI =1	Carcinogenic Risk	Non-carcinogenic risk
Soil Gas (0 to 15 ft bgs)										
1,2,4-Trimethylbenzene	3/12	ppbv	3.1	4.4	4.4	Max Concentration	NA	120		3.7E-02
1,2-Dichlorobenzene	2/12	ppbv	2.9	32	32	Max Concentration	NA	65		4.9E-01
1,4-Dichlorobenzene	2/12	ppbv	2.8	5.8	5.8	Max Concentration	3.5	13,000	1.7E-06	4.5E-04
Acetone	2/12	ppbv	100	140	140	Max Concentration	NA	130,000		1.1E-03
Benzene	5/12	ppbv	2	7	7	Max Concentration	9.9	940	7.1E-07	7.4E-03
Chloroform	1/12	ppbv	2.9	2.9	2.9	Max Concentration	2.2	6,100	1.3E-06	4.8E-04
Chlorobenzene	5/12	ppbv	2.3	27	27	Max Concentration	NA	22,000		1.2E-03
Ethylbenzene	2/12	ppbv	2.2	2.2	2.2	Max Concentration	22	23,000	1.0E-07	9.6E-05
m,p-Xylene	3/12	ppbv	2.6	11	11	Max Concentration	NA	2,300		4.8E-03
Methylene Chloride	2/12	ppbv	2	2.5	2.5	Max Concentration	150	12,000	1.7E-08	2.1E-04
o-Xylene	2/12	ppbv	3.1	3.5	3.5	Max Concentration	NA	2,300		1.5E-03
TCE	2/12	ppbv	4.8	5.3	5.3	Max Concentration	23	11,000	2.3E-07	4.8E-04
Tetrachloroethylene	3/12	ppbv	2.2	12	12	Max Concentration	5.8	500	2.1E-06	2.4E-02
Toluene	11/12	ppbv	2.4	59	59	Max Concentration	NA	130,000		4.5E-04
Total									**6.E-06**	**6.E-01**

* Maximum concentration was used in risk ratio calculations.

NA = not available – no PCG has been established for this compound

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SA 003 ATTACHMENT A4

Risk Summary Table for SA 003, Industrial Scenario

Initial Parcel #2 Feasibility Study, Former McClellan Air Force Base, California

Analyte	Frequency of Detection	Units	Minimum Detected Concentration	Maximum Detected Concentration	EPC*	EPC basis*	AFRPA Preliminary Cleanup Goals (PCGs)		Estimated Risk Based on AFRPA	
							Cancer Target Risk = 1.0×10^{-6}	Non-Cancer Target HI =1	Carcinogenic Risk	Non-carcinogenic risk
Soil Gas (0 to 15 ft bgs)										
1,2,4-Trimethylbenzene	3/12	ppbv	3.1	4.4	4.4	Max Concentration	NA	1,800		2.4E-03
1,2-Dichlorobenzene	2/12	ppbv	2.9	32	32	Max Concentration	NA	48,000		6.7E-04
1,4-Dichlorobenzene	2/12	ppbv	2.8	5.8	5.8	Max Concentration	58	190,000	9.9E-08	3.1E-05
Acetone	2/12	ppbv	100	140	140	Max Concentration	NA	1.9E+06		7.2E-05
Benzene	5/12	ppbv	2	7	7	Max Concentration	170	14,000	4.2E-08	5.0E-04
Chloroform	1/12	ppbv	2.9	2.9	2.9	Max Concentration	36	89,000	8.0E-08	3.3E-05
Chlorobenzene	5/12	ppbv	2.3	27	27	Max Concentration	NA	320,000		8.4E-05
Ethylbenzene	2/12	ppbv	2.2	2.2	2.2	Max Concentration	360	330,000	6.1E-09	6.7E-06
m,p-Xylene	3/12	ppbv	2.6	11	11	Max Concentration	NA	33,000		3.3E-04
Methylene Chloride	2/12	ppbv	2	2.5	2.5	Max Concentration	2,500	170,000	1.0E-09	1.5E-05
o-Xylene	2/12	ppbv	3.1	3.5	3.5	Max Concentration	NA	33,000		1.1E-04
TCE	2/12	ppbv	4.8	5.3	5.3	Max Concentration	380	160,000	1.4E-08	3.3E-05
Tetrachloroethylene	3/12	ppbv	2.2	12	12	Max Concentration	98	7,300	1.2E-07	1.6E-03
Toluene	11/12	ppbv	2.4	59	59	Max Concentration	NA	1.9E+06		3.0E-05
Total									**4.E-07**	**6.E-03**

* Maximum concentration was used in risk ratio calculations.

NA = not available – no PCG has been established for this compound

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SECTION A5

SA 035

A5.1 Site Overview and Features

SA 035 is located in IC 25 in northern OU A and includes Building 20 and the surrounding parking lot. It is located in the East McClellan District. The site covers approximately 20,000 square feet, or about one-half acre, including about 12,000 square feet covered by Building 20. Within IC 25, SA 035 is surrounded by SA 038 to the southeast, SA 049 to the west, and the northern section of SA 050 to the southwest. The site is adjacent to Building 21 to the east, which is not an IRP site, and Peacekeeper Way to the north.

From 1936 to 1960, Building 20 was a quartermaster's warehouse. After 1966, it was a telecommunications coordination center. A solvent spill was reported to have occurred in 1989, but no details of the spill, quantities released, or location were documented (Jacobs, 2002). SVOCs, fuels, oils, and solvents were identified as materials used or handled at the site. In 1942, a 2,500-gallon diesel UST was installed just west of the building to supply fuel to a back-up generator. Tank leak tests performed in 1986 and 1988 showed that no leaks were present. In 1992, the UST and associated contaminated soil were removed. Confirmation samples were collected from the tank excavation. No contamination was detected in the confirmation samples above detection limits.

A5.2 Source of Contamination

The source of contamination is not known, and there are no documented details of the solvent spill that occurred. The primary contaminants for this ROD are metals and SVOCs, although VOCs were also detected.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Jacobs. 2001. *Operable Unit A Remedial Investigation Characterization Summaries*. Final. September.

  Text: Vol. 1, IC 25, pp. 1-28

- Jacobs. 2002. *Operable Unit A Remedial Investigation Characterization Summaries Addendum*. Final. March.

  Text: Vol. 1, SA35, pp. 1-18
  Hits Table: Vol. 1, SA35, Attachment 1, pp. 1-8
  All Data: Vol. 2, Appendix 1, SA35, pp. 7-12, 23-35
  Human Health Risk Assessment Data: Vol. 3, Appendix 3, Section 1.3.1 pp. 1-9, Tables 1.3.1.10 to 1.3.1.16

- CH2M HILL. 2003. *LRA Initial Parcel Feasibility Study #1*. August.

  Risk Assessment (for SVOCs only): Vol. 2, Appendix G, pp. G2-11 – G2-16
  Data Gaps Investigation Results, Vol. 2, Appendix E, pp. E2-6 – E2-8
  Data Summary and ESF excerpts, Vol. 1, Appendix H, Section 6, pp. H6-1 – H6-7

- AFRPA. 2004. *LRA Initial Parcel Record of Decision #1*. June.

- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study #2*. Final. May. Vol. 2, Appendix D, pp. D6-1 – D6-4.

A5.3 Sampling Strategy and Type of Contamination

During the UST removal conducted in 1992, confirmation soil samples were collected and analyzed for petroleum-related constituents. No contamination was detected. Soil gas and groundwater samples were collected around the exterior of Building 20 and analyzed for VOCs during the Phase 2 RI and Data Gap investigation conducted from 1996 to 1999. No samples were collected from beneath the building. VOCs, including halogenated VOCs, were detected. As part of the Site Closure Data Gaps Investigation performed from 2000 to 2001, soil samples were collected and analyzed for metals and SVOCs (OU A RICS Addendum, 2002). Bis(2-chloroethyl)ether (bis2CEE), in particular, was detected in the same sample as elevated concentrations of arsenic. Soil samples were also collected and analyzed for SVOCs during the Initial Parcel FS Data Gap Investigation conducted in 2002. Bis2CEE was not detected. Further characterization and limited excavation at the location of the bis2CEE detection and elevated arsenic concentration were performed in December 2003 by AFRPA.

A5.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at SA 035 prior to the 2003 excavation. SVOCs, metals, and VOCs were the primary contaminants. However, several phases of RIs concluded that significant sources of contamination are not present at the site. Figure A-5 identifies the site location and significant site features.

A5.4.1 Metals

During the RI, three metals were identified at concentrations greater than the combined background values (arsenic, barium, and cadmium). The maximum arsenic detection of 12.4 mg/kg was detected in soil boring SA35SB001 at 1 foot. However, a sample taken in the same boring at 3 feet bgs had an arsenic concentration of 3.2 mg/kg, well below the combined background concentration. Barium was detected at a concentration of 374 mg/kg in soil boring SA35SB002 at 4 feet. Although barium exceeded the combined background concentration of 352 mg/kg, it did not exceed screening levels for protection of human health and the environment. Cadmium was detected at concentrations of 2.2 mg/kg and 2.3 mg/kg in SA35SB003 at 0.5 and 2 feet bgs, respectively; however, the reported concentrations were less than the screening levels for protection of human health and the environment. Boring SA35SB003 is located west of Building 20, adjacent to the former UST, and approximately 100 feet south of the nearest boring, SA35SB001, as shown on Figure A-5. Cadmium was not considered a significant contaminant at the site.

Subsequent to completing the Initial Parcel FS #1 and at the request of the state, the Air Force performed a limited excavation of soil during additional characterization of the elevated arsenic detection at SA35SB001. This work was performed during December 2003 and is documented in an addendum to the Initial Parcel FS #1. Approximately 1.2 cubic yards of soil were removed at the location of the boring (SA35SB001). After the excavation, soil samples were collected and analyzed for arsenic using Method SW7060 (and SVOCs as discussed in the following subsection). A composite sample was collected from the four sidewalls at 1 foot bgs, and a discrete sample and field duplicate were collected from the center of the excavation floor. The arsenic concentration was 4.6 mg/kg in the composite sidewall sample and 3.5 mg/kg in the field duplicate sample. Both were less than the "combined" background concentration for arsenic (4.9 mg/kg). The only concentration that exceeded the "combined" background concentration was detected in the primary excavation floor sample at a concentration of 7.3 mg/kg . These recent data suggest that arsenic concentrations at the site are similar to or only slightly greater than background.

A5.4.2 SVOCs

In SA35SB001 (0.5 foot bgs), SVOCs were detected, including bis2CEE at 0.462 mg/kg, DEPH at 0.145 mg/kg, and benzoic acid at 0.228 mg/kg. The location of this boring is shown on Figure A-5; it is located approximately 10 feet north of the northwest corner of Building 20. The bis2CEE detection exceeded the screening level for the protection of human health. However, this area was excavated in late 2003 and the contamination is no longer present. No SVOCs were detected in a sample collected at 2 feet bgs in this boring.

In SA35SB003, DEPH was reported in surface and 3.5 foot bgs samples at concentrations of 0.167 mg/kg and 0.196 g/kg, respectively. Both of these results were reported as trace and estimated concentrations. SA35SB003 was located adjacent to the former UST.

Because the bis2CEE detection exceeded its preliminary remediation goal during the site closure data gap sampling effort, it was identified as a data gap and was addressed in the Initial Parcel Data Gaps Investigation. A source for the bis2CEE is not known at this site. Four samples were collected at three locations in a triangular pattern approximately 15 feet away from the previous boring (SA35SB001). The samples were collected between 1 and 2 feet bgs. Bis2CEE was not detected in any of the samples; however, bis(2-ethylhexyl)phthalate was identified at a J-flagged concentration of 0.0657 mg/kg. This detection is likely the result of laboratory contamination and not a site contaminant. Although the extent of bis2CEE was limited, it was identified as a COC at the site because the previously reported concentration significantly exceeds the cleanup goal for protection of human health.

As stated above, the Air Force performed a limited soil excavation during additional characterization of the bis2CEE detection at SA35SB001. No SVOCs were detected in the three soil samples collected from the excavation sidewall and floor. In addition, no SVOCs were detected in the sample of excavated soil prior to its disposal.

A5.4.3 VOCs

In 1996, ten soil gas samples were collected from two borings (SA35HP001 and SA35HP002) at depths between 21 and 101 feet. One of two borings (SA35HP001) is located over 3,000 feet northwest of the site; therefore, soil gas impacts in this boring are not directly

related to SA 035. However, boring SA35HP002 is located on the site where several VOCs were detected at a depth of 81 feet bgs. Trichloroethylene (1,300 ppbv) and propene (1,800 ppbv) were the highest detected VOCs at this depth, and are most likely attributed to contaminant off-gassing from groundwater or smear-zone. Because these compounds were detected at a depth of 81 feet, the concentrations are not directly relevant to the evaluation of human health risks at the surface (CH2M HILL, 2005).

In 1999, three SSG samples were collected from three borings (SA35PR001, SA35PR002, and SA35PR003) located west of the Building 20. Samples were collected at depths ranging from 6.3 to 7 feet bgs. Only one VOC detection was reported, acetone was identified at a J-flagged concentration of 750 ppbv from SA35PR001. No analytes were detected at the other two locations. This acetone detection is below the unrestricted-use screening level.

VOCs were also detected in groundwater. Carbon tetrachloride was detected up to 19 µg/L, and TCE was detected up to 15 µg/L. TCE and carbon tetrachloride may be from an upgradient source (Jacobs, 2001).

A5.5 Contamination Exposure and Migration

Non-VOC contamination at the site presented a potential threat to human health, surface water, and groundwater. However, the contamination was removed from the site during the 2003 remedial action.

A5.6 Current and Potential Future Site and Resource Uses

The site is occupied at this time by a lease tenant (Surewest Communications). In the future, SA 035 will likely continue to be used for commercial/industrial purposes.

A5.7 Human Health Risk Assessment

The risk assessment as documented in Appendix A of the Initial Parcel ROD #1 was recalculated to account for the limited excavation conducted by the Air Force in 2003. Detections of arsenic reported above screening levels in boring SA35SB001 during the RI were removed. Both residential and occupational exposure scenarios were evaluated for SA 035. The risk results for these scenarios are summarized below and in the risk summary tables found in the Attachment at the end of this site summary.

A5.7.1 Risk Characterization

Subsequent to the limited excavation, the potential cancer risks for SA 035 were as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 4×10^{-5}
- Future adult resident (0-to-10-foot-bgs depth interval): 6×10^{-5}
- Future adult resident (0-to-2-foot-bgs depth interval) and groundwater: 7×10^{-5}
- Future adult resident (0-to-10-foot-bgs depth interval) and groundwater: 9×10^{-5}
- Outdoor Occupational Worker: 1×10^{-6}
- Future Construction Worker: 3×10^{-7}

The risk estimates for the residential scenarios are within EPA's risk management range. Although the maximum arsenic concentration was removed during the limited excavation, the primary contributor to the potential cancer risk is the homegrown produce pathway for arsenic. The risk estimates for the worker scenarios, however, are within or below EPA's risk management range. In addition, since Bis2CEE was removed through limited soil excavation, there are no carcinogenic COCs for the indoor air pathway and consequently, no risk calculations are presented for the indoor occupational scenario.

Subsequent to the limited excavation, the potential noncancer risks for soil were as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): < 1
- Future adult resident (0-to-10-foot-bgs depth interval): < 1
- Future child resident (0-to-2-foot-bgs depth interval): < 1
- Future child resident (0-to-10-foot-bgs depth interval): < 1
- Outdoor occupational worker: < 1
- Indoor occupational worker: < 1
- Future construction worker: < 1

The main contributors to the hazard indexes for the residential scenarios are VOCs in groundwater and arsenic in soil (homegrown produce pathway). For the residential and worker scenarios (excluding groundwater), the hazard indexes are less than 1, indicating that the potential for adverse noncancer health effects for those receptors are unlikely.

Based on the risk assessment, the potential cancer risk from groundwater exposure for future adult residents is 4×10^{-5}. The main contributors to the potential cancer risk are carbon tetrachloride and TCE. For groundwater, the noncancer hazard index for the future adult resident is 2, and the hazard index for the future child resident is 0.6. The main contributors to the hazard indexes are carbon tetrachloride and TCE.

A5.7.2 Uncertainties

There are uncertainties associated with the risk estimates for SA 035. These are listed briefly below with additional discussion provided in an attachment at the end of this site summary:

- Future re-use plans for this site are indefinite, but do not include residential use.
- The partition coefficients used to estimate potential risks from the homegrown produce pathway are uncertain.

A5.7.3 Basis for No Action

The risk estimates for SA 035 are less than a hazard index of 1 and are within EPA's acceptable risk range. No further action is required for soils at this site.

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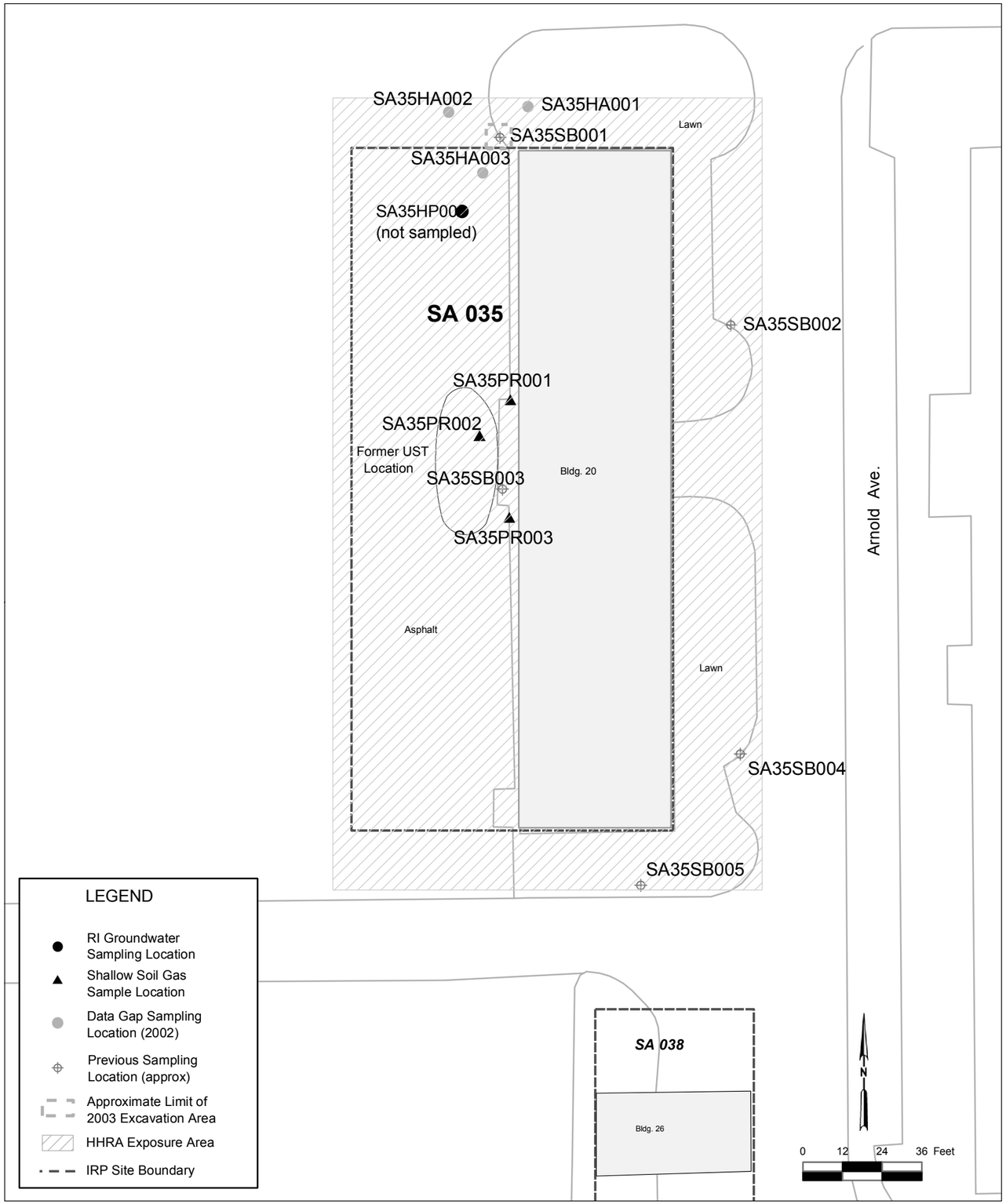


Soil Boring	Depth (feet bgs)	Arsenic (mg/kg)	bis(2-chloroethyl) ether (mg/kg)
SA35HA001	1.25	NA	ND
SA35HA001	2.25	NA	ND
SA35HA002	1.25	NA	ND
SA35HA003	3.75	NA	ND
SA35SB001*	1	**12.4**	**0.462**
SA35SB001	3	<BKGD	ND
SA35SB002	1.5	<BKGD	ND
SA35SB002	4	<BKGD	ND
SA35SB003	0.75	<BKGD	ND
SA35SB003	2.25	<BKGD	ND
SA35SB004	1.5	<BKGD	ND
SA35SB004	4	<BKGD	ND
SA35SB005	1.5	<BKGD	ND
SA35SB005	3.5	<BKGD	ND

Bold Text- exceeds a screening level.

* Limited Soil Excavation was performed around SA35SB001 in late 2003. No SVOCs were detected in the post-excavation confirmation sampling. The high hit of arsenic was also removed during the excavation.

NA = Not Analyzed
ND = Not Detected

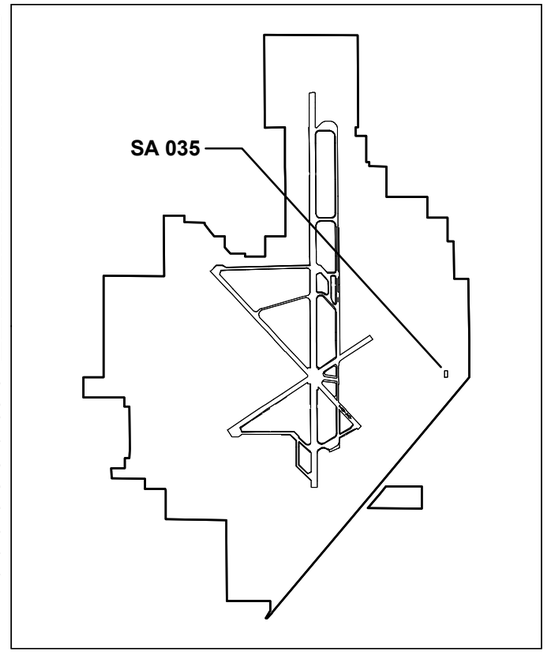
Boring ID	Analyte	Depth (ft bgs)	Concentration (ppbv)
VOCs (In shallow soil gas from 0-15 feet)			
SA35PR001	Acetone	6.3	750 J
SA35PR002	--	6.8	ND
SA35PR003	--	7	ND

Note: None of the results shown exceeds the Unrestricted Use Screening Level established for the respective analyte (Table C-2).

Dataflags:

J = Estimated concentration

KEY MAP



Note: SA35HP001 is located over 3,000 ft northwest of the site, and is not shown on this figure.

FIGURE A-5
SA 035 VOC AND NON-VOC CONTAMINANTS MAP

LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

CH2MHILL

Attachment A5
SA 035 Human Health Risk Assessment

ATTACHMENT A5

SA 035 Human Health Risk Assessment

The baseline human health risk assessment estimates what risks the site would pose if no action were taken. This section of the ROD summarizes the results of the updated baseline risk assessment for SA 035. This risk assessment was originally presented in the OU A RICS Addendum (Jacobs, 2002). This update uses the same risk assessment methodology as OU A for all exposure pathways except those involving indoor air. For indoor air pathways (i.e., inhalation exposure route for VOCs for the residential and indoor occupational scenarios), the SSG screening levels that are presented in Appendix C of this ROD and the SSG EPCs (see Table A5-1a) were used as the basis for inhalation cancer risk and noncancer hazard calculations. In addition, for chemicals that have had toxicity value updates since the OU A RICS Addendum was published, the most recent toxicity criteria have been used.

Identification of Chemicals of Concern

Potential COCs for SA 035 include VOCs, metals, and SVOCs benzoic acid and bis(2-ethylhexyl)phthalate. Tables A5-1a through A5-1d present the soil gas, air, groundwater, and soil data summaries, respectively, for the potential COCs. The tables include the range of concentrations for potential COCs, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the EPCs, and how the EPCs were derived for each of the soil depth intervals. In general, the lower value of the maximum concentration or the upper 95th percent confidence limit on the mean was used as the EPC for potential COCs detected in more than one sample. SVOC data from the RI and 2002 data gaps investigation were combined to revise the EPCs shown in Table A5-1d as compared to those presented in the OU A RICS Addendum. Bis(2-Chloroethyl)ether (Bis2CEE) was removed from the site through limited soil excavation in late 2003. The maximum arsenic concentration also was removed; however, the recent changes to the toxicity factor caused arsenic to remain a primary contributor to the cancer risk.

Exposure Assessment

A conceptual model was developed that describes the potential exposure pathways associated with soil and groundwater at SA 035 (see Figure 2-3 in Section 2.4 of the ROD). Although SA 035 likely will be used for commercial/industrial purposes in the future, several exposure scenarios were evaluated in the human health risk assessment to provide information for future risk-management decisions.

The following exposure scenarios were quantitatively evaluated in the human health risk assessment:

- Exposure of hypothetical future residents (adults and children) to soil (0 to 2 feet bgs) and groundwater

- Exposure of hypothetical future residents (adults and children) to soil (0 to 10 feet bgs) and groundwater
- Exposure of outdoor workers to soil (0 to 2 feet bgs)
- Exposure of indoor workers to VOCs in indoor air
- Exposure of construction workers to soil (0 to 15 feet bgs)

The exposure routes that were considered in the risk assessment for residents and workers potentially exposed to soil include incidental soil ingestion, inhalation of VOCs (indoor air for residents and ambient air for outdoor workers and construction workers) and resuspended particulates, and dermal contact with soil. For the residential scenarios, the ingestion of homegrown produce also was included. For groundwater, the ingestion, inhalation of VOCs, and dermal contact exposure routes were evaluated. For the indoor worker, potential risk associated with inhalation of VOCs in indoor air was evaluated.

Toxicity Assessment

The toxicity data that were used in the human health risk assessment are summarized in Tables A5-2 and A5-3. Health effects are divided into two categories: cancer and noncancer effects.

Table A5-2 presents the slope factors used to estimate potential excess lifetime cancer risks associated with exposure to groundwater, air, and soil at SA 035. As shown in Table A3-2, the oral slope factor was used to estimate potential risks associated with dermal exposure.

Table A5-3 presents the RfDs used to evaluate the potential for noncancer health effects. The oral RfD was used to estimate potential health effects associated with dermal exposure. In addition, inhalation RfDs are not available for benzoic acid and bis(2-ethylhexyl)phthalate, so the oral RfDs were used to evaluate potential health effects from the inhalation exposure route.

The hierarchy of sources for toxicity values follows EPA and Air Force guidance (EPA, 2003; USAF, 2006); the sources are listed below in order of preference:

1. EPA IRIS – online database (EPA, 2007)
2. EPA's Provisional Peer Reviewed Toxicity Values (as cited in the 2004 EPA Region 9 PRG table [EPA, 2004])
3. Cal-EPA cancer potency factors and RELs online database (Cal-EPA, 2007)
4. Other EPA sources (including HEAST, NCEA provisional toxicity values, and route-extrapolated toxicity values as cited in the 2004 EPA Region 9 PRG table [EPA, 2004])

Toxicity criteria for several of the contaminants have changed since the human health risk assessment was conducted. The risk estimates have been updated with the most current values. In addition, Bis2CEE was removed from the site through limited soil excavation in late 2003 and therefore, Bis2CEE is not included in the cancer risk and noncancer hazard calculations.

The following cancer toxicity slope factors were updated:

- Chloroform – Inhalation: 0.080 to 0.081 $(mg/kg\text{-}day)^{-1}$
- PCE – Oral: 0.052 to 0.54 $(mg/kg\text{-}day)^{-1}$
- TCE – Oral: 0.015 to 0.013 $(mg/kg\text{-}day)^{-1}$; Inhalation: 0.01 to 0.007 $(mg/kg\text{-}day)^{-1}$
- Carbon tetrachloride – Oral: 0.15 to 0.13 $(mg/kg\text{-}day)^{-1}$. Inhalation: 0.15 to 0.053 $(mg/kg\text{-}day)^{-1}$
- Bis(2-ethylhexyl)phthalate – Inhalation: 0.014 to 0.0084 $(mg/kg\text{-}day)^{-1}$

The following non-cancer toxicity RfDs were updated:

- Arsenic – Inhalation: $3.0x10^{-4}$ to $8.6x10^{-6}$ mg/kg-day
- Barium – Oral: 0.07 to 0.2 mg/kg-day
- Copper – Oral: 0.037 to 0.040 mg/kg-day. Inhalation: 0.037 to 0.040 mg/kg-day
- Acetone – Oral: 0.1 to 0.9 mg/kg-day. Inhalation: 0.1 to 0.9 mg/kg-day
- Carbon tetrachloride – Inhalation: $5.7x10^{-4}$ to 0.011 mg/kg-day
- Chloroform – Inhalation: 0.01 to 0.086 mg/kg-day
- PCE – Inhalation: 0.1 to 0.01 mg/kg-day
- TCE – Oral: 0.006 to 0.0003 mg/kg-day. Inhalation: 0.006 to 0.17 mg/kg-day
- Xylenes – Oral: 2.0 to 0.2 mg/kg-day. Inhalation: 2.0 to 0.029 mg/kg-day

Risk Characterization

Cal-EPA and EPA toxicity values described above were used in the human health risk assessment along with the exposure information to estimate the potential risks from contacting potential COCs in soil, air, or groundwater at SA 035. For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$Risk = CDI \times SF \quad (1)$$

Where:

Risk = a unitless probability (e.g., 1×10^{-6}) of an individual developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in a million chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer that individuals face from other causes such as smoking or exposure to too much sun. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with an RfD derived for a similar exposure period. An RfD represents a level to which an individual may be exposed that is not expected to cause any deleterious effect. The ratio of the receptor average daily exposure to the route-specific RfD is called a hazard quotient (HQ). An HQ less than 1 indicates that the receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index is generated by adding the HQs over the exposure routes. A hazard index less than 1 indicates that, based on the sum of all HQs from different exposure routes, toxic noncarcinogenic effects are unlikely. A hazard index greater than 1 indicates that site-related exposure may present a risk to human health.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD} \quad (2)$$

Where:

CDI = chronic daily intake (mg/kg-day)
RfD = reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

Table A5-4 presents the potential cancer risk estimates for the various exposure scenarios and exposure routes at SA 035. Both residential and occupational exposure scenarios were evaluated for SA 035. The risk results for these scenarios are summarized below and presented in the risk summary tables at the end of this section.

Subsequent to the limited excavation, the potential cancer risks for soil exposure for SA 035 were as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 4×10^{-5}
- Future adult resident (0-to-10-foot-bgs depth interval): 6×10^{-5}
- Future adult resident (0-to-2-foot-bgs depth interval) and groundwater: 7×10^{-5}
- Future adult resident (0-to-10-foot-bgs depth interval) and groundwater: 9×10^{-5}
- Outdoor occupational worker: 1×10^{-6}
- Future construction worker: 3×10^{-7}

The risk estimates for the residential scenarios are within EPA's risk management range. Although the maximum arsenic concentration was removed during the limited excavation, the primary contributor to the potential cancer risk is the homegrown produce pathway for arsenic. The risk estimates for the worker scenarios, however, are within or below EPA's risk management range. In addition, since Bis2CEE was removed through limited soil excavation, there are no carcinogenic COCs for the indoor air pathway and consequently, no risk calculations are presented for the indoor occupational scenario.

Tables A5-5 presents the noncancer hazard indexes for the various exposure scenarios and exposure routes at SA 035. Subsequent to the limited excavation, the potential noncancer risks for soil were as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): < 1
- Future adult resident (0-to-10-foot-bgs depth interval): < 1
- Future child resident (0-to-2-foot-bgs depth interval): < 1
- Future child resident (0-to-10-foot-bgs depth interval): < 1
- Outdoor occupational worker: < 1
- Indoor occupational worker: < 1
- Future construction worker: < 1

The main contributors to the hazard indexes for the residential scenarios are VOCs in groundwater and arsenic in soil (homegrown produce pathway). For the residential and worker scenarios (excluding groundwater), the hazard indexes are less than 1, indicating that the potential for adverse noncancer health effects for those receptors are unlikely.

Based on the risk assessment, the potential cancer risk from groundwater exposure for future adult residents is 4×10^{-5}. The main contributors to the potential cancer risk are carbon tetrachloride and TCE. For groundwater, the noncancer hazard index for the future adult resident is 2, and the hazard index for the future child resident is 0.6. The main contributors to the hazard indexes are carbon tetrachloride and TCE.

Uncertainties

Following are the uncertainties associated with the risk estimates for SA 035:

Current re-use plans for this site are indefinite, but do not include residential use. Hence, the use of the residential scenario for the site should be considered hypothetical at this time.

Although arsenic was retained as a potential COC for soil, the levels of arsenic at SA 035 are low and do not appear to be representative of site-related contamination. The maximum detected concentration in surface soil (2.8 mg/kg) does not exceed the McClellan background value for surface soils (5.8 mg/kg). The maximum detected concentration of arsenic in the 0-to-10-foot-bgs and 0-to-15-foot-bgs depth intervals (7.3 mg/kg) is greater than the McClellan background values for subsurface soil (6.5 mg/kg for silts and clays and 3.7 mg/kg for sands), but is most likely due to variations in naturally occurring arsenic and not indicative of site-related contamination.

Cadmium was detected at concentrations greater than the combined background values at SA 035 but was eliminated as a potential COC based on the statistical comparison. There is some uncertainty associated with the elimination of metals as COCs based on the background comparison. However, site-specific background levels of cadmium at the former McClellan Air Force Base are less than risk-based screening levels, so potential cancer risks associated with background levels of cadmium are less than 1×10^{-6} and the HQ is less than 1 for background conditions.

The partition coefficients used to estimate potential risks from the homegrown produce pathway are based on modeled data and not empirical data of plant uptake of potential COCs. The homegrown produce pathway is the major contributor to the overall risk

estimates for the site, and the uncertainties from this pathway are reflected in the overall risk estimates, which may be overestimated or underestimated because of the uncertainties with the plant partition coefficients.

For several compounds, Cal-EPA presents more conservative toxicity values than the EPA values used in the risk calculations presented in Tables A5-4 and A5-5. The following chemicals have more conservative cancer slope factors and noncancer RfDs:

- Arsenic – Oral slope factor: 9.5 $(mg/kg\text{-}day)^{-1}$
- Beryllium – Inhalation RfD: 2.0E-06 (mg/kg-day)
- Carbon tetrachloride – Oral slope factor: 1.5E-01 $(mg/kg\text{-}day)^{-1}$. Inhalation slope factor: 1.5E-01 $(mg/kg\text{-}day)^{-1}$
- Chloroform – Inhalation RfD: 1.4E-02 (mg/kg-day)

Use of these toxicity values would yield more conservative estimates. Using the Cal-EPA oral slope factor for arsenic, for the residential scenarios for soil exposure, the cancer risk estimates (2E-04 for the 0-to-2-foot-bgs depth interval and 3E-04 for the 0-to-10-foot-bgs depth interval) exceed EPA's risk management range due to exposure to arsenic through the homegrown produce pathway. The groundwater risks using more conservative Cal-EPA toxicity values (6E-05) are higher primarily due to the Cal-EPA slope factors for carbon tetrachloride. The hazard indexes for SA 035 are not significantly affected by the more conservative Cal-EPA toxicity values (i.e., for the construction worker, the HI is 0.4 with the EPA RfD for beryllium and 0.5 with the Cal-EPA RfD).

References

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Text: Vol. 1, SA35, pp. 1-18
Hits Table: Vol. 1, SA35, Attachment 1, pp. 1-8
All Data: Vol. 2, Appendix 1, SA35, pp. 7-12, 23-35
Human Health Risk Assessment Data: Vol. 3, Appendix 3, Section 1.3.1 pp. 1-9, Tables 1.3.1.10 to 1.3.1.16

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United States Environmental Protection Agency (EPA). 2003. "Human Health Toxicity Values in Superfund Risk Assessments." OSWER Directive 9285.7-53. December 5.

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Table A5-1a
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
SA 035

Scenario Timeframe:	**Future**							
Medium	**Soil Gas**							
Exposure Medium	**Soil Gas**							
Exposure Point	**Chemical of Concern**	**Concentration Detected (ppbv) Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration (ppbv)**	**Statistical Measure[a]**	**Exposure Point Concentration[b] (ppbv)**	**Exposure Point Concentration in Soil[c] (mg/kg)**
SA 035 - Soil Gas	Acetone	7.5E+02	7.5E+02	1/3	1.79E+04	Max Detect	7.5E+02	4.4E-01

[a] The statistical measure indicates the basis for the exposure point concentration.

[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.

[c] Exposure point concentrations for these VOCs in soil are estimated from measured shallow soil gas concentrations.

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Table A5-1b
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
SA 035

Scenario Timeframe: Future						
Medium: Air						
Exposure Medium: Air						
			Construction Worker Air Exposure		Occupational Worker Air Exposure	
Exposure Point	Chemical of Concern	Exposure Point Concentration in Soil (mg/kg)	1-Year Flux Rate (g/m^2-s)	Exposure Point Concentration Construction Worker Outdoor Air[b] (mg/m^3)	25-Year Flux Rate (g/m^2-s)	Exposure Point Concentration Occupational Outdoor Air[b] (mg/m^3)
SA 035 - VOCs in Air	Acetone[a]	4.4E-01	3.18E-20	1.2E-16	--	3.1E-07

[a] The exposure point concentration for this VOC in soil is estimated from a measured shallow soil gas concentration.
[b] Emissions from soil and resulting air concentrations were estimated from models using the exposure point concentration estimated for soil.

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Table A5-1c
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
SA 035

Scenario Timeframe:	**Future**						
Medium	**Groundwater**						
Exposure Medium	**Groundwater**						
Exposure Point	**Chemical of Concern**	**Concentration Detected (µg/L) Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration (µg/L)**	**Statistical Measure[a,c]**	**Exposure Point Concentration[b] (µg/L)**
SA 035 - Groundwater On-site Direct Contact	Acetone	--	3.9E+00	1/1	--[c]	Max Detect	3.9E+00
	Carbon tetrachloride	1.7E+00	2.4E+00	2/3	3.3E+00	Max Detect	2.4E+00
	Chloroform	9.2E-01	9.2E-01	1/3	9.4E+01	Max Detect	9.2E-01
	Tetrachloroethene	3.7E-01	3.7E-01	1/3	5.1E-01	Max Detect	3.7E-01
	Trichloroethene	1.6E+00	1.3E+01	3/3	1.6E+01	Max Detect	1.3E+01
	Xylenes	2.1E+00	2.1E+00	3/3	6.4E+02	Max Detect	2.1E+00

[a] The statistical measure indicates the basis for the exposure point concentration.

[b] The exposure point concentration is the lower value of the maximum concentration or the 95 UCL concentration.

[c] Due to the limited data set, statistical analyses could not be conducted to determine the 95 UCL concentrations.

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Table A5-1d
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
SA 035

Scenario Timeframe:	**Future**
Medium	**Soil**
Exposure Medium	**Soil**

Exposure Point	Chemical of Concern	Concentration Detected (mg/kg)		Frequency of Detection	95th UCL Concentration (mg/kg)	Statistical Measure[a]	Exposure Point Concentration[b] (mg/kg)
		Min	Max				
SA 035 - Soil On-site Direct Contact (0-2 ft bgs)	Arsenic	1.1E+00	2.8E+00	4/4	--	--	2.8E+00
	Barium	1.1E+02	2.7E+02	8/8	2.0E+02	95UCL Normal	2.0E+02
	Beryllium	3.2E-01	5.5E-01	8/8	5.0E-01	95UCL Normal	5.0E-01
	Copper	1.4E+01	3.2E+01	8/8	2.5E+01	95UCL Normal	2.5E+01
	Lead	6.6E+00	5.2E+01	8/8	5.0E+01	95UCL Lognormal	5.0E+01
	Zinc	3.1E+01	6.3E+01	8/8	5.5E+01	95UCL Normal	5.5E+01
	Benzoic Acid	2.3E-01	2.3E-01	1/5	2.0E-01	95UCL Lognormal	2.0E-01
	Bis(2-ethylhexyl)phthalate	1.5E-01	1.5E-01	1/7	1.7E-01	Max Detect	1.5E-01
SA 035 - Soil On-site Direct Contact (0-10 ft bgs)	Arsenic	1.1E+00	7.3E+00	11/11	4.1E+00	95UCL Lognormal	4.1E+00
	Barium	1.1E+02	3.7E+02	11/11	2.3E+02	95UCL Lognormal	2.3E+02
	Beryllium	2.9E-01	6.3E-01	11/11	5.0E-01	95UCL Normal	5.0E-01
	Copper	1.3E+01	3.2E+01	11/11	2.3E+01	95UCL Normal	2.3E+01
	Lead	4.6E+00	5.2E+01	11/11	3.0E+01	95UCL Lognormal	3.0E+01
	Zinc	2.7E+01	6.3E+01	11/11	5.0E+01	95UCL Normal	5.0E+01
	Benzoic Acid	2.3E-01	2.3E-01	1/10	1.3E-01	95UCL Lognormal	1.3E-01
	Bis(2-ethylhexyl)phthalate	6.6E-02	2.0E-01	3/14	1.1E-01	95UCL Lognormal	1.1E-01
SA 035 - Soil On-site Direct Contact (0-15 ft bgs)	Arsenic	1.1E+00	7.3E+00	11/11	4.1E+00	95UCL Lognormal	4.1E+00
	Barium	1.1E+02	3.7E+02	11/11	2.3E+02	95UCL Lognormal	2.3E+02
	Beryllium	2.9E-01	6.3E-01	11/11	5.0E-01	95UCL Normal	5.0E-01
	Copper	1.3E+01	3.2E+01	11/11	2.3E+01	95UCL Normal	2.3E+01
	Lead	4.6E+00	5.2E+01	11/11	3.0E+01	95UCL Lognormal	3.0E+01
	Zinc	2.7E+01	6.3E+01	11/11	5.0E+01	95UCL Normal	5.0E+01
	Benzoic Acid	2.3E-01	2.3E-01	1/10	1.3E-01	95UCL Lognormal	1.3E-01
	Bis(2-ethylhexyl)phthalate	6.6E-02	2.0E-01	3/14	1.1E-01	95UCL Lognormal	1.1E-01

[a] The statistical measure indicates the basis for the exposure point concentration.

[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.

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Table A5-2
Cancer Toxicity Data Summary
SA 035

Pathway: Ingestion, Dermal						
Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence[a]	Source	Date
Arsenic	1.5E+00	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Beryllium				B2		
Lead				B2		
Benzoic Acid						
Bis(2-ethylhexyl)phthalate	1.4E-02	1.4E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Carbon tetrachloride	1.3E-01	1.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Chloroform	3.1E-02	3.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Tetrachloroethene	5.4E-01	5.4E-01	$(mg/kg\text{-}day)^{-1}$		Cal-EPA	2007
Trichloroethene	1.3E-02	1.3E-02	$(mg/kg\text{-}day)^{-1}$	B2/C	Cal-EPA	2007
Pathway: Inhalation						
Chemical of Concern	InhalationCancer Slope Factor		Slope Factor Units	Weight of Evidence[a]	Source	Date
Arsenic	1.5E+01		$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Beryllium	8.4E+00		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Lead				B2		
Benzoic Acid						
Bis(2-ethylhexyl)phthalate	8.4E-03		$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Carbon tetrachloride	5.3E-02		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Chloroform	8.1E-02		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Tetrachloroethene	2.1E-02		$(mg/kg\text{-}day)^{-1}$		Cal-EPA	2007
Trichloroethene	7.0E-03		$(mg/kg\text{-}day)^{-1}$	B2/C	Cal-EPA	2007

[a]Weight of Evidence Classification

A - human carcinogen
B1 and B2 - probable human carcinogen
C - possible human carcinogen
D - not classifiable as a human carcinogen
E - evidence of noncarcinogenicity for humans
Reference = USEPA 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December.

Cal-EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System

Table A5-3
Non-Cancer Toxicity Data Summary
SA 035

Pathway: Ingestion, Dermal									
Chemical of Concern	Chronic/ subchronic	Oral RfD	Oral RfD Units	Dermal RfD	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Arsenic	Chronic	3.0E-04	mg/kg-day	3.0E-04	mg/kg-day	Vascular	3	IRIS	2007
Barium	Chronic	2.0E-01	mg/kg-day	2.0E-01	mg/kg-day	Kidney	3	IRIS	2007
Beryllium	Chronic	2.0E-03	mg/kg-day	2.0E-03	mg/kg-day	Small intestine; Lungs	300	IRIS	2007
Copper	Chronic	4.0E-02	mg/kg-day	4.0E-02	mg/kg-day	Gastro-intestinal system		HEAST	1997
Lead									
Zinc	Chronic	3.0E-01	mg/kg-day	3.0E-01	mg/kg-day	Blood	3	IRIS	2007
Benzoic Acid	Chronic	4.0E+00	mg/kg-day	4.0E+00	mg/kg-day		1	IRIS	2007
Bis(2-ethylhexyl)phthalate	Chronic	2.0E-02	mg/kg-day	2.0E-02	mg/kg-day	Liver	1000	IRIS	2007
Acetone	Chronic	9.0E-01	mg/kg-day	9.0E-01	mg/kg-day	Kidney	1000	IRIS	2007
Carbon tetrachloride	Chronic	7.0E-04	mg/kg-day	7.0E-04	mg/kg-day	Liver		IRIS	2007
Chloroform	Chronic	1.0E-02	mg/kg-day	1.0E-02	mg/kg-day	Liver		IRIS	2007
Tetrachloroethene	Chronic	1.0E-02	mg/kg-day	1.0E-02	mg/kg-day	Liver	300	IRIS	2007
Trichloroethene	Chronic	3.0E-04	mg/kg-day	3.0E-04	mg/kg-day			NCEA	2004
Xylenes	Chronic	2.0E-01	mg/kg-day	2.0E-01	mg/kg-day	Decreased body weight	1000	IRIS	2007

Pathway: Inhalation								
Chemical of Concern	Chronic/sub chronic	Inhalation RfD	Inhalation RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Arsenic	Chronic	8.57E-06	mg/kg-day	Vascular	3	Cal-EPA	2007
Barium	Chronic	1.40E-04	mg/kg-day			HEAST	1997
Beryllium	Chronic	5.71E-06	mg/kg-day	Small intestine; Lungs	300	IRIS	2007
Copper	Chronic	4.00E-02	mg/kg-day	Gastro-intestinal system		HEAST	1997
Lead							
Zinc	Chronic	3.00E-01	mg/kg-day	Blood	3	IRIS	2007
Benzoic Acid	Chronic	4.00E+00	mg/kg-day		1	ROUTE	
Bis(2-ethylhexyl)phthalate	Chronic	2.00E-02	mg/kg-day	Liver	1000	ROUTE	
Acetone	Chronic	9.00E-01	mg/kg-day	Kidney	1000	ROUTE	
Carbon tetrachloride	Chronic	1.14E-02	mg/kg-day	Liver		Cal-EPA	2007
Chloroform	Chronic	8.57E-02	mg/kg-day	Liver		Cal-EPA	2007
Tetrachloroethene	Chronic	1.00E-02	mg/kg-day	Liver	300	Cal-EPA	2007
Trichloroethene	Chronic	1.71E-01	mg/kg-day			Cal-EPA	2007
Xylenes	Chronic	2.90E-02	mg/kg-day	Decreased body weight	1000	IRIS	2007

Notes:

Toxicity values used were accurate as of the date of report submittal and are not necessarily the most current values.
Blank cells indicate information is not available or not applicable.

Cal-EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
mg/kg-day = milligrams per kilogram per day
NCEA = National Center for Environmental Assessment
RfD = reference dose
ROUTE = route-to-route extrapolated value (e.g., oral RfD used for inhalation RfD)

Table A5-4
Risk Characterization Summary - Carcinogens
SA 035

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Carcinogenic Risk				
						Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 035 - Soil On-site Direct Contact (0-2 ft bgs)	Arsenic	2.8E+00	mg/kg	6.6E-06	6.9E-09	6.3E-07	3.0E-05	3.7E-05
			Beryllium	5.0E-01	mg/kg	--	7.0E-10	--	--	7.0E-10
			Lead	5.0E+01	mg/kg	--	--	--	--	--
			Benzoic Acid	2.0E-01	mg/kg	--	--	--	--	--
			Bis(2-ethylhexyl)phthalate	1.5E-01	mg/kg	3.2E-09	1.1E-14	1.0E-09	7.6E-09	1.2E-08
			Carbon tetrachloride	--	--	--	--	--	--	--
			Chloroform	--	--	--	--	--	--	--
			Tetrachloroethene	--	--	--	--	--	--	--
			Trichloroethene	--	--	--	--	--	--	--
			TOTAL			**6.6E-06**	**7.6E-09**	**6.3E-07**	**3.0E-05**	**4.E-05**
		SA 035 - Soil On-site Direct Contact (0-10 ft bgs)	Arsenic	4.1E+00	mg/kg	9.6E-06	1.0E-08	9.3E-07	4.5E-05	5.5E-05
			Beryllium	5.0E-01	mg/kg	--	7.2E-10	--	--	7.2E-10
			Lead	3.0E+01	mg/kg	--	--	--	--	--
			Benzoic Acid	1.3E-01	mg/kg	--	--	--	--	--
			Bis(2-ethylhexyl)phthalate	1.1E-01	mg/kg	2.5E-09	9.0E-15	8.0E-10	5.9E-09	9.2E-09
			Carbon tetrachloride	--	--	--	--	--	--	--
			Chloroform	--	--	--	--	--	--	--
			Tetrachloroethene	--	--	--	--	--	--	--
			Trichloroethene	--	--	--	--	--	--	--
			TOTAL			**9.6E-06**	**1.1E-08**	**9.3E-07**	**4.5E-05**	**6.E-05**
Groundwater	Groundwater	SA 035 - Groundwater On-site Direct Contact	Arsenic	--	--	--	--	--	--	--
			Beryllium	--	--	--	--	--	--	--
			Lead	--	--	--	--	--	--	--
			Benzoic Acid	--	--	--	--	--	--	--
			Bis(2-ethylhexyl)phthalate	--	--	--	--	--	--	--
			Carbon tetrachloride	2.4E+00	µg/L	4.7E-06	9.5E-06	1.2E-06	--	1.5E-05
			Chloroform	9.2E-01	µg/L	4.2E-07	5.6E-06	3.7E-08	--	6.0E-06
			Tetrachloroethene	3.7E-01	µg/L	3.0E-06	5.8E-07	1.9E-06	--	5.5E-06
			Trichloroethene	1.3E+01	µg/L	2.5E-06	6.8E-06	4.2E-07	--	9.7E-06
			TOTAL			**1.1E-05**	**2.2E-05**	**3.5E-06**	**--**	**4.E-05**

TOTAL Soil (0-2 ft bgs) + Groundwater Risks = 7.E-05
TOTAL Soil (0-10 ft bgs) + Groundwater Risks = 9.E-05

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Table A5-4
Risk Characterization Summary - Carcinogens
SA 035

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Occupational**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Carcinogenic Risk				
						Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 035 - Soil On-site Direct Contact (0-2 ft bgs)	Arsenic	2.8E+00	mg/kg	7.4E-07	3.3E-89	5.1E-07	--	1.3E-06
			Beryllium	5.0E-01	mg/kg	--	3.3E-10	--	--	3.3E-10
			Lead	5.0E+01	mg/kg	--	--	--	--	--
			Benzoic Acid	2.0E-01	mg/kg	--	--	--	--	--
			Bis(2-ethylhexyl)phthalate	1.5E-01	mg/kg	3.5E-10	5.3E-15	8.1E-10	--	1.2E-09
			TOTAL			**7.5E-07**	**3.3E-10**	**5.1E-07**	**--**	**1.E-06**

Scenario Timeframe:	**Future**
Receptor Population:	**Indoor Occupational**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Carcinogenic Risk				
						Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 035 - Soil On-site Direct Contact (0-2 ft bgs)	Arsenic	--	ppbv	--	--	--	--	--
			Beryllium	--	ppbv	--	--	--	--	--
			Lead	--	ppbv	--	--	--	--	--
			Benzoic Acid	--	ppbv	--	--	--	--	--
			Bis(2-ethylhexyl)phthalate	--	ppbv	--	--	--	--	--
			TOTAL			**--**	**--**	**--**	**--**	**--**

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Carcinogenic Risk				
						Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 035 - Soil On-site Direct Contact (0-15 ft bgs)	Arsenic	2.8E+00	mg/kg	1.7E-07	7.1E-08	4.8E-08	--	2.9E-07
			Beryllium	5.0E-01	mg/kg	--	1.2E-08	--	--	1.2E-08
			Lead	5.0E+01	mg/kg	--	--	--	--	--
			Benzoic Acid	2.0E-01	mg/kg	--	--	--	--	--
			Bis(2-ethylhexyl)phthalate	1.1E-01	mg/kg	1.1E-10	1.7E-16	1.0E-10	--	2.1E-10
			TOTAL			**1.7E-07**	**8.3E-08**	**4.8E-08**	**--**	**3.E-07**

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Table A5-5
Risk Characterization Summary - Non-Carcinogens
SA 035

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 035 - Soil On-site Direct Contact (0-2 ft bgs)	Arsenic	2.8E+00	mg/kg	Vascular	1.E-02	1.E-04	2.E-03	1.E-01	1.E-01
			Barium	2.0E+02	mg/kg		1.E-03	4.E-04	5.E-05	6.E-03	7.E-03
			Beryllium	5.0E-01	mg/kg	Small intestine; Lungs	3.E-04	3.E-05	1.E-05	2.E-03	2.E-03
			Copper	2.5E+01	mg/kg	Gastro-intestinal system	9.E-04	2.E-07	4.E-05	4.E-03	5.E-03
			Lead	5.0E+01	mg/kg		--	--	--	--	--
			Zinc	5.5E+01	mg/kg	Blood	3.E-04	6.E-08	1.E-02	1.E-03	1.E-02
			Benzoic Acid	2.0E-01	mg/kg		7.E-08	9.E-13	3.E-08	5.E-05	5.E-05
			Bis(2-ethylhexyl)phthalate	1.5E-01	mg/kg	Liver	1.E-05	1.E-10	4.E-06	5.E-05	6.E-05
			Acetone	4.4E-01	mg/kg	Kidney	7.E-07	6.E-03	3.E-07	--	6.E-03
			Carbon tetrachloride	--	--	Liver	--	--	--	--	--
			Chloroform	--	--	Liver	--	--	--	--	--
			Tetrachloroethene	--	--	Liver	--	--	--	--	--
			Trichloroethene	--	--		--	--	--	--	--
			Xylenes	--	--	Decreased body weight	--	--	--	--	--
			TOTAL				**2.E-02**	**6.E-03**	**1.E-02**	**1.E-01**	**2.E-01**
		SA 035 - Soil On-site Direct Contact (0-10 ft bgs)	Arsenic	4.1E+00	mg/kg	Vascular	8.E-03	6.E-05	9.E-04	7.E-02	8.E-02
			Barium	2.3E+02	mg/kg		2.E-03	5.E-04	6.E-05	7.E-03	9.E-03
			Beryllium	5.0E-01	mg/kg	Small intestine; Lungs	4.E-04	3.E-05	1.E-05	2.E-03	2.E-03
			Copper	2.3E+01	mg/kg	Gastro-intestinal system	8.E-04	2.E-07	3.E-05	3.E-03	4.E-03
			Lead	3.0E+01	mg/kg		--	--	--	--	--
			Zinc	5.0E+01	mg/kg	Blood	2.E-04	5.E-08	9.E-06	1.E-03	1.E-03
			Benzoic Acid	1.3E-01	mg/kg		5.E-08	6.E-13	2.E-08	4.E-05	4.E-05
			Bis(2-ethylhexyl)phthalate	1.1E-01	mg/kg	Liver	8.E-06	9.E-11	3.E-06	4.E-05	5.E-05
			Acetone	4.4E-01	mg/kg	Kidney	7.E-07	6.E-03	3.E-07	--	6.E-03
			Carbon tetrachloride	--	--	Liver	--	--	--	--	--
			Chloroform	--	--	Liver	--	--	--	--	--
			Tetrachloroethene	--	--	Liver	--	--	--	--	--
			Trichloroethene	--	--		--	--	--	--	--
			Xylenes	--	--	Decreased body weight	--	--	--	--	--
			TOTAL				**1.E-02**	**6.E-03**	**1.E-03**	**8.E-02**	**1.E-01**

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Table A5-5
Risk Characterization Summary - Non-Carcinogens
SA 035

Groundwater (cont…)	Groundwater	SA 035 - Groundwater On-site Direct Contact	Arsenic	--	--	Vascular	--	--	--	--	--
			Barium	--	--		--	--	--	--	--
			Beryllium	--	--	Small intestine; Lungs	--	--	--	--	--
			Copper	--	--	Gastro-intestinal system	--	--	--	--	--
			Lead	--	--		--	--	--	--	--
			Zinc	--	--	Blood	--	--	--	--	--
			Benzoic Acid	--	--		--	--	--	--	--
			Bis(2-ethylhexyl)phthalate	--	--	Liver	--	--	--	--	--
			Acetone	3.9E+00	µg/L	Kidney	1.E-04	6.E-04	5.E-07	--	7.E-04
			Carbon tetrachloride	2.4E+00	µg/L	Liver	9.E-02	3.E-02	3.E-02	--	2.E-01
			Chloroform	9.2E-01	µg/L	Liver	3.E-03	2.E-03	2.E-04	--	4.E-03
			Tetrachloroethene	3.7E-01	µg/L	Liver	1.E-03	5.E-03	7.E-04	--	7.E-03
			Trichloroethene	1.3E+01	µg/L		1.E+00	1.E-02	2.E-01	--	1.E+00
			Xylenes	2.1E+00	µg/L	Decreased body weight	3.E-04	1.E-02	2.E-04	--	1.E-02
			TOTAL				**1.E+00**	**6.E-02**	**3.E-01**	**--**	**2.E+00**

Receptor Hazard Index (soil [0-2 ft bgs] + groundwater) = 2.E+00
Receptor Hazard Index (soil [0-10 ft bgs] + groundwater) = 2.E+00

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Table A5-5
Risk Characterization Summary - Non-Carcinogens
SA 035

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Child**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 035 - Soil On-site Direct Contact (0-2 ft bgs)	Arsenic	2.8E+00	mg/kg	Vascular	1.E-01	2.E-04	1.E-02	3.E-01	5.E-01
			Barium	2.0E+02	mg/kg		1.E-02	1.E-03	4.E-04	2.E-02	3.E-02
			Beryllium	5.0E-01	mg/kg	Small intestine; Lungs	3.E-03	6.E-05	9.E-05	5.E-03	8.E-03
			Copper	2.5E+01	mg/kg	Gastro-intestinal system	8.E-03	5.E-07	2.E-04	1.E-02	2.E-02
			Lead	5.0E+01	mg/kg		--	--	--	--	--
			Zinc	5.5E+01	mg/kg	Blood	2.E-03	1.E-07	7.E-05	3.E-03	5.E-03
			Benzoic Acid	2.0E-01	mg/kg		7.E-07	2.E-12	2.E-07	2.E-04	2.E-04
			Bis(2-ethylhexyl)phthalate	1.5E-01	mg/kg	Liver	9.E-05	3.E-10	3.E-05	1.E-04	3.E-04
			Acetone	4.4E-01	mg/kg	Kidney	6.E-06	6.E-03	2.E-06	--	6.E-03
			Carbon tetrachloride	--	--	Liver	--	--	--	--	--
			Chloroform	--	--	Liver	--	--	--	--	--
			Tetrachloroethene	--	--	Liver	--	--	--	--	--
			Trichloroethene	--	--		--	--	--	--	--
			Xylenes	--	--	Decreased body weight	--	--	--	--	--
			TOTAL				**1.E-01**	**7.E-03**	**1.E-02**	**4.E-01**	**5.E-01**
		SA 035 - Soil On-site Direct Contact (0-10 ft bgs)	Arsenic	4.1E+00	mg/kg	Vascular	7.E-02	1.E-04	6.E-03	2.E-01	3.E-01
			Barium	2.3E+02	mg/kg		1.E-02	1.E-03	4.E-04	2.E-02	3.E-02
			Beryllium	5.0E-01	mg/kg	Small intestine; Lungs	3.E-03	6.E-05	1.E-04	5.E-03	9.E-03
			Copper	2.3E+01	mg/kg	Gastro-intestinal system	7.E-03	4.E-07	2.E-04	9.E-03	2.E-02
			Lead	3.0E+01	mg/kg		--	--	--	--	--
			Zinc	5.0E+01	mg/kg	Blood	2.E-03	1.E-07	6.E-05	3.E-03	5.E-03
			Benzoic Acid	1.3E-01	mg/kg		4.E-07	1.E-12	1.E-07	1.E-04	1.E-04
			Bis(2-ethylhexyl)phthalate	1.1E-01	mg/kg	Liver	7.E-05	2.E-10	2.E-05	1.E-04	2.E-04
			Acetone	4.4E-01	mg/kg	Kidney	6.E-06	6.E-03	2.E-06	--	6.E-03
			Carbon tetrachloride	--	--	Liver	--	--	--	--	--
			Chloroform	--	--	Liver	--	--	--	--	--
			Tetrachloroethene	--	--	Liver	--	--	--	--	--
			Trichloroethene	--	--		--	--	--	--	--
			Xylenes	--	--	Decreased body weight	--	--	--	--	--
			TOTAL				**1.E-01**	**7.E-03**	**7.E-03**	**2.E-01**	**3.E-01**

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Table A5-5
Risk Characterization Summary - Non-Carcinogens
SA 035

Groundwater (cont…)	Groundwater	SA 035 - Groundwater On-site Direct Contact	Arsenic	--	--	Vascular	--	--	--	--	--
			Barium	--	--		--	--	--	--	--
			Beryllium	--	--	Small intestine; Lungs	--	--	--	--	--
			Copper	--	--	Gastro-intestinal system	--	--	--	--	--
			Lead	--	--		--	--	--	--	--
			Zinc	--	--	Blood	--	--	--	--	--
			Benzoic Acid	--	--		--	--	--	--	--
			Bis(2-ethylhexyl)phthalate	--	--	Liver	--	--	--	--	--
			Acetone	3.9E+00	µg/L	Kidney	3.E-04	1.E-03	8.E-07	--	2.E-03
			Carbon tetrachloride	2.4E+00	µg/L	Liver	2.E-01	6.E-02	5.E-02	--	3.E-01
			Chloroform	9.2E-01	µg/L	Liver	6.E-03	3.E-03	4.E-04	--	1.E-02
			Tetrachloroethene	3.7E-01	µg/L	Liver	2.E-03	1.E-02	1.E-03	--	2.E-02
			Trichloroethene	1.3E+01	µg/L		1.E-01	2.E-02	2.E-02	--	2.E-01
			Xylenes	2.1E+00	µg/L	Decreased body weight	7.E-04	2.E-02	4.E-04	--	2.E-02
			TOTAL				**4.E-01**	**1.E-01**	**7.E-02**	**--**	**6.E-01**

Receptor Hazard Index (soil [0-2 ft bgs] + groundwater) = 1.E+00
Receptor Hazard Index (soil [0-10 ft bgs] + groundwater) = 9.E-01

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Table A5-5
Risk Characterization Summary - Non-Carcinogens
SA 035

Scenario Timeframe:	**Future**										
Receptor Population:	**Outdoor Occupational**										
Receptor Age:	**Adult**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 035 - Soil On-site Direct Contact (0-2 ft bgs)	Arsenic	2.8E+00	mg/kg	Gastro-intestinal system	4.E-03	7.E-05	3.E-03	--	8.E-03
			Barium	2.0E+02	mg/kg	--	5.E-04	3.E-04	1.E-04	--	9.E-04
			Beryllium	5.0E-01	mg/kg	Blood	1.E-04	2.E-05	3.E-05	--	2.E-04
			Copper	2.5E+01	mg/kg	--	3.E-04	1.E-07	7.E-05	--	4.E-04
			Lead	5.0E+01	mg/kg	--	--	--	--	--	--
			Zinc	5.5E+01	mg/kg	Liver	9.E-05	4.E-08	2.E-05	--	1.E-04
			Benzoic Acid	2.0E-01	mg/kg	Kidney	3.E-08	6.E-13	6.E-08	--	8.E-08
			Bis(2-ethylhexyl)phthalate	1.5E-01	mg/kg	Liver	4.E-06	8.E-11	8.E-06	--	1.E-05
			Acetone	4.4E-01	mg/kg	Kidney	2.E-07	7.E-08	5.E-07	--	8.E-07
			TOTAL				**5.E-03**	**4.E-04**	**3.E-03**	**--**	**9.E-03**

Scenario Timeframe:	**Future**										
Receptor Population:	**Indoor Occupational**										
Receptor Age:	**Adult**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 035 - Soil On-site Direct Contact (0-2 ft bgs)	Acetone	7.5E+02	ppbv	Kidney	--	4.E-04	--	--	4.E-04
			TOTAL				**--**	**4.E-04**	**--**	**--**	**4.E-04**

Scenario Timeframe:	**Future**										
Receptor Population:	**Construction Worker**										
Receptor Age:	**Adult**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 035 - Soil On-site Direct Contact (0-10 ft bgs)	Arsenic	4.1E+00	mg/kg	Gastro-intestinal system	3.E-02	4.E-02	7.E-03	--	7.E-02
			Barium	2.3E+02	mg/kg	--	5.E-03	3.E-01	5.E-04	--	3.E-01
			Beryllium	5.0E-01	mg/kg	Blood	1.E-03	2.E-02	1.E-04	--	2.E-02
			Copper	2.3E+01	mg/kg	--	3.E-03	1.E-04	3.E-04	--	3.E-03
			Lead	3.0E+01	mg/kg	--	--	--	--	--	--
			Zinc	5.0E+01	mg/kg	Liver	8.E-04	3.E-05	7.E-05	--	9.E-04
			Benzoic Acid	1.3E-01	mg/kg	Kidney	2.E-07	4.E-13	2.E-07	--	3.E-07
			Bis(2-ethylhexyl)phthalate	1.1E-01	mg/kg	Liver	3.E-05	6.E-11	3.E-05	--	5.E-05
			Acetone	4.4E-01	mg/kg	Kidney	2.E-06	3.E-17	2.E-06	--	5.E-06
			TOTAL				**4.E-02**	**4.E-01**	**8.E-03**	**--**	**4.E-01**

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SECTION A6

SA 041

A6.1 Site Overview and Features

SA 041 is in the central portion of IC 26, which is in the northeastern portion of OU A. It is located in the East McClellan District. It includes Building 54, which consisted of a welding and sheet-metal fabrication shop in the western half of the building, and a carpentry shop in the eastern half of the building. The shops were in operation from 1944 to 1990. Thereafter, an Employee Relations office occupied Building 54. The building covers the majority of the site, and the total site area is approximately 28,000 square feet. SA 041 is surrounded by PRL S-014 to the north, SA 034 to the east, and SA 040 to the south. The site is adjacent to Building 21 to the west, which is not an IRP site.

Activities in the building involved minimal use of hazardous materials. Specific chemicals handled at the site included a variety of solvents, adhesives, fuels, and oils. Wastes generated by the operations in the building were taken to a hazardous waste storage area directly north of the building until pick up and final disposal.

A6.2 Source of Contamination

Suspected sources of contamination were not identified because the building has a concrete floor with no drains and no visual evidence of contamination was noted. The building slab is also surrounded by asphalt and concrete (Jacobs, 2001), and based on aerial photos from 1946 to the present, this area has been covered with buildings and asphalt paving. During the RI, low levels of VOCs were identified.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Jacobs. 1992. IRP OUA *Remedial Investigation Sampling and Analysis Plan, Section 3 Field Sampling Plan* (FSP). Volume 2, pp. SA41-1-2.
- Jacobs. 1995. *RI, Interim Basewide Final Report, Site Characterization Summary (SCS) and Field Sampling Plan, Part 2A, Operable Unit A, IC 26*. November.
- Jacobs. 2001. *Interim Basewide Remedial Investigation Report Final Part 2A-Remedial Investigation Characterization Summaries*. September. Text: Vol. 1 IC 26 pp. 1-28.
- CH2M HILL. 2003. *LRA Initial Parcel Feasibility Study #1*. August.

  Data Summary and ESF excerpts, Vol. 1, Appendix H, Section 7, pp. H7-1 – H7-4
- CH2M HILL. 2004. *LRA Initial Parcel Record of Decision #1*. June.
- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study #2*. Final. May. Vol. 2, Appendix D, pp. D7-1 – D7-4.

A6.3 Sampling Strategy and Type of Contamination

During the Phase 1 RI, shallow screening soil gas samples were collected at eight locations around the perimeter of Building 54 during 1992. Samples were analyzed for VOCs. No soil samples were collected.

A6.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at SA 041. No primary contaminants were identified. Figure A-6 identifies the site location and significant site features. During the Phase I RI conducted in 1992, eight screening-level SSG samples (SA41SG01 to SA41SG08) were collected at depths from 3 to 5 feet bgs at eight locations around the perimeter of Building 54. Results from six of the eight soil gas samples collected at depths of 3 to 5 feet bgs reported low levels of aromatic VOCs, up to 950 ppbv. A Method TO-14 sample collected at SA41SG01 confirmed the presence of low levels of halogenated VOCs (primarily, carbon tetrachloride and Freon constituents) ranging in concentration from 6.6 to 78 ppbv. Carbon tetrachloride concentrations exceed the unrestricted use and industrial use screening levels. All other VOC concentrations detected were well below the unrestricted use screening levels. Based on the OU A RI SAP, soil samples were collected only if a known or suspected release location was identified (OU A RI SAP, 1992). Because the building has a concrete floor with no drains, visual evidence of contamination was not noted, and paving surrounds the building except for a 3-foot-wide strip of exposed soil along the east side of the building, suspected sources or potential contaminant pathways were not identified and no soil samples were collected (SCS and FSP, Jacobs, 1995b). There appears to be no source of soil gas contamination in the vicinity of SA 041.

A6.5 Contamination Exposure and Migration

There were no COCs identified for this site. Therefore, exposure pathways were not predicted and migration of contamination is not expected.

A6.6 Current and Potential Future Site and Resource Uses

The site is currently occupied by a lease tenant (The Fab Shop) that specializes in custom sheet metal fabrication. In the future, SA 041 will likely continue to be used for commercial/ industrial purposes.

A6.7 Human Health Risk Assessment

According to the OU A RICS, site investigations revealed that activities within the building involved minimal use of hazardous materials. In addition, potential contaminant pathways were not identified because the building had concrete floors with no drains, and there was no visual evidence of contamination noted. There was also no exposed soil present around the building with the exception of a narrow 3-foot-wide strip along the east side of the building. Therefore, soil and groundwater sampling was not conducted at the site.

However, shallow screening soil gas samples were collected around the perimeter of the building. Confirmed analytes were not reported at concentrations greater than 500 ppbv. Because SSG samples did not exceed 500 ppbv and soil sampling was determined to not be necessary, contaminants of potential concern were not selected during the screening level human health risk assessment (SCS and FSP, Jacobs, 1995), which did not include the indoor air pathway. Therefore, a human health risk assessment was not performed for the site.

A6.7.1 Basis for No Action

The low levels of contaminants present at SA 041 do not present a threat to human health or water quality. Therefore, no action is required under CERCLA.

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Boring ID	Analyte	Depth (ft bgs)	Concentration (ppbv)
VOCs (In shallow soil gas from 0-15 feet)			
SA41SG01	**Carbon Tetrachloride**	3	**78**
SA41SG01	Freon 11	3	20
SA41SG01	Freon 113	3	6.6
SA41SG01	Freon 12	3	28
SA41SG01	TCE	3	2.6
SA41SG01	1,1,1-Trichloroethane	3	18
SA41SG02 through SA41SB08	(1)	3	(1)

Note: Bolded compounds exceed the Industrial Screening Level established for the respective analyte (Table C-2).
(1) = Shallow soil gas screening samples, No confirmations by Method TO-14

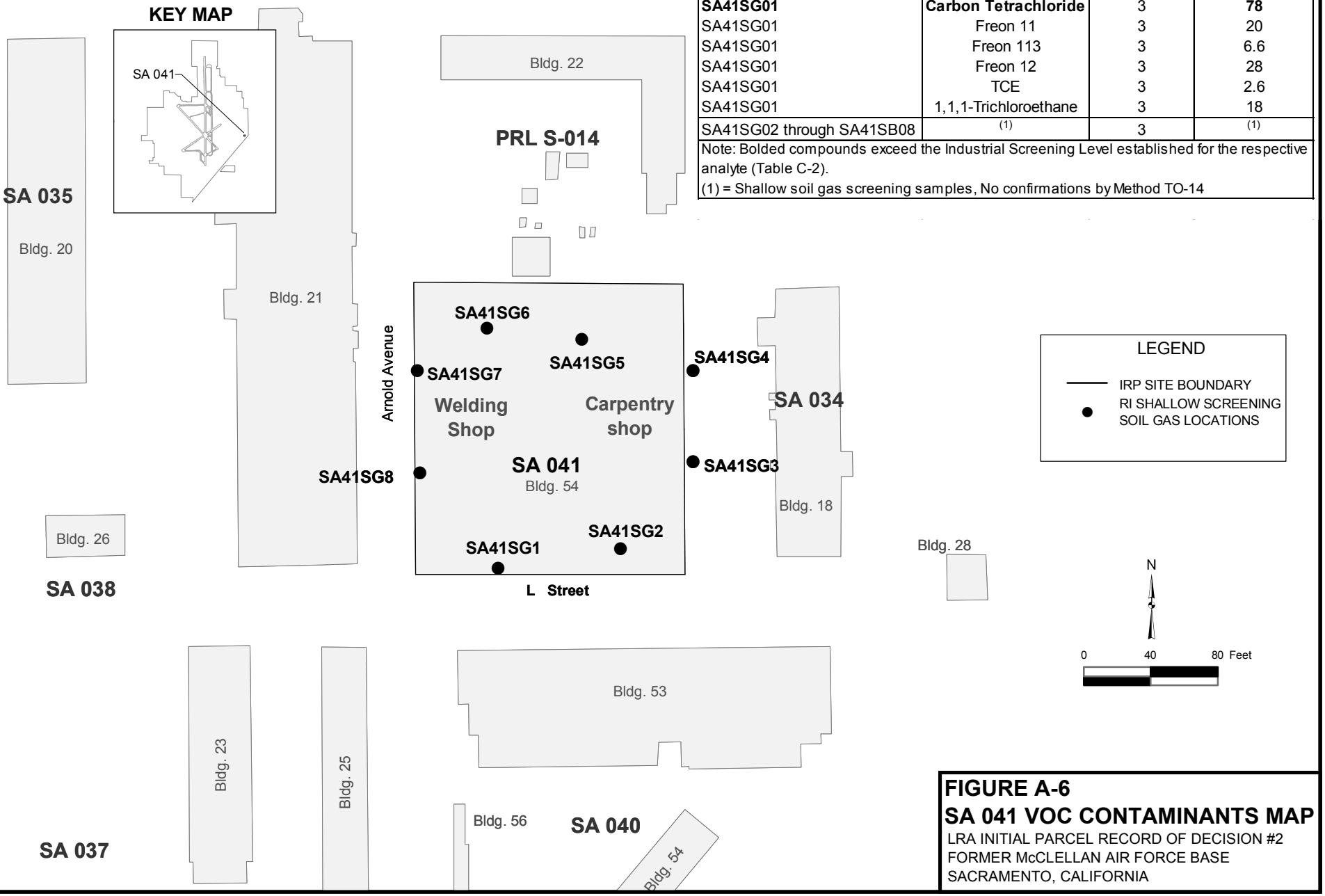

FIGURE A-6
SA 041 VOC CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

SAC \\GLACIER\PROJ\MCCLELLAN\340972_TO400\MAPFILES\IP2_ROD\FIGA-6_SA_041.MXD FIGA-6_SA_041.PDF 6/13/2008 15:00:02

SECTION A7

SA 091

A7.1 Site Overview and Features

SA 091 is in southern OU A in IC 43 located in the South McClellan District. It consists of the former warehouse Building 621 (Bays A through D) and an associated open storage lot to the east. The site is approximately 10 acres. The former warehouse covered more than half of the site. The site also included a paved 4.5-acre open storage area east of the building that still exists. SA 091 is surrounded by confirmed site (CS) 024 to the east, SA 088 to the northeast, and SA 104 to the north. The site is bounded to the south by the base property line.

The building was constructed about 1946 and served as general warehousing until it was likely remodeled in 1981. Bay A then became a designated hazardous materials storage area and the remaining bays were used to receive and store non-hazardous materials. A variety of solvents, acids, bases, paints, electrical transformers, and compressed gases were stored at the site. Materials were generally stored on pallets, and any leaking or damaged containers were stored in a bermed staging area in Bay A until released for offbase disposal. A solvent spill was reported west of Bay C in 1988. Records indicate that the spill was investigation and contaminated soil (approximately 16 cubic yards) was subsequently removed.

In a 1953 photograph, the open storage lot appears to be paved. The entire area of the site surrounding the building has been covered by pavement since at least 1953. Records indicate that PCB transformers and transformer oil were handled and stored in this area, and spills or leaks were likely to have occurred. The site was active until approximately 1994, at which time Building 621 was demolished and only the foundation remained.

A7.2 Source of Contamination

The primary source of contamination is likely spills from materials stored in the open storage area. During the RI, pesticides were identified in this area. Another potential source of contamination was the spill west of Bay C. However, records indicate that a removal action was conducted and the contamination was removed.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Jacobs. 1995. Final Part 2A: OUA Site Characterization Summary/FSP for IC 43, Section IC 43, pp. 1 through 56, and Appendix C.
- Jacobs. 2001. *Operable Unit A Remedial Investigation Characterization Summaries*. Final. September.

  Text: Vol. 3, IC 43, pp. 1-48
  Hits Table: Vol. 3, IC 43, Attachment 1, pp. 1-30
  All Data: Vol. 9, Appendix A1, SA91, pp. 4-6, 8-25

- CH2M HILL. 2003. Initial Parcel Feasibility Study #1. Final. August.

  Risk Assessment (for pesticides only): Vol. 2, Appendix G, pp. G2-17 – G2-21
  Data Gaps Investigation Results, Vol. 2, Appendix E, pp. E2-18 – E2-21
  Data Summary and ESF excerpts, Vol. 1, Appendix H, Section 2, pp. H8-1 – H8-7

- AFRPA. 2004. LRA Initial Parcel Record of Decision #1. June.

- CH2M HILL. 2005. LRA Initial Parcel Feasibility Study #2. Final. May. Vol. 2, Appendix D, pp. D8-1 – D8-4.

A7.3 Sampling Strategy and Type of Contamination

In 1988, soil samples were collected during a solvent spill investigation west of Bay C at Building 621. Samples were analyzed for VOCs, SVOCs, PCBs, and metals. Soil gas and soil samples were collected and analyzed for TPH, pesticides, PCBs, and VOCs (soil gas samples only) during the Phase 1 RI. Only soil gas samples were collected around Building 621 to determine the need for further soil sampling. In the open storage area, sampling and analysis were tailored to uses identified during interviews. As a part of the Initial Parcel FS Data Gap investigation conducted in 2002, shallow soil samples were collected and analyzed for pesticides to bound previously reported detections identified during the RI.

A7.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at SA 091. TPH, pesticides, PCBs, and VOCs were identified. However, several phases of RIs concluded that significant contamination is not present at the site. Figure A-10 identifies the site location and significant site features.

A7.4.1 TPH

TPH-D was reported from hand-auger borings drilled in the open storage lot during the RI. The highest reported detection was 76 mg/kg from SA91HA011, which is below the screening level for the protection of groundwater and surface water. Most reported detections were in the surface sample at 0.25 foot bgs and were typically not detected at the 2.5-foot bgs sample. No detections were reported from the 5-foot bgs sample depth. The extent of TPH-D detections appears to be limited to the central part of the sampled area.

A7.4.2 Pesticides

Based on the RI data, pesticides were reported sporadically across the site. Most detections were very low and ranged in concentration from 0.001 to 0.029 mg/kg. These concentrations were often qualified as tentatively identified and estimated. One sample location, however, contained a slightly elevated detection of two compounds. DDT44 and DDE44 concentrations of 0.34 mg/kg and 0.47 mg/kg, respectively, were reported in the sample from SA91HA001 at a depth of 2.5 feet. In this boring, there were no detections at the surface and 5-foot bgs samples. This location, the northwestern-most sample location, was not bounded laterally, and a data gap existed.

Step-out sampling, as part of the Data Gaps Investigation for the Initial Parcel FS, was conducted to define the lateral extent of pesticide contamination found in soil boring SA91HA001. Shallow hand-auger borings were drilled at grid locations spaced at approximately 50-foot intervals. Samples were collected at 0 to 0.5 foot and at 2 feet. Results of this sampling contained similar compounds reported in boring SA91HA001 during the RI. These included detections of DDE44 and DDT44. Concentrations were very low when compared to the slightly elevated hits detected in the RI and, with one exception, were all J-flagged as estimated. The maximum reported DDE44 detection was 0.0057 J mg/kg. The maximum reported DDT44 was 0.0192 mg/kg. A detection of DDD44 was also reported from one sample at 0.001 J mg/kg. Based on this sampling event, the previously elevated detections from the RI were successfully bounded and concentrations are less than screening levels for unrestricted use.

A7.4.3 PCBs

Based on interview records, the parking area was a known PCB transformer storage location with potential spill and leak occurrences; therefore, soil samples were collected and analyzed for PCB contamination in this area. According to the RI data, 76 samples from 28 locations were collected from hand-auger borings drilled in the adjacent open storage lot and analyzed for PCBs using Method SW8080. The method detection limits ranged from 0.03 mg/kg to 3 mg/kg with method detection limits for 89 percent of the PCB analyses less than the screening level of 0.063 mg/kg. There were no PCB contaminants detected. The elevated method detection limits were reported in seven samples, of which only one had a detection of TPH-D and two others had detections of pesticides. Six of the seven samples were from three adjacent borings. The reason for the elevated method detection limits is not known, nor is the relative location of these samples to the reported transformer storage. Samples were collected at 32 locations (28 locations during the RI and 4 locations during the 2002 data gaps investigation) in a grid pattern within the open storage area on 50-foot centers. The four locations with elevated method detection limits represent approximately 13 percent of the open storage area.

A7.4.4 VOCs

Based on RI data collected in 1992, 21 screening-level SSG samples (SA91SG1 to SA91SG21) were collected around Building 621. VOC contamination was detected in 20 soil gas samples. Analytical results from the soil gas samples indicated that PCE and 1,1,1-trichloroethane were the primary contaminants detected at approximately 1 ppbv. However, during confirmation analyses, the presence of PCE and 1,1,1-trichloroethane were not confirmed. The four confirmation samples (SA91SG04, SA91SG05, SA91SG09, and SA91SG14) were collected from depths between 4 and 7 feet bgs and analyzed by Method TO-14. Results of confirmation sampling indicated that low levels of VOCs were primarily detected in sample SA91SG05, including acetone (76 ppbv), toluene (3.9 J ppbv), xylene compounds (m- and p-isomers 6.2 ppbv and o-isomer 3 J ppbv), and 1,3,5-trimethylbenzene (4 ppbv). All VOCs were below their unrestricted-use screening levels. Freon 113 (48 ppbv) was also detected in SA91SG14 at levels well below the unrestricted-use screening level.

SA 091 is above a groundwater plume primarily contaminated with TCE. Contamination is most likely a result of groundwater contamination migrating from CS 024, which is to the east of SA 091.

A soil vapor extraction (SVE) system is operating at CS 024, and the northeastern portion of SA 091 is within its radius of influence. VOC concentrations in this area have likely decreased as a result of the CS 024 SVE system. Additional soil gas data, including SSG data, will be collected as necessary at SA 091 to support the CS 024 SVE termination and optimization process (STOP).

A7.5 Contamination Exposure and Migration

Potential exposure is likely to occur when shallow soils are brought to the surface by excavation, drilling, or construction. Migration is not expected because there are no significant levels of non-VOC contaminants present at the site. In addition, the low levels of non-VOC contaminants at the site do not present a threat to surface water or groundwater quality.

A7.6 Current and Potential Future Site and Resource Uses

The site is vacant at this time, the former foundation of Building 621 has been demolished and the site is awaiting redevelopment (possibly a business park) by some future tenant through a lease arrangement with McClellan Park. In the future, SA 091 will likely be used for commercial/industrial purposes.

A7.7 Human Health Risk Assessment

The baseline human health risk assessment estimates what risks the site would pose if no action were taken. This section of the ROD summarizes the results of the baseline risk assessment for SA 091 as documented in Initial Parcel FS #1 (Appendix G). For groundwater, a screening-level assessment of potential risks was performed for the ROD. This evaluation was not included in the Initial Parcel FS #1. The most current data from monitoring well EW-301 were used in the groundwater assessment. This risk assessment was originally presented in the OU A RICS Addendum (Jacobs, 2002). This update uses the same risk assessment methodology as OU A for all exposure pathways except those involving indoor air. For indoor air pathways, the SSG screening levels that are presented in Appendix C of this ROD were used as the basis for inhalation cancer risk and noncancer hazard calculations. In addition, for chemicals that have had toxicity value updates since the OU A RICS Addendum was published, the most recent toxicity criteria have been used. The risk results for these scenarios are summarized below and in the risk summary tables found in the attachment at the end of this site summary.

A7.7.1 Risk Characterization

The potential cancer risks for SA 091 based on soil exposure only are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 7×10^{-9}
- Future adult resident (0-to-10-foot-bgs depth interval): 6×10^{-8}
- Outdoor occupational worker: 4×10^{-10}
- Future construction worker: 1×10^{-9}

The risk estimates for the residential scenarios and worker scenarios for soil exposure are below EPA's risk management range. In addition, the noncancer hazard indexes are less than 1 for the scenarios evaluated for soil exposure indicating that the potential for adverse non-cancer health effects is unlikely.

For the screening-level groundwater evaluation, the potential cancer risk for future adult residents is 2×10^{-4}. The main contributors to the potential cancer risk are arsenic, hexavalent chromium, and TCE. For groundwater, the noncancer hazard index for the future adult resident is 10 and the hazard index for the future child resident is 25 for the presumed household uses of groundwater pathway. The main contributor to the hazard indexes is TCE.

A7.7.2 Uncertainties

There are uncertainties associated with the risk estimates for SA 091. These are listed briefly below with additional discussion provided in an attachment at the end of this site summary:

- Groundwater underlying this site has likely been affected by an upgradient source; therefore, site-related risks specific to SA 091 associated with exposure to groundwater could not be evaluated.
- Current re-use plans for the site are indefinite, but do not include residential use.
- Only limited samples from the site were analyzed for SVOCs and metals. These samples were collected outside of the exposure area. None of the samples collected from the open storage and truck parking area were analyzed for PAHs or metals.

A7.7.3 Basis for No Action

The low levels of contaminants present at SA 091 do not present a threat to human health or water quality. Therefore, no action is required under CERCLA.

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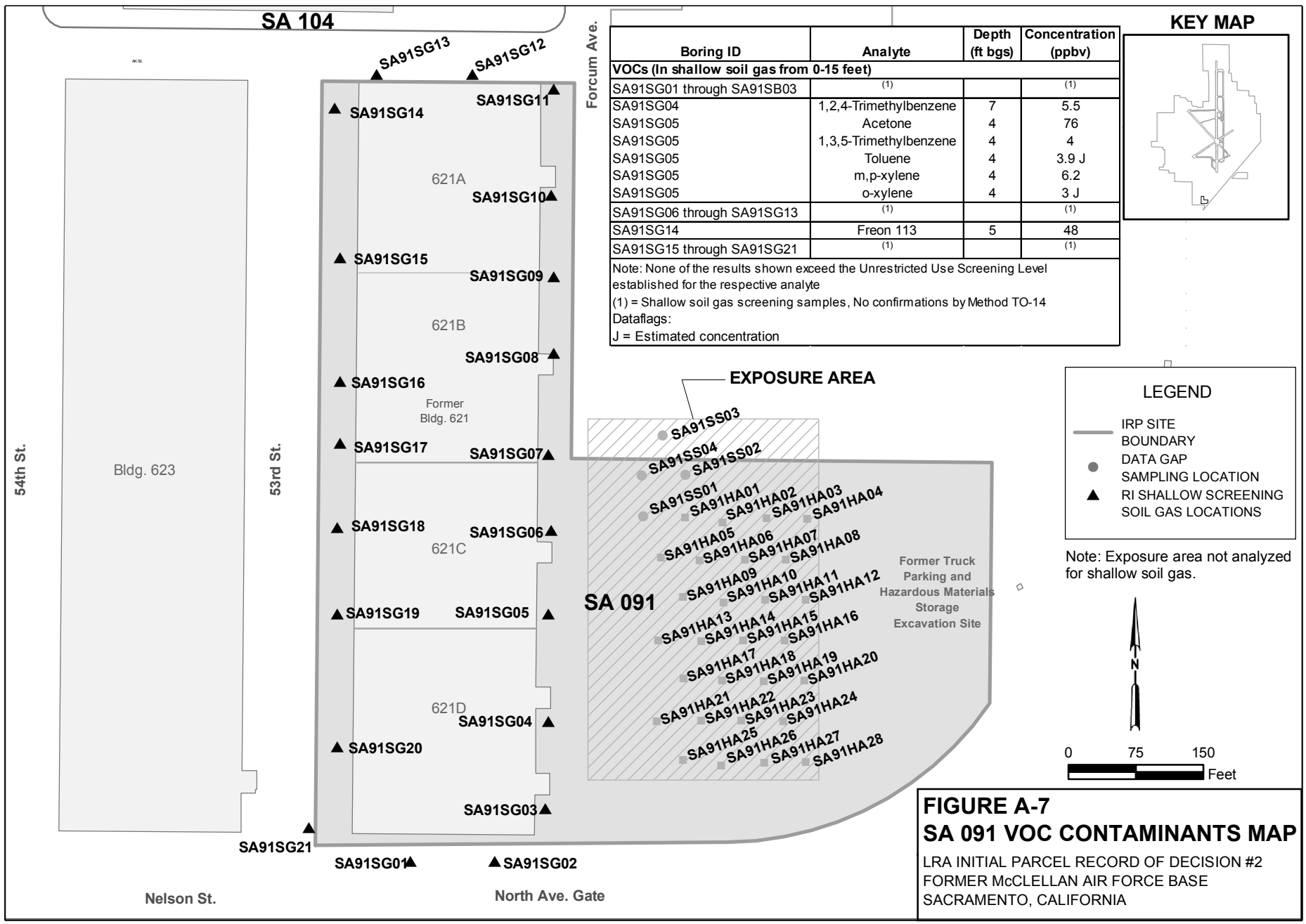

Boring ID	Analyte	Depth (ft bgs)	Concentration (ppbv)
VOCs (In shallow soil gas from 0-15 feet)			
SA91SG01 through SA91SB03	(1)		(1)
SA91SG04	1,2,4-Trimethylbenzene	7	5.5
SA91SG05	Acetone	4	76
SA91SG05	1,3,5-Trimethylbenzene	4	4
SA91SG05	Toluene	4	3.9 J
SA91SG05	m,p-xylene	4	6.2
SA91SG05	o-xylene	4	3 J
SA91SG06 through SA91SG13	(1)		(1)
SA91SG14	Freon 113	5	48
SA91SG15 through SA91SG21	(1)		(1)

Note: None of the results shown exceed the Unrestricted Use Screening Level established for the respective analyte
(1) = Shallow soil gas screening samples, No confirmations by Method TO-14
Dataflags:
J = Estimated concentration

FIGURE A-7
SA 091 VOC CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

SAC \\GLACIER\PROJ\MCCLELLAN\340972_TO400\MAPFILES\IP2_ROD\FIGA-7_SA_091.MXD FIGA-7_SA_091.PDF 6/13/2008 15:02:44

Attachment A7
SA 091 Human Health Risk Assessment

ATTACHMENT A7

SA 091 Human Health Risk Assessment

The baseline human health risk assessment estimates what risks the site would pose if no action were taken. This section of the ROD summarizes the results of the baseline risk assessment for SA 091 as documented in Initial Parcel FS #1 (Appendix G). For groundwater, a screening-level assessment of potential risks was performed for the ROD. This evaluation was not included in the Initial Parcel FS #1. The most current data from monitoring well EW-301 were used in the groundwater assessment. This risk assessment was originally presented in the OU A RICS (Jacobs, 2001). This update uses the same risk assessment methodology as OU A for all exposure pathways. In addition, for chemicals that have had toxicity value updates since the OU A RICS Addendum was published, the most recent toxicity criteria have been used.

Identification of Chemicals of Concern

Three potential COCs were identified for SA 091 in soil (DDD, DDE, and DDT). Table A7-1a presents the soil data summary for SA 091. The table includes the range of concentrations for potential COCs, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the EPCs, and how the EPCs were derived for each of the soil depth intervals. In general, the lower value of the maximum concentration or the upper 95th percent confidence limit on the mean was used as the EPC for potential COCs detected in more than one sample.

For groundwater, metals and VOCs were identified as potential COCs. Table A7-1b presents the groundwater data summary for monitoring well EW-301 and includes the detected concentrations of metals and VOCs.

Exposure Assessment

A conceptual model was developed that describes the potential exposure pathways associated with soil and groundwater at SA 091 (see Figure 2-3 in Section 2.4 of the ROD). Although SA 091 will likely be used for commercial/industrial purposes in the future, several exposure scenarios were evaluated in the human health risk assessment to provide information for future risk-management decisions.

The following exposure scenarios were quantitatively evaluated in the human health risk assessment:

- Exposure of hypothetical future residents (adults and children) to soil (0 to 2 feet bgs) and groundwater
- Exposure of hypothetical future residents (adults and children) to soil (0 to 10 feet bgs) and groundwater

- Exposure of commercial/industrial workers to soil (0 to 2 feet bgs)
- Exposure of construction workers to soil (0 to 15 feet bgs)

The exposure routes that were considered in the risk assessment include incidental soil ingestion, inhalation of resuspended particulates, and dermal contact with soil. For the residential scenarios, the ingestion of homegrown produce was included. For groundwater, the exposure routes included ingestion, dermal contact, and inhalation of VOCs.

Toxicity Assessment

The toxicity data that were used in the human health risk assessment are summarized in Tables A7-2 and A7-3. Health effects are divided into two categories: cancer and non-cancer effects.

Table A7-2 presents the slope factors used to estimate potential excess lifetime cancer risks associated with exposure to soil and groundwater at SA 091. As shown in Table A7-2, the oral slope factor was used to estimate potential risks associated with dermal exposure. In addition, inhalation slope factors are not available for DDD and DDE, so the oral slope factors were used to estimate potential risks associated with inhalation exposure. Table A7-3 presents the RfDs used to evaluate the potential for non-cancer health effects. RfDs are not available for DDD and DDE, so RfDs for DDT were used as surrogates to evaluate the potential for adverse non-cancer health effects. The toxicity information indicates that the critical effect upon which the RfD for DDT is based is related to the liver. As a pesticide, the primary toxic effects of DDT are on the nervous system. The oral RfD was used to estimate potential health effects associated with dermal exposure. In addition, an inhalation RfD is not available for DDT, so the oral RfD was used to evaluate potential health effects from the inhalation exposure route.

The hierarchy of sources for toxicity values follows EPA and Air Force guidance (EPA, 2003; USAF, 2006); the sources are listed below in order of preference:

1. EPA IRIS – online database (EPA, 2007)
2. EPA's Provisional Peer Reviewed Toxicity Values (as cited in the 2004 EPA Region 9 PRG table [EPA, 2004])
3. Cal-EPA cancer potency factors and RELs online database (Cal-EPA, 2007)
4. Other EPA sources (including HEAST, NCEA provisional toxicity values, and route-extrapolated toxicity values as cited in the 2004 EPA Region 9 PRG table [EPA, 2004])

Toxicity criteria for some of the contaminants have changed since the human health risk assessment was conducted. The risk estimates have been updated with the most current values.

The following cancer toxicity slope factors were updated:

- Chloroform – Inhalation: 0.080 to 0.081 $(mg/kg\text{-}day)^{-1}$
- Nickel – Inhalation: 0.90 to 0.91 $(mg/kg\text{-}day)^{-1}$

- TCE – Oral: 0.015 to 0.013 $(mg/kg\text{-}day)^{-1}$. Inhalation: 0.01 to 0.007 $(mg/kg\text{-}day)^{-1}$
- Hexavalent chromium – Inhalation: 0.051 to 42 $(mg/kg\text{-}day)^{-1}$

The following non-cancer toxicity RfDs were updated:

- Chloroform – Inhalation: 0.01 to 0.086 mg/kg-day
- Barium – Oral: 0.07 to 0.2 mg/kg-day
- Vanadium – Oral: 0.007 to 0.001 mg/kg-day. Inhalation: 0.007 to 0.001 mg/kg-day
- 1,2-Dichloroethane – Oral: 0.0029 to 0.02 mg/kg-day. Inhalation: 0.0029 to 0.11 mg/kg-day
- 1,1-Dichloroethene – Inhalation: 0.02 to 0.057 mg/kg-day
- TCE – Oral: 0.006 to 0.0003 mg/kg-day. Inhalation: 0.006 to 0.17 mg/kg-day

Risk Characterization

The EPA toxicity values described above were used in the human health risk assessment along with the exposure information to estimate the potential risks from contacting soil at SA 091. For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$Risk = CDI \times SF \quad (1)$$

Where:

Risk = a unitless probability (e.g., 1×10^{-6}) of an individual developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in a million chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer that individuals face from other causes such as smoking or exposure to too much sun. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with an RfD derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of the receptor average daily exposure to the route-specific RfD is called a hazard quotient (HQ). An HQ less than 1 indicates that the receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index is generated by adding the HQs over the exposure routes. A hazard index less than 1 indicates that, based on the sum of all HQs from different

exposure routes, toxic noncarcinogenic effects are unlikely. A hazard index greater than 1 indicates that site-related exposure may present a risk to human health.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD} \quad (2)$$

Where:

CDI = chronic daily intake (mg/kg-day)
RfD = reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

Table A7-4 presents the potential cancer risk estimates for the various exposure scenarios and exposure routes at SA 091. These risk estimates are based on reasonable maximum exposure and were developed taking into account various conservative assumptions about the frequency and duration of the receptors to soil and the toxicity of the potential COCs.

Both residential and occupational exposure scenarios were evaluated for SA 091. The risk results for these scenarios are summarized below and presented in the risk summary tables at the end of this section.

The potential cancer risks for SA 091 based on soil exposure only are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 7×10^{-9}
- Future adult resident (0-to-10-foot-bgs depth interval): 6×10^{-8}
- Outdoor occupational worker: 4×10^{-10}
- Future construction worker: 1×10^{-9}

The risk estimates for the residential scenarios and worker scenarios for soil exposure are below EPA's risk management range.

Table A7-5 presents the non-cancer hazard indexes for the various exposure scenarios and exposure routes at SA 091. The hazard indexes are less than 1 for the scenarios evaluated for soil exposure indicating that the potential for adverse non-cancer health effects is unlikely.

For the screening-level groundwater evaluation, the potential cancer risk for future adult residents is 2×10^{-4}. The main contributors to the potential cancer risk are arsenic and TCE. The noncancer hazard index for the future adult resident is 11 and the hazard index for the future child resident is 25 for the presumed household uses of groundwater pathway. The main contributor to the hazard indexes is TCE.

Uncertainties

The uncertainties associated with the risk estimates for SA 091 include the following:

A screening-level evaluation of potential risks associated with exposure to groundwater was performed for SA 091. However, the groundwater underlying this site has likely been affected by an upgradient source (i.e., CS 24) and therefore, site-related risks specific to SA 091 associated with exposure to groundwater could not be evaluated.

Current re-use plans for the site are indefinite, but do not include residential use. Hence, the use of the residential scenario for this site should be considered hypothetical at this time

Only limited samples from the site were analyzed for SVOCs and metals. This may result in underestimating site risks.

For several compounds, Cal-EPA presents more conservative toxicity values than the EPA values used for the risk calculations presented in Tables A7-4 and A7-5. The following chemicals have more conservative Cal-EPA cancer slope factors and noncancer RfDs:

- Arsenic – Oral slope factor: 9.5 $(mg/kg\text{-}day)^{-1}$
- Hexavalent chromium – Inhalation slope factor: 5.1E+02 $(mg/kg\text{-}day)^{-1}$
- 1,1-Dichloroethene – Inhalation RfD: 2.0E-02 (mg/kg-day)

Use of these toxicity values would yield more conservative estimates for cancer risks and hazard indexes. For SA 091, the difference in RfDs between EPA and Cal-EPA for 1,1-dichloroethene do not significantly affect the hazard index results. Using the Cal-EPA slope factor for arsenic, the cancer risk estimate for groundwater is 8×10^{-4}.

References

California Environmental Protection Agency (Cal-EPA). 2007. Office of Environmental Health Hazard Assessment (OEHHA). Cal-EPA – OEHHA Toxicity Criteria Database.

Jacobs. 2001. *Operable Unit A Remedial Investigation Characterization Summaries*. Final. September.

United States Air Force (USAF). 2006. "Toxicity Values for Use in Risk Assessments and Establishing Risk-Based Cleanup Levels." Memorandum from Gregory R. Ottoman, Major, USAF. July 14.

United States Environmental Protection Agency (EPA). 2003. "Human Health Toxicity Values in Superfund Risk Assessments." OSWER Directive 9285.7-53. December 5.

United States Environmental Protection Agency (EPA). 2004. Region 9 Preliminary Remediation Goal (PRG) table. October.

United States Environmental Protection Agency (EPA). 2007. Integrated Risk Information System (IRIS). Online database.

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Table A7-1a
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
SA 091

Scenario Timeframe:	**Future**
Medium	**Soil**
Exposure Medium	**Soil**

Exposure Point	Chemical of Concern	Concentration Detected (mg/kg)		Frequency of Detection	95th UCL Concentration (mg/kg)	Statistical Measure[a]	Exposure Point Concentration[b] (mg/kg)
		Min	Max				
SA 091 - Soil On-site Direct Contact (0-2 ft bgs)	DDD	1.0E-03	1.0E-03	1/32	8.2E-04	95UCL Lognormal	8.2E-04
	DDE	3.0E-04	2.0E-03	5/32	8.9E-04	95UCL Lognormal	8.9E-04
	DDT	7.0E-04	9.8E-03	9/32	1.4E-03	95UCL Lognormal	1.4E-03
SA 091 - Soil On-site Direct Contact (0-10 ft bgs)	DDD	1.0E-03	1.0E-03	1/83	2.1E-03	Max Detect	1.0E-03
	DDE	3.0E-04	4.7E-01	9/83	1.6E-02	95UCL Normal	1.6E-02
	DDT	7.0E-04	3.4E-01	15/83	1.2E-02	95UCL Normal	1.2E-02

[a] The statistical measure indicates the basis for the exposure point concentration.

[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.

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Table A7-1b
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
SA 091

Scenario Timeframe:	**Future**						
Medium	**Groundwater**						
Exposure Medium	**Groundwater**						
Exposure Point	**Chemical of Concern**	**Concentration Detected (µg/L) Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration[a] (µg/L)**	**Statistical Measure[b]**	**Exposure Point Concentration[c] (µg/L)**
SA 091 - Groundwater On-site Direct Contact	Chloroform	2.1E-01	2.1E-01	1	--	Max Detect	2.1E-01
	1,1-Dichloroethane	1.1E+00	1.1E+00	1	--	Max Detect	1.1E+00
	1,2-Dichloroethane	1.8E-01	1.8E-01	1	--	Max Detect	1.8E-01
	1,1-Dichloroethene	2.4E+00	2.4E+00	1	--	Max Detect	2.4E+00
	cis-1,2-Dichloroethene	3.3E+00	3.3E+00	1	--	Max Detect	3.3E+00
	Trichloroethene	9.6E+01	9.6E+01	1	--	Max Detect	9.6E+01
	Arsenic	5.1E+00	5.1E+00	1	--	Max Detect	5.1E+00
	Barium	5.4E+01	5.4E+01	1	--	Max Detect	5.4E+01
	Chromium	1.1E+01	1.1E+01	1	--	Max Detect	1.1E+01
	Chromium, hexavalent	9.9E+00	9.9E+00	1	--	Max Detect	9.9E+00
	Iron	8.7E+01	8.7E+01	1			8.7E+01
	Nickel	1.6E+00	1.6E+00	1	--	Max Detect	1.6E+00
	Vanadium	2.8E+01	2.8E+01	1	--	Max Detect	2.8E+01

[a] Due to the limited data set, a statistical analysis could not be conducted to determine the 95th UCL concentration.
[b] The statistical measure indicates the basis for the exposure point concentration.
[c] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.

95th UCL = 95 percent upper confidence limit on the mean.

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Table A7-2
Cancer Toxicity Data Summary
SA 091

Pathway: Ingestion, Dermal						
Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence[a]	Source	Date
DDD	2.4E-01	2.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
DDE	3.4E-01	3.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
DDT	3.4E-01	3.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Chloroform	3.1E-02	3.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
1,1-Dichloroethane	5.7E-03	5.7E-03	$(mg/kg\text{-}day)^{-1}$	C	Cal-EPA	2007
1,2-Dichloroethane	9.1E-02	9.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
1,1-Dichloroethene						
cis -1,2-Dichloroethene						
Trichloroethene	1.3E-02	1.3E-02	$(mg/kg\text{-}day)^{-1}$		Cal-EPA	2007
Arsenic	1.5E+00	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Barium						
Chromium						
Chromium, hexavalent						
Iron						
Nickel						
Vanadium						

Pathway: Inhalation					
Chemical of Concern	InhalationCancer Slope Factor	Slope Factor Units	Weight of Evidence[a]	Source	Date
DDD	2.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
DDE	3.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
DDT	3.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Chloroform	8.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
1,1-Dichloroethane	5.7E-03	$(mg/kg\text{-}day)^{-1}$	C	Cal-EPA	2007
1,2-Dichloroethane	9.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
1,1-Dichloroethene					
cis -1,2-Dichloroethene					
Trichloroethene	7.0E-03	$(mg/kg\text{-}day)^{-1}$		Cal-EPA	2007
Arsenic	1.5E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Barium					
Chromium	4.2E+01			IRIS	2007
Chromium, hexavalent	4.2E+01	$(mg/kg\text{-}day)^{-1}$	A	Cal-EPA	2007
Iron					
Nickel	9.1E-01	$(mg/kg\text{-}day)^{-1}$	D	Cal-EPA	2007
Vanadium					

[a]Weight of Evidence Classification

A - human carcinogen
B1 and B2 - probable human carcinogen
C - possible human carcinogen
D - not classifiable as a human carcinogen
E - evidence of noncarcinogenicity for humans
Reference = USEPA 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December.

Cal-EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System

Table A7-3
Non-Cancer Toxicity Data Summary
SA 091

Pathway: Ingestion, Dermal									
Chemical of Concern	Chronic/ subchronic	Oral RfD	Oral RfD Units	Dermal RfD	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
DDD	Chronic	5.0E-04	mg/kg-day	5.0E-04	mg/kg-day			SURROGATE	
DDE	Chronic	5.0E-04	mg/kg-day	5.0E-04	mg/kg-day			SURROGATE	
DDT	Chronic	5.0E-04	mg/kg-day	5.0E-04	mg/kg-day	Liver	100	IRIS	2007
Chloroform	Chronic	1.0E-02	mg/kg-day	1.0E-02	mg/kg-day	Liver	1000	IRIS	2007
1,1-Dichloroethane	Chronic	1.0E-01	mg/kg-day	1.0E-01	mg/kg-day	Kidney	1000	HEAST	1997
1,2-Dichloroethane	Chronic	2.0E-02	mg/kg-day	2.0E-02	mg/kg-day			NCEA	2004
1,1-Dichloroethene	Chronic	5.0E-02	mg/kg-day	5.0E-02	mg/kg-day	Liver	100	IRIS	2007
cis-1,2-Dichloroethene	Chronic	1.0E-02	mg/kg-day	1.0E-02	mg/kg-day	Blood-forming system	3000	PPRTV	2004
Trichloroethene	Chronic	3.0E-04	mg/kg-day	3.0E-04	mg/kg-day	Nervous system		NCEA	2004
Arsenic	Chronic	3.0E-04	mg/kg-day	3.0E-04	mg/kg-day	Skin	3	IRIS	2007
Barium	Chronic	2.0E-01	mg/kg-day	2.0E-01	mg/kg-day	Kidney	3	IRIS	2007
Chromium	Chronic	1.5E+00	mg/kg-day	1.5E+00	mg/kg-day	None reported	100	Cal-EPA	2007
Chromium, hexavalent	Chronic	3.0E-03	mg/kg-day	3.0E-03	mg/kg-day	None reported	900	IRIS	2007
Iron	Chronic	3.0E-01	mg/kg-day	3.0E-01	mg/kg-day			NCEA	2004
Nickel	Chronic	2.0E-02	mg/kg-day	2.0E-02	mg/kg-day	Decreased weight	300	IRIS	2007
Vanadium	Chronic	1.0E-03	mg/kg-day	1.0E-03	mg/kg-day	Liver and kidney	100	NCEA	2004

Pathway: Inhalation								
Chemical of Concern	Chronic/ subchronic	Inhalation RfD	Inhalation RfD Units		Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
DDD	Chronic	5.0E-04	mg/kg-day				ROUTE	
DDE	Chronic	5.0E-04	mg/kg-day				ROUTE	
DDT	Chronic	5.0E-04	mg/kg-day				ROUTE	
Chloroform	Chronic	8.6E-02	mg/kg-day		Alimentary system		Cal-EPA	2007
1,1-Dichloroethane	Chronic	1.4E-01	mg/kg-day		Kidney		Cal-EPA	2007
1,2-Dichloroethane	Chronic	1.1E-01	mg/kg-day		Alimentary system		Cal-EPA	2007
1,1-Dichloroethene	Chronic	5.7E-02	mg/kg-day		Alimentary system		Cal-EPA	2007
cis-1,2-Dichloroethene	Chronic	1.0E-02	mg/kg-day				ROUTE	
Trichloroethene	Chronic	1.7E-01	mg/kg-day		Nervous system		Cal-EPA	2007
Arsenic	Chronic	8.6E-06	mg/kg-day		Cardiovascular system		Cal-EPA	2007
Barium	Chronic	1.4E-04	mg/kg-day				Cal-EPA	2007
Chromium	Chronic	1.5E+00	mg/kg-day				Cal-EPA	2007
Chromium, hexavalent	Chronic	2.2E-06	mg/kg-day		Nasal septum	90	Cal-EPA	2007
Iron								
Nickel	Chronic	1.4E-05	mg/kg-day		Respiratory system		Cal-EPA	2007
Vanadium	Chronic	1.0E-03	mg/kg-day				NCEA	2004

Notes:
Toxicity values used were accurate as of the date of report submittal and are not necessarily the most current values.
Blank cells indicate information is not available or not applicable.

Cal-EPA = California Environmental Protection Agency
HEAST = Health Effects Assessment Summary Table
IRIS = Integrated Risk Information System
NCEA = Nationa Center for Environmental Assessment, USEPA
PPRTV = Provisional Peer Reviewed Toxicity Value
ROUTE = route-to-route extrapolated value (e.g., oral RfD used for inhalation RfD)
SURROGATE = RfDs for DDT used for DDD and DDE

Table A7-4
Risk Characterization Summary - Carcinogens
SA 091

Scenario Timeframe:	**Future**									
Receptor Population:	**Resident**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 091 - Soil On-site Direct Contact (0-2 ft bgs)	DDD	8.2E-04	mg/kg	3.1E-10	1.8E-15	5.0E-11	1.3E-09	1.7E-09
			DDE	8.9E-04	mg/kg	4.8E-10	2.8E-15	7.7E-11	1.3E-09	1.9E-09
			DDT	1.4E-03	mg/kg	7.7E-10	4.6E-15	1.2E-10	2.2E-09	3.1E-09
			TOTAL			**1.6E-09**	**9.2E-15**	**2.5E-10**	**4.8E-09**	**7.E-09**
		SA 091 - Soil On-site Direct Contact (0-10 ft bgs)	DDD	1.0E-03	mg/kg	3.8E-10	2.2E-15	6.1E-11	1.6E-09	2.0E-09
			DDE	1.6E-02	mg/kg	8.4E-09	5.0E-14	1.4E-09	2.2E-08	3.2E-08
			DDT	1.2E-02	mg/kg	6.5E-09	3.9E-14	1.1E-09	1.9E-08	2.7E-08
			TOTAL			**1.5E-08**	**9.1E-14**	**2.6E-09**	**4.3E-08**	**6.E-08**
Groundwater	Groundwater	SA 091- Groundwater On-Site Direct Contact	Chloroform	2.1E-01	ug/L	9.7E-08	1.3E-06	6.4E-09	--	1.4E-06
			1,1-Dichloroethane	1.1E+00	ug/L	8.9E-08	4.5E-07	5.0E-09	--	5.4E-07
			1,2-Dichloroethane	1.8E-01	ug/L	2.4E-07	1.2E-06	8.4E-09	--	1.4E-06
			1,1-Dichloroethene	2.4E+00	ug/L	--	--	--	--	--
			cis -1,2-Dichloroethene	3.3E+00	ug/L	--	--	--	--	--
			Trichloroethene	9.6E+01	ug/L	1.6E-05	3.5E-05	2.0E-06	--	5.3E-05
			Arsenic	5.1E+00	ug/L	1.1E-04	--	2.9E-07	--	1.1E-04
			Barium	5.4E+01	ug/L	--	--	--	--	--
			Chromium	1.1E+01	ug/L	--	--	--	--	--
			Chromium, hexavalent	9.9E+00	ug/L		--		--	--
			Iron	8.7E+01	ug/L	--	--	--	--	--
			Nickel	1.6E+00	ug/L	--	--	--	--	--
			Vanadium	2.8E+01	ug/L	--	--	--	--	--
			TOTAL			**1.3E-04**	**3.8E-05**	**2.3E-06**	**--**	**2.E-04**

TOTAL (soil [0-2 ft bgs] + groundwater) = 2.E-04
TOTAL (soil [0-10 ft bgs] + groundwater) = 2.E-04

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Table A7-4
Risk Characterization Summary - Carcinogens
SA 091

Scenario Timeframe:	**Future**									
Receptor Population:	**Outdoor Occupational**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 091 - Soil On-site Direct Contact (0-2 ft bgs)	DDD	8.2E-04	mg/kg	3.4E-11	8.6E-16	3.9E-11	--	7.3E-11
			DDE	8.9E-04	mg/kg	5.3E-11	1.3E-15	6.0E-11	--	1.1E-10
			DDT	1.4E-03	mg/kg	8.6E-11	2.1E-15	9.8E-11	--	1.8E-10
			TOTAL			**1.7E-10**	**4.3E-15**	**2.0E-10**	**--**	**4.E-10**
Scenario Timeframe:	**Future**									
Receptor Population:	**Construction Worker**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 091 - Soil On-site Direct Contact (0-15 ft bgs)	DDD	1.0E-03	mg/kg	1.6E-11	4.2E-17	7.6E-12	--	2.4E-11
			DDE	1.6E-02	mg/kg	3.6E-10	9.4E-16	1.7E-10	--	5.3E-10
			DDT	1.2E-02	mg/kg	2.8E-10	7.3E-16	1.3E-10	--	4.1E-10
			TOTAL			**6.6E-10**	**1.7E-15**	**3.1E-10**	**--**	**1.E-09**

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Table A7-5
Risk Characterization Summary - Non-Carcinogens
SA 091

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 091 - Soil On-site Direct Contact (0-2 ft bgs)	DDD	8.2E-04	mg/kg		2.2E-06	2.8E-11	4.5E-07	1.8E-05	2.1E-05
			DDE	8.9E-04	mg/kg		2.4E-06	3.1E-11	4.9E-07	1.3E-05	1.6E-05
			DDT	1.4E-03	mg/kg	Liver	3.9E-06	4.9E-11	7.9E-07	4.7E-06	9.4E-06
			TOTAL				**8.5E-06**	**1.1E-10**	**1.7E-06**	**3.6E-05**	**5.E-05**
		SA 091 - Soil On-site Direct Contact (0-10 ft bgs)	DDD	1.0E-03	mg/kg		2.7E-06	3.4E-11	5.5E-07	2.2E-05	2.5E-05
			DDE	1.6E-02	mg/kg		4.3E-05	5.4E-10	8.6E-06	2.3E-04	2.8E-04
			DDT	1.2E-02	mg/kg	Liver	3.4E-05	4.2E-10	6.7E-06	1.9E-04	2.3E-04
			TOTAL				**8.0E-05**	**9.9E-10**	**1.6E-05**	**4.4E-04**	**5.E-04**
Groundwater	Groundwater	SA 091 - Groundwater On-Site Direct Contact	Chloroform	2.1E-01	ug/L	Liver	5.8E-04	3.4E-04	4.3E-05	--	9.6E-04
			1,1-Dichloroethane	1.1E+00	ug/L	Kidney	2.9E-04	1.0E-03	1.8E-05	--	1.3E-03
			1,2-Dichloroethane	1.8E-01	ug/L		2.4E-04	2.1E-04	9.5E-06	--	4.6E-04
			1,1-Dichloroethene	2.4E+00	ug/L	Liver	1.3E-03	5.6E-03	1.5E-04	--	7.1E-03
			cis-1,2-Dichloroethene	3.3E+00	ug/L	Blood-forming system	9.1E-03	4.5E-02	8.6E-04	--	5.5E-02
			Trichloroethene	9.6E+01	ug/L	Nervous system	8.8E+00	7.7E-02	1.2E+00	--	1.0E+01
			Arsenic	5.1E+00	ug/L	Skin	4.7E-01	--	1.3E-03	--	4.7E-01
			Barium	5.4E+01	ug/L	Kidney	7.4E-03	--	2.1E-05	--	7.4E-03
			Chromium	1.1E+01	ug/L	None reported	2.0E-04	--	5.8E-07	--	2.0E-04
			Chromium, hexavalent	9.9E+00	ug/L	None reported	9.0E-02	--	5.2E-04	--	9.1E-02
			Iron	8.7E+01	ug/L		7.9E-03	--	2.3E-05	--	7.9E-03
			Nickel	1.6E+00	ug/L	Decreased weight	2.2E-03	--	1.3E-06	--	2.2E-03
			Vanadium	2.8E+01	ug/L	Liver and kidney	7.7E-01	--	2.2E-03	--	7.7E-01
			TOTAL				**1.0E+01**	**1.3E-01**	**1.2E+00**	**--**	**11**

TOTAL (soil [0-2 ft bgs] + groundwater) = 11
TOTAL (soil [0-10 ft bgs] + groundwater) = 11

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Table A7-5
Risk Characterization Summary - Non-Carcinogens
SA 091

Scenario Timeframe:	**Future**										
Receptor Population:	**Resident**										
Receptor Age:	**Child**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 091 - Soil On-site Direct Contact (0-2 ft bgs)	DDD	8.2E-04	mg/kg		2.1E-05	6.5E-11	3.0E-06	5.1E-05	7.5E-05
			DDE	8.9E-04	mg/kg		2.3E-05	7.1E-11	3.3E-06	3.6E-05	6.2E-05
			DDT	1.4E-03	mg/kg	Liver	3.7E-05	1.2E-10	5.3E-06	6.2E-05	1.0E-04
			TOTAL				**8.1E-05**	**2.6E-10**	**1.2E-05**	**1.5E-04**	**2.E-04**
		SA 091 - Soil On-site Direct Contact (0-10 ft bgs)	DDD	1.0E-03	mg/kg		2.6E-05	8.0E-11	3.7E-06	6.2E-05	9.2E-05
			DDE	1.6E-02	mg/kg		4.0E-04	1.3E-09	5.9E-05	6.3E-04	1.1E-03
			DDT	1.2E-02	mg/kg	Liver	3.1E-04	9.8E-10	4.6E-05	5.3E-04	8.9E-04
			TOTAL				**7.4E-04**	**2.4E-09**	**1.1E-04**	**1.2E-03**	**2.E-03**
Groundwater	Groundwater	SA 091 - Groundwater On-Site Direct Contact	Chloroform	2.1E-01	ug/L	Liver	1.3E-03	7.8E-04	6.9E-05	--	2.2E-03
			1,1-Dichloroethane	1.1E+00	ug/L	Kidney	6.7E-04	2.4E-03	2.9E-05	--	3.1E-03
			1,2-Dichloroethane	1.8E-01	ug/L		5.7E-04	4.9E-04	1.5E-05	--	1.1E-03
			1,1-Dichloroethene	2.4E+00	ug/L	Liver	3.1E-03	1.3E-02	2.4E-04	--	1.7E-02
			cis-1,2-Dichloroethene	3.3E+00	ug/L	Blood-forming system	2.1E-02	1.1E-01	1.4E-03	--	1.3E-01
			Trichloroethene	9.6E+01	ug/L	Nervous system	2.0E+01	6.3E-03	2.0E+00	--	2.2E+01
			Arsenic	5.1E+00	ug/L	Skin	1.1E+00	--	2.2E-03	--	1.1E+00
			Barium	5.4E+01	ug/L	Kidney	1.7E-02	--	3.5E-05	--	1.7E-02
			Chromium	1.1E+01	ug/L	None reported	4.7E-04	--	9.4E-07	--	4.7E-04
			Chromium, hexavalent	9.9E+00	ug/L	None reported	2.1E-01	--	8.4E-04	--	2.1E-01
			Iron	8.7E+01	ug/L		1.9E-02	--	3.7E-05	--	1.9E-02
			Nickel	1.6E+00	ug/L	Decreased weight	5.1E-03	--	2.0E-06	--	5.1E-03
			Vanadium	2.8E+01	ug/L	Liver and kidney	1.8E+00	--	3.6E-03	--	1.8E+00
			TOTAL				**2.3E+01**	**1.3E-01**	**2.0E+00**	**--**	**25**

TOTAL (soil [0-2 ft bgs] + groundwater) = 25
TOTAL (soil [0-10 ft bgs] + groundwater) = 25

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Table A7-5
Risk Characterization Summary - Non-Carcinogens
SA 091

Scenario Timeframe:	**Future**										
Receptor Population:	**Outdoor Occupational**										
Receptor Age:	**Adult**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 091 -	DDD	8.2E-04	mg/kg		8.0E-07	2.0E-11	9.1E-07	--	1.7E-06
		Soil On-site	DDE	8.9E-04	mg/kg		8.7E-07	2.2E-11	1.0E-06	--	1.9E-06
		Direct Contact	DDT	1.4E-03	mg/kg	Liver	1.4E-06	3.5E-11	1.6E-06	--	3.0E-06
		(0-2 ft bgs)	**TOTAL**				**3.1E-06**	**7.7E-11**	**3.5E-06**	**--**	**7.E-06**
Scenario Timeframe:	**Future**										
Receptor Population:	**Construction Worker**										
Receptor Age:	**Adult**										
							ROD 2007 Updated Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 091 -	DDD	1.0E-03	mg/kg		9.4E-06	2.4E-11	4.5E-06	--	1.4E-05
		Soil On-site	DDE	1.6E-02	mg/kg		1.5E-04	3.9E-10	7.0E-05	--	2.2E-04
		Direct Contact	DDT	1.2E-02	mg/kg	Liver	1.2E-04	3.0E-10	5.5E-05	--	1.8E-04
		(0-10 ft bgs)	**TOTAL**				**2.8E-04**	**7.1E-10**	**1.3E-04**	**--**	**4.E-04**

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Appendix B
Site Characteristics for Group 2 Sites

SECTION B1

AOC G-2

B1.1 Site Overview and Features

AOC G-2 is located in the south-central portion of OU G, and is within the proposed Core Aviation/Industrial District. The site borders the East McClellan District, residential housing to the south and east, and a significant source of VOC contamination, PRL T-044, to the west. AOC G-2 was formerly known as Tank Farm 7 and served as a storage location for petroleum, oil, and lubricants. The former Wherry Housing area is located directly south and east of AOC G-2 with the nearest housing units located approximately 150 feet from the contaminated areas.

AOC G-2 operated from the mid-1950s until 1999. In 1999, the former Tank Farm 7 was demolished under the fuels program. The site contained an aboveground storage tank (AST), underground fuel distribution pipelines, fuel filtration units constructed on concrete pads, two fueling stands, storm water sewers, and Building 1059 (for office use). The AST stored JP-4 and later stored JP-8. Based on interview results, the AST may have originally stored aviation gasoline for C-121 aircraft. The area below the tank was lined with clay and covered with gravel. In addition, the clay-lined area was encircled by an asphalt and concrete covered overflow berm.

B1.2 Source of Contamination

The primary contaminants at AOC G-2 are total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAHs) in soil and volatile organic compounds (VOCs) in soil gas. The UST removed in 1995 was not found to be the source of contamination at this site. The source of soil and soil gas contamination was likely due to spills and leaks from the AST and the associated piping.

A bioventing system was installed at the site in 2000. The system operated until 2003 and was decommissioned because the subsurface within its influence was fully oxygenated (Parsons, 2003). The site is partially located within the area of influence of an operating SVE system at PRL T-044 installed in 2001. The area has been monitored for soil gas contamination as a part of both the SVE and bioventing programs.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Jacobs. 2000a. *Operable Units: E-H Remedial Investigation Characterization Summaries 2*. Final. June.

  Text: Vol. 1, AOC G-2, pgs. 1-16
  Hits Table: Vol. 1, AOC G-2, Attachment 1, pgs. 1-3
  All Data: Vol. 3, Appendix A, AOCG2, pgs. 12-16
  HHRA Data: Vol. 6, Appendix C1, Section 9.7 pgs. 9-25 to 9-29, Tables 9.7.6 to 9.7.12

- Parsons. 2003. *Baseline Services Report for Five Bioventing Sites at McClellan and Davis Global Communications Site, California*. July.
- URS. 2004. *OU G RICS Addendum, POL/SSG Investigation*. June.
- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May.
- CH2M HILL. 2007. *Phase 1 LRA Initial Parcel #2 Pre-Decision Work Plan*. Final. August.
- CH2M HILL. 2007. Pre-Decision Sampling Results for AOC G-2 (located in Appendix D of this document).

B1.3 Sampling Strategy and Type of Contamination

Three field investigations were performed to evaluate vadose zone contaminated by TPH and PAHs in soil and VOCs in SSG.

In 1995, when the UST was removed, confirmation sampling was performed. These samples were collected to determine whether the UST that collected runoff and spills from the filtration units had contaminated the soils in AOC G-2. Four soil samples were analyzed for VOCs and TPH. Soil and soil gas samples were not collected from below the drains. The nearest soil sample was collected immediately north of Building 1059 during the UST removal.

In 1997 and 1998, the first phase of a remedial investigation for OU G RICS was performed within the bermed area. Soil and soil gas samples were collected for laboratory analyses from 12 soil borings (AG02SB001 through AG02SB0012) and 3 SSG borings (AG02SB013 through AG02SB015). Samples were analyzed for VOCs (10 samples by method M18MS) and for TPH-D and TPH-G (32 samples by SW8015D and SW8015V, respectively).

In 2003 eight borings (AG02SB016U through AG02SB023U) were drilled outside the bermed area for the SSG/POL investigation (OU G RICS Addendum for POL/SSG). Twenty six soil and soil gas samples were collected along the former underground piping areas to define the extent of TPH contamination. During the POL/SSG effort, samples were analyzed for VOCs (16 samples by TO-15), PAHs (26 samples by method SW8310) and TPH-D and TPH-G (24 samples by method SW8015D and SW8015V). The SSG samples were collected while the adjacent PRL T-44 SVE system was operational; therefore, the analytical results are not appropriate for a quantitative risk assessment.

In 2007, soil, soil gas, and groundwater samples were collected during the pre-decision sampling effort to better define the volume of soil to be excavated. Data from the samples were used to determine the current concentrations of TPH in soil within the berm, assess the presence of PAHs, and determine the current concentrations of VOCs in soil gas beneath and outside the berm. Twenty-six borings were drilled, and soil samples were collected and analyzed for PAHs, TPH-D, TPH-G, and VOCs. Twenty-seven soil gas samples were collected and analyzed for VOCs by Method TO-15. One groundwater sample was collected and analyzed for VOCs, TPH-D, and TPH-G. The results from the pre-decision sampling effort and the three previous investigations are summarized below. For more details regarding the results from the pre-decision sampling effort, please see Appendix D of this document.

B1.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at AOC G-2. TPH, PAHs and VOCs were determined to be present at the site, and benzo(a)pyrene, dibenzo(a,h)anthracene, VOCs, TPH-G and TPH-D may pose a risk to human health and the environment. Figure B-1a identifies the site location and significant site features.

B1.4.1 TPH

While a biovent system operated at the site for several years, TPH contamination is still present at the site at elevated concentrations. The elevated concentrations of TPH contamination were limited to the shallow soils (≤ 10 feet) located in the containment berm. The source of this TPH-G and THP-D contamination was likely due to spills and leaks from the AST and the associated piping.

B1.4.1.1 UST Area

TPH was not detected at significant concentrations in soil during the UST removal. Only one low-level detection of TPH-D (2.6 mg/kg) was reported. A closure letter was issued by Sacramento County in 1996.

B1.4.1.2 AST Bermed Area

During the RICS, detections of total petroleum hydrocarbons as diesel (TPH-D) were reported in nine samples from five borings at AOC G-2 and TPH-G was reported in six samples from three borings. Elevated levels of TPH-D and TPH-G were detected in the 0.5- and 6-foot samples at borings AG02SB004 and AG02SB006. Elevated levels of TPH-G were additionally detected in the 0.5- and 6-foot samples at boring AG02SB007. TPH was not detected in any of the samples below 6 feet in these borings. The maximum TPH-D and TPH-G concentrations were reported as 2,300 mg/kg and 1,900 mg/kg, respectively (from the 6-foot sample from boring AG02SB006 to the south of the AST), which exceed the screening levels for protection of groundwater and surface water.

In soil samples collected during the pre-decision sampling effort, concentrations of TPH-D and TPH-G were detected greater than screening levels. The maximum concentration of TPH-D was detected at 3,000 mg/kg from AG02SB027 at 10 feet bgs. The maximum TPH-G concentration was detected at 15,000 mg/kg from AG02SB026 at 10 feet bgs. The results from the pre-decision sampling effort confirm the presence of TPH at concentrations greater than screening levels within the bermed area.

B1.4.1.3 Outside Bermed Area

The reported concentrations did not exceed the screening levels. A single detection (2.3 mg/kg) of TPH-D was reported in a sample collected at 5 feet bgs from boring A02SB020U (URS, 2003). In samples collected during the pre-decision sampling effort, TPH-D and TPH-G were not detected in soil samples collected outside the bermed area at concentrations exceeding screening levels. This reinforces the conclusion reached in the OUs E-H RICS that TPH contamination at AOC G-2 is likely the result of possible spills and leaks associated with the fuel facility and is limited to the near-surface soils (less than 10 feet bgs) within the containment berm (Jacobs, 2000a).

B1.4.2 VOCs

VOCs have been detected in SSG at the site during the RI and during the pre-decision sampling effort in 2007. This last sampling effort was subsequent to biovent system operation to remediate fuel contamination within the bermed area and SVE system operation to remediate VOCs originating from the adjacent site PRL T-044.

B1.4.2.1 UST Area

No VOCs were detected above screening levels. Methylene chloride was the only VOC detected.

B1.4.2.2 AST Bermed Area

In 1997 and 1998 elevated concentrations of VOCs, most notably benzene at 92,000 ppbv in boring AG02SB013 (9.7 feet bgs) and trichloroethene at 69,000 ppbv in boring PT44SB014 (20.3 feet bgs), were reported in SSG samples collected within the berm. The benzene concentration exceeds the screening level for unrestricted and industrial use scenarios.

In soil gas samples collected during the pre-decision sampling effort, maximum concentrations include hexane at a concentration of 1,380,000 ppbv, m,p-xylene at 271,000 ppbv, o-xylene at 59,000 ppbv, and 1,2,4-trimethylbenzene at 12,500 ppbv, all detected in soil gas samples from AG02SB027 (located within the berm) (Figure B-1b). Concentrations reported for 1,1,2,2-tetrachloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, hexane, m,p-xylene, methylene chloride, n-propylbenzene, o-xylene, and PCE exceed unrestricted use screening levels. Concentrations of 1,1,2,2-tetrachloroethane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, hexane, m,p-xylene, and o-xylene also exceed industrial use screening levels.

B1.4.2.3 Outside Bermed Area

Overall, VOC concentrations were low. Maximum benzene concentrations were reported in a sample collected at 5 feet bgs from boring AG02SB018U (13 ppbv) and in a sample collected at 15 feet bgs from boring AG02SB022U (13 ppbv). The SVE system at PRL T-044 was operational at the time that these samples were collected; however, these borings were not within the 300-foot radius of influence of the SVE system. Only AG02SB016U was within the radius of influence of the PRL T-044 SVE system.

During the pre-decision sampling effort, benzene was the only VOC detected in soil gas samples collected outside the bermed area at concentrations exceeding a screening level. It was detected in the 15-foot-bgs soil gas samples from AG02SB033 and AG02SB034 at concentrations of 10.0 ppbv and 19.7 ppbv, respectively. Both borings are located south of the bermed area.

B1.4.3 PAHs

PAHs were detected in 3 of the 26 soil samples collected adjacent to the underground piping outside of the berm during the POL/SSG field effort. All samples were analyzed using method SW8310. The concentrations of benzo(a)pyrene (0.021 mg/kg) and Dibenzo(a,h)anthracene (0.026 mg/kg) exceeded their screening level for protection of

human health (0.011 and 0.021 mg/kg, respectively) in a duplicate soil sample collected in boring AG02SB020U at 5 feet bgs but were not detected in the associated normal sample.

In soil samples collected during the pre-decision sampling effort, seven PAHs were detected in samples collected between the surface and 10 feet bgs at concentrations greater than screening levels for unrestricted use. Four of the seven detected PAHs, including naphthalene, benzo(a)pyrene, benzo(a)anthracene, and benzo(b)fluoranthene, had concentrations greater than industrial use screening levels. All PAHs with concentrations greater than screening levels were detected in samples collected within the bermed area. Naphthalene was the most frequently detected PAH. The maximum concentration was 9.2 mg/kg from AG02SB027 at 10 feet bgs. PAHs were not detected in any soil samples collected at 15 feet bgs.

B1.5 Contamination Exposure and Migration

Data indicate that TPH concentrations in surface soils could impact groundwater and surface water. The current assessment of contamination at this site does not take into account the effects of bioventing and SVE.

B1.6 Current and Potential Future Site and Resource Uses

Currently the site is vacant. In the future, AOC G-2 will likely be used for commercial/industrial purposes.

B1.7 Human Health Risk Assessment

A human health risk assessment (HHRA) was completed for the site using results collected during the RI and during the pre-decision sampling effort. The exposure area identified in the RICS for AOC G-2 encompasses the area within the containment berm and is limited to a depth of less than 10 feet as this was the only area where SSG was collected. However, the previous risk assessment was considered incomplete because of significant uncertainties regarding PAHs, TPH, and SSG. These uncertainties have subsequently been resolved by additional sampling at the site.

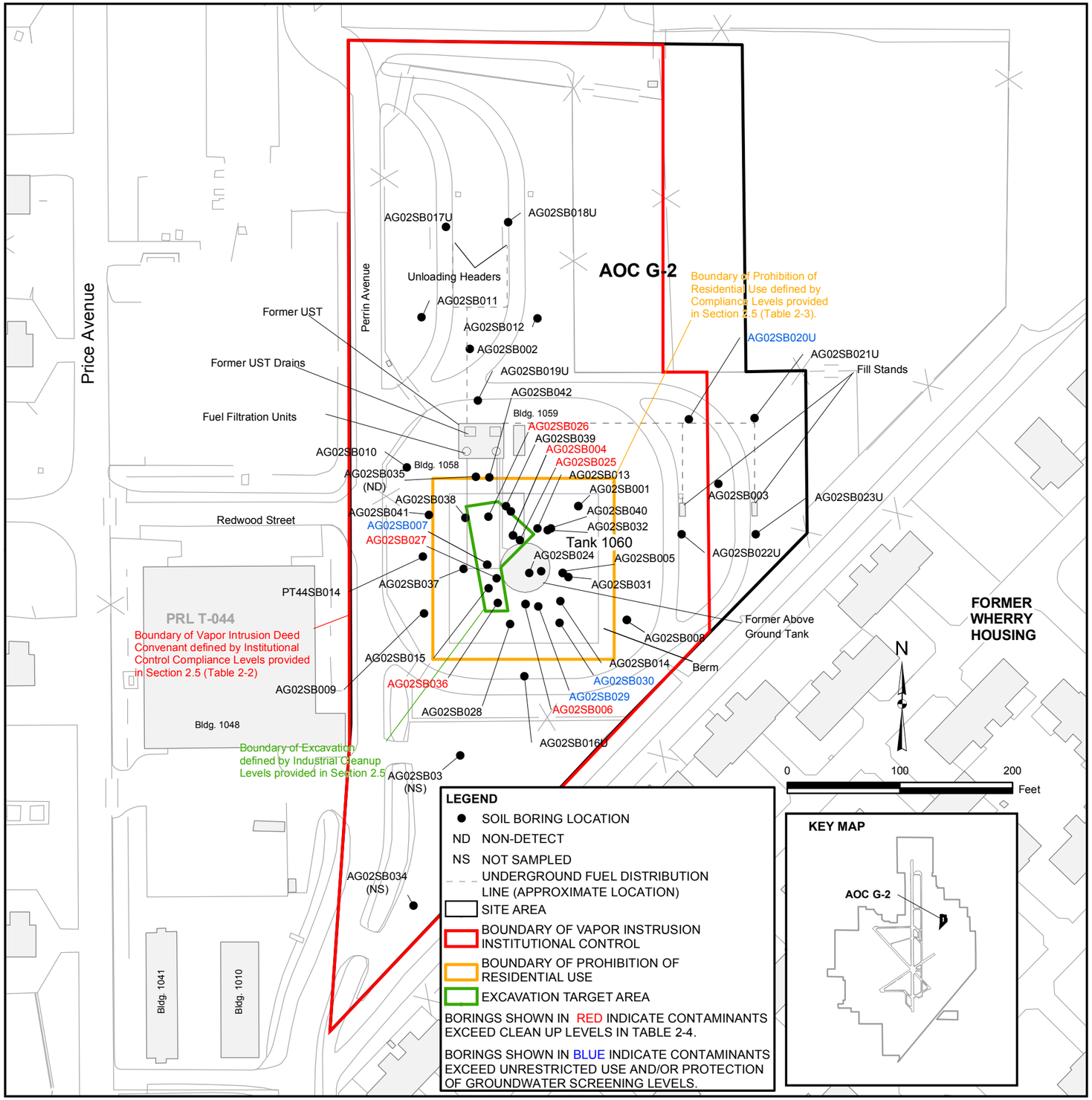
Risk estimates at AOC G-2 were calculated for ten PAHs detected in soil and VOCs detected in SSG. SSG data include data collected during the POL/SSG (not including data from AG02SB016U) and during the IP #2 pre-decision sampling effort. The risk estimates are shown in the risk summary tables for AOC G-2 (Attachment 1). The estimated cancer risk is 5×10^{-3} for the residential scenario, and the noncarcinogenic risk is 400. For the industrial scenario, the estimated cancer risk is 3×10^{-4} and the noncarcinogenic risk is 30. The primary drivers for the carcinogenic risk are 1,1,2,2-tetrachloroethane and ethylbenzene. Fuel-related VOCs are the primary contributors to the noncarcinogenic risk. Risk summary tables are provided as an attachment at the end of this site summary.

B1.8 Uncertainties

The sampling and analyses performed at AOC G-2 were sufficient and appropriate for the potential contaminants and release mechanisms at this site. There were no uncertainties identified for this site.

B1.9 Basis for Action

The risk estimates for AOC G-2 are greater than the EPA's range of acceptable risk. In addition, TPH-G in soil presents a risk to surface water and groundwater. Therefore, the response action selected in this ROD is necessary to protect human health and to protect water quality from actual or threatened releases of hazardous substances into the environment. The selected remedial action is excavation of contaminated soil with concentrations exceeding industrial cleanup levels and offsite disposal. In addition, institutional controls, including prohibition of residential use and a deed covenant for SSG contamination, will be applied within the areas shown on Figure B-1a. The boundary for the prohibition against residential use encompasses an area that includes sampling locations with detected concentrations that exceed the non-VOC institutional control compliance levels for unrestricted use presented in Section 2.5 (see Table 2-3). The boundary for the deed covenant addressing potential SSG contamination encompasses all site-related locations with detected VOC concentrations that exceed the institutional control compliance levels provided in Section 2.5 (see Table 2-2) for unrestricted use and a sufficient buffer.



Boring	Depth (feet bgs)	Contaminant	Concentration (mg/kg)
AG02SB004	0.25	TPH-D	260
		TPH-G	**1,400J (FD)**
	6	TPH-D	250
		TPH-G	**270**
AG02SB006	0.5	**TPH-G**	**540**
	6	TPH-D	2300
		TPH-G	**1900**
AG02SB007	0.5	TPH-G	26
	5	TPH-G	15J
AG02SB020U	5	Benzo(a)pyrene	0.021J (FD)
AG02SB025*	0.5	TPH-D	510
	5	TPH-D	110J (FD)
		TPH-G	**570J (FD)**
		TPH-G	130J
		Naphthalene	0.37 (FD)
		Naphthalene	0.35
	10	**TPH-G**	**1,300**
AG02SB026*	10	TPH-D	1,900
		TPH-G	**15,000**
		Benzo (a) anthracene	**2.3J+**
		Benzo (a) pyrene	**1.4J+**
		Benzo (b) fluoranthene	**1.2J+**
		Benzo(k)fluoranthene	0.32J+
		Dibenzo (a,h) anthracene	0.099J+
		Indeno (1,2,3-c,d) pyrene	0.54J+
		Naphthalene	1J+
AG02SB027*	0.5	TPH-D	1,000 (FD)
		TPH-D	920
		TPH-G	**900J (FD)**
		TPH-G	450J
		Naphthalene	1.9 (FD)
		Naphthalene	1.5
	5	TPH-G	120J+
		Benzo (a) anthracene	**1.6J-**
		Naphthalene	0.48
	10	TPH-D	3,000
		TPH-G	100
		Naphthalene	**9.2**
AG02SB029*	5	TPH-G	69
AG02SB030*	0.5	Benzo (b) fluoranthene	0.076
		Dibenzo (a,h) anthracene	0.031J
AG02SB036*	5	**TPH-G**	**260**

* = Pre-decision sample location
(FD) = Field duplicate
ND = Non-detect
NA = Not analyzed
J = Estimated
J- = Estimated, biased low
J+ = Estimated, biased high

All contaminants shown exceed unrestricted use and/or protection of groundwater screening levels.
Bold text = exceeds clean up levels in Table 2-4

Borings with concentrations less than screening levels are shown on figure.
Borings not sampled for non-VOCs indicated with NS.

FIGURE B-1a
AOC G-2 NON-VOC CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA
CH2MHILL

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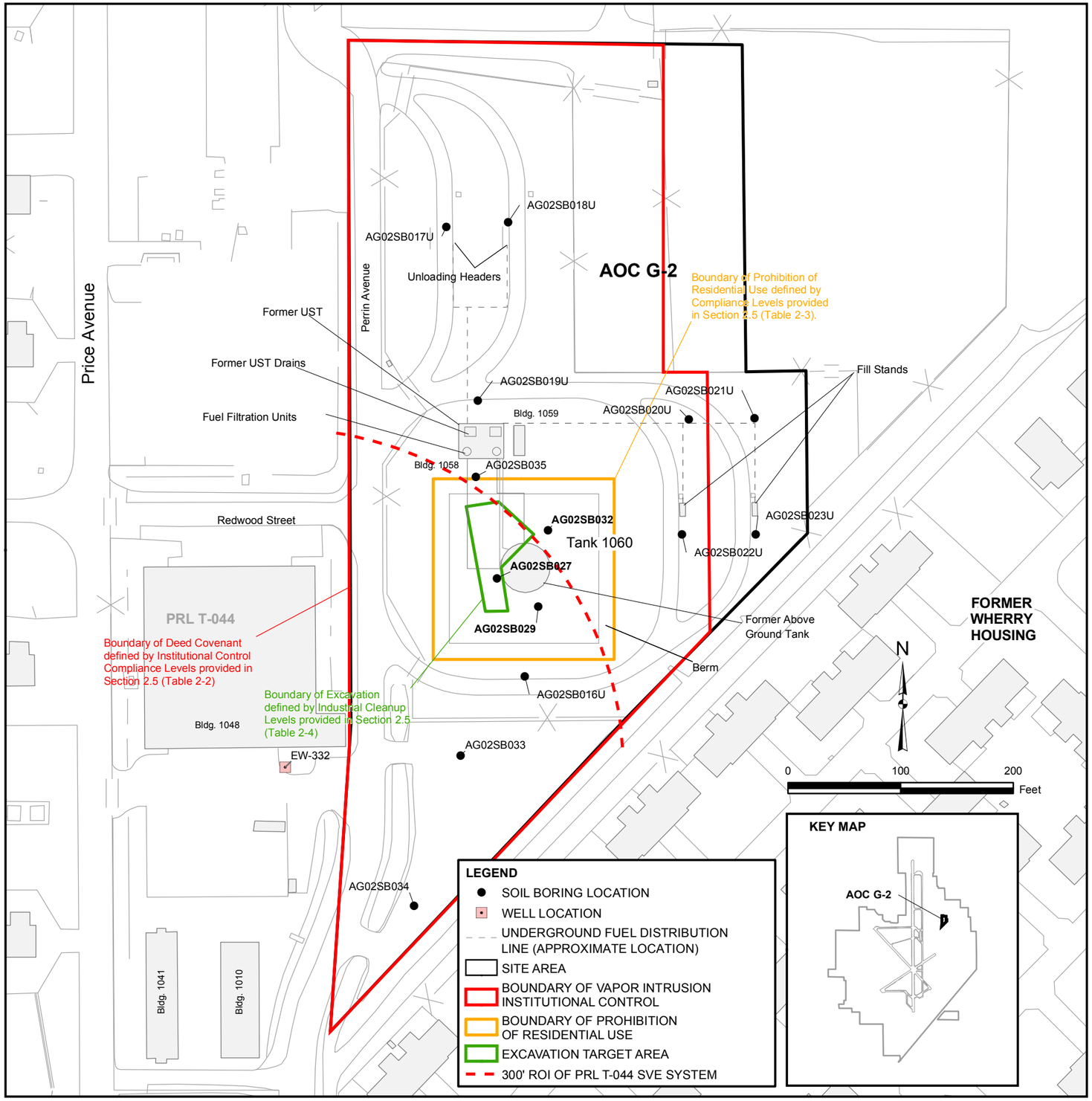

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VOCs in Soil Gas

Boring	Depth (ft bgs)	Contaminant	Concentration (ppbv)
AG02SB018U	5	Benzene	13
AG02SB022U	15	Benzene	12
		Benzene	13 (FD)
AG02SB027*	5	**1,2,4-Trimethylbenzene**	**3200**
		1,3,5-Trimethylbenzene	644
AG02SB027*	15	**1,2,4-Trimethylbenzene**	**12500 J**
		1,3,5-Trimethylbenzene	**5270 J**
		Ethylbenzene	56200
		Hexane	**1380000**
		m,p-Xylene	**271000**
		n-Propylbenzene	7900 J-
		o-Xylene	**59500**
		Toluene	84500
AG02SB029*	5	1,2,4-Trimethylbenzene	1300 J
		1,3,5-Trimethylbenzene	744 J
		Hexane	32300
		m,p-Xylene	7870
AG02SB029*	15	**1,1,2,2-Tetrachloroethane**	**323**
		1,2,4-Trimethylbenzene	1180
		1,3,5-Trimethylbenzene	589
		m,p-Xylene	4360
		Tetrachloroethylene	47.8 J
AG02SB032*	5	Methylene Chloride	329 J
AG02SB032*	15	**1,1,2,2-Tetrachloroethane**	**1340**
AG02SB033*	15	Benzene	10.3 J
AG02SB034*	15	Benzene	19.7J

Notes:
* = Pre-decision sample location
(FD) = Field duplicate
J = Estimated
J- = Estimated, biased low

All contaminants shown exceed unrestricted use screening levels.
Bold text = exceeds industrial screening levels

Data from boring AG02SB016U is not included because it is within the ROI of the PRL T-044 SVE system and the system was operating when the data was collected.

Only borings where shallow soil gas data were collected are shown on this figure. Results for borings without data listed are less than screening levels.

FIGURE B-1b
AOC G-2 VOC CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA
CH2MHILL

Attachment B1
AOC G-2 Risk Summary Tables

AOC G-2 ATTACHMENT B1

Risk Summary Table for AOC G-2, Unrestricted Use Scenario

Initial Parcel #2 Feasibility Study, Former McClellan Air Force Base, California

Analyte	Frequency of Detection	Units	Minimum Detected Concentration	Maximum Detected Concentration	EPC*	EPC basis*	AFRPA Preliminary Cleanup Goals (PCGs)		Estimated Risk Based on AFRPA PCGs	
							Cancer Target Risk = 1.0 x 10^{-6}	Non-Cancer Target HI =1	Carcinogenic Risk	Non-carcinogenic risk
Soil (0 to 10 ft bgs)										
Acenaphthene	1/33	mg/kg	0.710	0.710	0.710	Max Concentration	NA	290		2.5E-03
Anthracene	2/33	mg/kg	0.190	1.60	1.60	Max Concentration	NA	2,300		6.8E-04
Benzene	5/13	mg/kg	5.80E-04	0.180	0.180	Max Concentration	0.63	32	2.8E-07	5.6E-03
Benzo (a) anthracene	5/33	mg/kg	0.00450	2.30	2.30	Max Concentration	0.088	570	2.6E-05	4.0E-03
Benzo (a) pyrene	1/33	mg/kg	1.40	1.40	1.40	Max Concentration	0.018	680	7.9E-05	2.1E-03
Benzo (b) fluoranthene	4/33	mg/kg	0.00680	1.20	1.20	Max Concentration	0.11	680	1.1E-05	1.8E-03
Benzo (g,h,i) perylene	1/33	mg/kg	0.0880	0.0880	0.0880	Max Concentration	NA	750		1.2E-04
Benzo(k)fluoranthene	1/33	mg/kg	0.320	0.320	0.320	Max Concentration	0.11	670	3.0E-06	4.8E-04
Chrysene	1/33	mg/kg	0.160	0.160	0.160	Max Concentration	0.88	570	1.8E-07	2.8E-04
Dibenzo (a,h) anthracene	4/33	mg/kg	0.0130	0.0990	0.0990	Max Concentration	0.038	790	2.6E-06	1.3E-04
Ethylbenzene	9/13	mg/kg	0.00210	4.40	4.40	Max Concentration	3.8	1,700	1.2E-06	2.5E-03
Fluoranthene	3/33	mg/kg	0.0140	0.130	0.130	Max Concentration	NA	490		2.7E-04
Fluorene	6/33	mg/kg	0.0160	1.90	1.90	Max Concentration	NA	240		7.9E-03
Indeno (1,2,3-c,d) pyrene	4/33	mg/kg	0.0100	0.540	0.540	Max Concentration	0.12	760	4.4E-06	7.1E-04
m,p-Xylene	11/13	mg/kg	0.00160	9.90	9.90	Max Concentration	NA	270		3.7E-02
Naphthalene	7/33	mg/kg	0.0120	9.20	9.20	Max Concentration	2.4	25	3.8E-06	3.7E-01
o-Xylene	9/13	mg/kg	1.00E-03	3.20	3.20	Max Concentration	NA	570		1.2E-02
Phenanthrene	7/33	mg/kg	0.0610	5.90	5.90	Max Concentration	NA	260		2.2E-02
Pyrene	2/33	mg/kg	0.0300	0.0640	0.0640	Max Concentration	NA	350		1.8E-04
tert-Butyl Alcohol	1/13	mg/kg	0.0360	0.0360	0.0360	Max Concentration	NA	NA		
Toluene	6/13	mg/kg	9.50E-04	2.60	2.60	Max Concentration	NA	3,100		8.3E-04
Soil Gas (0 to 15 ft bgs)										
1,1,2,2-Tetrachloroethane	2/34	ppbv	323	1,340	1,340	Max Concentration	0.61	3,100	2.2E-03	4.4E-01
1,2,4-Trichlorobenzene	1/34	ppbv	0.335	0.335	0.335	Max Concentration	NA	47		7.1E-03
1,2,4-Trimethylbenzene	19/34	ppbv	0.257	12,500	12,500	Max Concentration	NA	120		1.0E+02
1,3,5-Trimethylbenzene	12/34	ppbv	0.241	5,270	5,270	Max Concentration	NA	120		4.3E+01
1,3-Dichlorobenzene	1/34	ppbv	0.174	0.174	0.174	Max Concentration	NA	1,700		1.0E-04
1,4-Dichlorobenzene	1/34	ppbv	0.304	0.304	0.304	Max Concentration	3.5	13,000	8.8E-08	2.3E-05
Acetone	14/20	ppbv	67.9	747	747	Max Concentration	NA	130,000		5.6E-03
Benzene	5/34	ppbv	2.40	248	248	Max Concentration	9.9	940	2.5E-05	2.6E-01
Chloroform	2/34	ppbv	0.527	0.860	0.860	Max Concentration	2.2	6,100	4.0E-07	1.4E-04
Chloromethane	1/34	ppbv	1.10	1.10	1.10	Max Concentration	65	4,400	1.7E-08	2.5E-04
Ethylbenzene	21/34	ppbv	0.189	56,200	56,200	Max Concentration	22	23,000	2.6E-03	2.5E+00
Hexane	14/20	ppbv	6.05	1.38E+06	1.38E+06	Max Concentration	NA	20,000		6.9E+01
m,p-Xylene	31/34	ppbv	0.513	271,000	271,000	Max Concentration	NA	2,300		1.2E+02
MEK (2-Butanone)	13/20	ppbv	9.53	143	143	Max Concentration	NA	170,000		8.6E-04
Methyl t-butyl ether (MtBE)	1/34	ppbv	7.44	7.44	7.44	Max Concentration	260	83,000	2.9E-08	8.9E-05
Methylene Chloride	9/34	ppbv	2.00	329	329	Max Concentration	150	12,000	2.2E-06	2.9E-02
MIBK (Methyl Isobutyl Ketone)	3/20	ppbv	0.756	52.9	52.9	Max Concentration	NA	73,000		7.2E-04
n-Butylbenzene	1/20	ppbv	104	104	104	Max Concentration	NA	2,600		4.1E-02
Heptane	8/14	ppbv	2.40	160	160	Max Concentration	NA	17,000		9.4E-03
n-Propylbenzene	9/20	ppbv	15.20	7,900	7,900	Max Concentration	NA	2,800		2.8E+00
o-Xylene	22/34	ppbv	0.243	59,500	59,500	Max Concentration	NA	2,300		2.6E+01
TCE	6/34	ppbv	2.15	13.4	13.4	Max Concentration	23	11,000	5.9E-07	1.2E-03
Tetrachloroethylene	5/34	ppbv	0.406	47.8	47.8	Max Concentration	5.8	500	8.2E-06	9.5E-02
Toluene	30/34	ppbv	0.729	84,500	84,500	Max Concentration	NA	130,000		6.4E-01
Trichlorotrifluoroethane	4/34	ppbv	0.521	2.15	2.15	Max Concentration	NA	390,000		5.6E-06
Total									**5.E-03**	**4.E+02**

* Maximum concentration was used in risk ratio calculations.

NA = not available – no PCG has been established for this compound

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AOC G-2 ATTACHMENT B1

Risk Summary Table for AOC G-2, Industrial Scenario

Initial Parcel #2 Feasibility Study, Former McClellan Air Force Base, California

Analyte	Frequency of Detection	Units	Minimum Detected Concentration	Maximum Detected Concentration	EPC*	EPC basis*	AFRPA Preliminary Cleanup Goals (PCGs)		Estimated Risk Based on AFRPA PCGs	
							Cancer Target Risk = 1.0 x 10^{-6}	Non-Cancer Target HI =1	Carcinogenic Risk	Non-carcinogenic risk
Soil (0 to 10 ft bgs)										
Acenaphthene	1/33	mg/kg	0.710	0.710	0.710	Max Concentration	NA	16,000		4.4E-05
Anthracene	2/33	mg/kg	0.190	1.60	1.60	Max Concentration	NA	100,000		1.6E-05
Benzene	5/13	mg/kg	5.80E-04	0.180	0.180	Max Concentration	1.4	110	1.3E-07	1.6E-03
Benzo (a) anthracene	5/33	mg/kg	0.00450	2.30	2.30	Max Concentration	0.88	11,000	2.6E-06	2.0E-04
Benzo (a) pyrene	1/33	mg/kg	1.40	1.40	1.40	Max Concentration	0.14	11,000	9.7E-06	1.2E-04
Benzo (b) fluoranthene	4/33	mg/kg	0.00680	1.20	1.20	Max Concentration	0.88	11,000	1.4E-06	1.1E-04
Benzo (g,h,i) perylene	1/33	mg/kg	0.0880	0.0880	0.0880	Max Concentration	NA	11,000		7.8E-06
Benzo(k)fluoranthene	1/33	mg/kg	0.320	0.320	0.320	Max Concentration	0.88	11,000	3.6E-07	2.8E-05
Chrysene	1/33	mg/kg	0.160	0.160	0.160	Max Concentration	8.7	11,000	1.8E-08	1.5E-05
Dibenzo (a,h) anthracene	4/33	mg/kg	0.0130	0.0990	0.0990	Max Concentration	0.26	11,000	3.8E-07	8.8E-06
Ethylbenzene	9/13	mg/kg	0.00210	4.40	4.40	Max Concentration	8.3	6,900	5.3E-07	6.4E-04
Fluoranthene	3/33	mg/kg	0.0140	0.130	0.130	Max Concentration	NA	15,000		8.6E-06
Fluorene	6/33	mg/kg	0.0160	1.90	1.90	Max Concentration	NA	13,000		1.5E-04
Indeno (1,2,3-c,d) pyrene	4/33	mg/kg	0.0100	0.540	0.540	Max Concentration	0.88	11,000	6.1E-07	4.8E-05
m,p-Xylene	11/13	mg/kg	0.00160	9.90	9.90	Max Concentration	NA	900		1.1E-02
Naphthalene	7/33	mg/kg	0.0120	9.20	9.20	Max Concentration	5.1	180	1.8E-06	5.0E-02
o-Xylene	9/13	mg/kg	1.00E-03	3.20	3.20	Max Concentration	NA	900		3.6E-03
Phenanthrene	7/33	mg/kg	0.0610	5.90	5.90	Max Concentration	NA	11,000		5.2E-04
Pyrene	2/33	mg/kg	0.0300	0.0640	0.0640	Max Concentration	NA	11,000		5.8E-06
tert-Butyl Alcohol	1/13	mg/kg	0.0360	0.0360	0.0360	Max Concentration	NA	NA		
Toluene	6/13	mg/kg	9.50E-04	2.60	2.60	Max Concentration	NA	17,000		1.6E-04
Soil Gas (0 to 15 ft bgs)										
1,1,2,2-Tetrachloroethane	2/34	ppbv	323	1,340	1,340	Max Concentration	10	45,000	1.3E-04	3.0E-02
1,2,4-Trichlorobenzene	1/34	ppbv	0.335	0.335	0.335	Max Concentration	NA	690		4.9E-04
1,2,4-Trimethylbenzene	19/34	ppbv	0.257	12,500	12,500	Max Concentration	NA	1,800		7.1E+00
1,3,5-Trimethylbenzene	12/34	ppbv	0.241	5,270	5,270	Max Concentration	NA	1,800		3.0E+00
1,3-Dichlorobenzene	1/34	ppbv	0.174	0.174	0.174	Max Concentration	NA	25,000		7.0E-06
1,4-Dichlorobenzene	1/34	ppbv	0.304	0.304	0.304	Max Concentration	58	190,000	5.2E-09	1.6E-06
Acetone	14/20	ppbv	67.9	747	747	Max Concentration	NA	1.9E+06		3.9E-04
Benzene	5/34	ppbv	3.83	248	248	Max Concentration	170	14,000	1.5E-06	1.8E-02
Chloroform	2/34	ppbv	0.527	0.860	0.860	Max Concentration	36	89,000	2.4E-08	9.6E-06
Chloromethane	1/34	ppbv	1.10	1.10	1.10	Max Concentration	1,100	64,000	1.0E-09	1.7E-05
Ethylbenzene	21/34	ppbv	0.189	56,200	56,200	Max Concentration	360	330,000	1.5E-04	1.7E-01
Hexane	14/20	ppbv	6.05	1.38E+06	1.38E+06	Max Concentration	NA	290,000		4.7E+00
m,p-Xylene	31/34	ppbv	0.513	271,000	271,000	Max Concentration	NA	33,000		8.2E+00
MEK (2-Butanone)	13/20	ppbv	9.53	143	143	Max Concentration	NA	2.4E+06		5.9E-05
Methyl t-butyl ether (MtBE)	1/34	ppbv	7.44	7.44	7.44	Max Concentration	4,400	1.2E+06	1.7E-09	6.1E-06
Methylene Chloride	9/34	ppbv	3.10	329	329	Max Concentration	2,500	170,000	1.3E-07	2.0E-03
MIBK (Methyl Isobutyl Ketone)	3/20	ppbv	0.756	52.9	52.9	Max Concentration	NA	1.1E+06		4.9E-05
n-Butylbenzene	1/20	ppbv	104	104	104	Max Concentration	NA	37,000		2.8E-03
Heptane	8/14	ppbv	2.40	160	160	Max Concentration	NA	250,000		6.4E-04
n-Propylbenzene	9/20	ppbv	15.20	7,900	7,900	Max Concentration	NA	42,000		1.9E-01
o-Xylene	22/34	ppbv	0.243	59,500	59,500	Max Concentration	NA	33,000		1.8E+00
TCE	6/34	ppbv	2.15	13.4	13.4	Max Concentration	380	160,000	3.5E-08	8.1E-05
Tetrachloroethylene	5/34	ppbv	0.406	47.8	47.8	Max Concentration	98	7,300	4.9E-07	6.5E-03
Toluene	30/34	ppbv	0.729	84,500	84,500	Max Concentration	NA	1.9E+06		4.4E-02
Trichlorotrifluoroethane	4/34	ppbv	0.521	2.15	2.15	Max Concentration	NA	5.6E+06		3.8E-07
Total									**3.E-04**	**3.E+01**

* Maximum concentration was used in risk ratio calculations.

NA = not available – no PCG has been established for this compound

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SECTION B2

AOC H-1

B2.1 Site Overview and Features

AOC H-1 is located in the northeast portion of OU H and is within the East McClellan District. The site served as the Base Exchange service station since 1957. Prior to 1957 the site was a wetland and open area until 1953, when the site was used for aircraft parking. The original four fuel tanks were removed in 1991. The four replacement fuel tanks were installed in 1991. AOC H-1 includes Building 900, gas pump islands, and asphalt-covered parking areas. Areas surrounding Building 900 on all sides are paved. To the north of AOC H-1 is Laurel Avenue and to the south is Building 903. Base housing dormitories exist approximately 300 feet to the east of the site. Surface water runoff from AOC H-1 flows into storm drains that convey drainage to Second Creek. Current operations at AOC H-1 include dispensing gasoline and operating a mini-mart.

The service station opened in 1957 after installation of four single-walled steel 10,000-gallon fuel USTs and one 500-gallon waste oil UST. An additional UST was later installed in front of the station adjacent to the west side of Building 900. This tank was not used to store gasoline; and the specific year of its installation, the tank's volume, and the exact location were not documented. This UST, however, was removed in 1987. Leaks in the piping from the four fuel USTs to the dispenser were discovered in early 1986 and the piping was replaced in 1987. In 1991, the four fuel USTs were removed and replaced with four new double-walled 10,000-gallon fuel USTs (Jacobs, 2000a). The 500-gallon waste oil UST remains, but is abandoned in place. Excavation of contaminated soil (TPH and BTEX) was also performed at the pump stand location.

B2.2 Source of Contamination

The primary contaminants include TPH-D, TPH-G, SVOCs, PCBs, and metals. The likely sources of contamination include the former USTs and associated piping, piping connections to the former vapor recovery unit, an oil water separator, and an abandoned IWL drain. Surface spills may have occurred due to leaks or releases from an oil filter drain area, a battery storage area, or stored containers of oil, solvents, and sulfuric acid. Inside the service garage, hydraulic lifts were used and could have been a potential source of PCB contaminated oils. There is no evidence, however, that the hydraulic lifts have leaked. There are cracks in the pavement near the garage. The current 10,000-gallon USTs passed leak tests in 1991 and are not considered sources of contamination.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Jacobs. 2000a. *Operable Units E-H: Remedial Investigation Characterization Summaries 2.* Final. June.

  Text: Vol. 2, AOC H-1, pgs. 1-19
  Hits Table: Vol. 2, AOC H-1, Attachment 1, pgs. 1-2
  All Data: Vol. 4, Appendix A, AOCH1, pgs. 8-18, 32-44
  HHRA Data: Vol. 6, Appendix C1, Section 9.10 pgs. 9-41 to 9-45, Tables 9.10.7 to 9.10.11

- Mitretek. 2002. Letter: "Modeling Results for Building 900, McClellan Air Force Base, California." February 15 (within Underground Storage Tank Closure Report Building 900)

- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study #2*. Final. May.

B2.3 Sampling Strategy and Type of Contamination

Several field investigations were performed during the late 1980s and early 2000 to evaluate soil, soil gas, and groundwater contamination at AOC H-1. The field investigations included soil and soil gas sampling.

Several field efforts conducted through 1991 were performed to characterize TPH contamination previous to, during and subsequent to UST removal and soil excavation. The first field investigation was performed in 1987. During this investigation, one soil boring was advanced and soil samples were collected. On April 9, 1991, three soil samples were collected from excavated soil during tank removal. Because TPH was detected in these samples, eight soil borings were advanced between 14 to 19 feet bgs in the UST excavation area. On April 16, six soil borings were drilled in the pump island area, with soil samples collected at 2.5 and 7.5 feet. From April 18 through 25, 17 additional borings were advanced (four in the UST excavation area, and 13 in the pump island area). Soil samples were collected from 5 to 20 feet bgs. Much of the soils sampled during April 1991 were later excavated. During the removal of the four fuel USTs, soil was excavated to approximately 21 feet bgs, but work crews could not excavate further due to dangerous working conditions. Using an OVA, "hot spots" were discovered remaining in soil beyond the excavation. A total of 2,800 cubic yards of excavated soil was removed from the site.

In May and June of 1991, samples were collected in areas below, or at the perimeter of excavation areas to characterize the remaining TPH contamination. Four soil borings were drilled in the UST excavation area after excavation. Fifteen soil samples were collected from these borings from 22 to 44 feet bgs. Ten samples were collected from excavations at former USTs and pump islands locations.

After the waste oil UST and piping were abandoned in place (concrete filled and capped) in December 1995 two borings were advanced and sampled in this area. One soil boring was drilled beneath the abandoned waste oil UST in January 1996. A second boring was angled beneath the tank in May 1986. Samples were analyzed for TPH-D, TPH-G, VOCs, AVOCs, MTBE, and metals.

An RI was performed in 1997 during which soil and soil gas samples were collected from 5 borings (AH01SB003 through AH01SB007) ranging from 5 to 114 feet bgs. A Monitoring Zone A well was constructed from boring AH01SB003. Samples were analyzed for metals, SVOCs, VOCs, PCBs, and TPH.

In 2001, two additional borings were advanced, from which eight soil samples were collected from 25 to 40 feet bgs. Samples were analyzed for metals, PCBs, SVOCs, and TPH.

B2.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at AOC H-1. Metals, PCBs, PAHs and residual TPH were determined to be present at the site, and TPH and PCBs were detected above screening levels. Figure B-2 identifies the site location and significant site features.

B2.4.1 Metals

With the exception of vanadium, no reported metals concentrations exceed the screening levels for the protection of human health or groundwater. Four metals (barium, cadmium, cobalt, and vanadium) were detected above combined background values. The elevated concentrations were reported in samples collected from 3.75 feet bgs and deeper. These detections do not represent significant metals contamination.

Vanadium was detected at concentrations ranging from 52 to 110 mg/kg. The maximum concentration of vanadium is only slightly greater than the "combined" background level (75.7 mg/kg). There is no known source of vanadium at the site. The levels of vanadium at AOC H-1 appear to be representative of naturally occurring variations in background levels rather than indicative of site-related contamination.

B2.4.2 PCBs

PCB-1254 and PCB-1260 were detected at concentrations of 0.0093 J mg/kg and 0.0057 J mg/kg, respectively, from boring AH01SB004 at 1.5 feet bgs. The concentrations of PCBs do not exceed screening levels for the protection of human health or groundwater but do exceed the screening level for protection of surface water. No PCBs were detected in a field duplicate sample. It does not appear that PCBs are a major contaminant at the site.

B2.4.3 SVOCs

Bis(2-ethylhexyl)phthalate (DEHP) was the only contaminant detected at an estimated maximum concentration of 0.071 mg/kg in shallow soil (0 to 15 bgs) and at an estimated maximum concentration of 0.13 J mg/kg in deep soil. The sample location is approximately 40 feet from the abandoned (former) IWL. SVOC concentrations do not exceed any screening levels for the protection of human health and the environment.

B2.4.4 TPH

Soil samples were collected and analyzed for TPH and fuel-related contaminants before and after the removal of the four USTs and the pump island. The results of these removal actions are summarized in the following sections.

B2.4.4.1 UST Area Prior to Removal Actions

BTEX and TPH contamination were detected at 19 bgs with TPH-G concentrations ranging from nondetect (with a 5 mg/kg method detection limit) to 9,520 mg/kg. During the removal of the four fuel USTs, soil was excavated to approximately 21 feet bgs, but work crews could not excavate further due to dangerous working conditions. Using an OVA, "hot spots" were discovered remaining in soil beyond the excavation.

B2.4.4.2 UST Area After Removal Actions

Upon review of the tank excavation, confirmation sampling, and RI data, the majority of TPH-contaminated soil has been removed and only one detection of residual TPH-D and one detection of TPH-G were found in excess of the screening levels that are protective of groundwater. Residual TPH has been delineated vertically and laterally at the site and modeling has shown that impacts to groundwater are unlikely. Based on these data regulatory closure of the four former fuel USTs at AOC H-1 has been requested for No Further Action (NFA) status with institutional controls. RWQCB approval of this request is pending.

In confirmation samples taken after excavation, only TPH-D exceeded screening levels in one of the samples (Sample H2, 200 mg/kg at 24 feet bgs) at a concentration above screening levels for protection of groundwater.

B2.4.4.3 Pump Stand Area Prior to Removal Actions

BTEX and TPH concentrations were also detected at the pump stand locations with TPH-G concentrations ranging from nondetect (with a 5 mg/kg method detection limit) to 5,990 mg/kg in boring PP9 at 10 feet bgs. Contaminated soil from the pump stand location was removed to depths ranging from 1 to 13 feet bgs.

B2.4.4.4 Pump Stand Area After the Removal Actions

Confirmatory sampling was conducted at the pump stand boring location PP5 at 12.5 feet bgs (June 1991). The results indicated a TPH-G concentration of 338 mg/kg, in excess of the screening level for protection of groundwater. TPH-D was not detected (with a 10 mg/kg method detection limit). SESOIL modeling was conducted for this residual TPH-G contamination. The modeling results indicted that the residual TPH-G contamination will not impact groundwater (Mitretek, February 2002). Limited sampling below the excavation fill during the 1997 RI resulted in no detections of TPH-D and no detections over 1 mg/kg of TPH-G.

B2.4.5 VOCs

Three SSG borings were drilled and sampled during the RI, and no analytes were detected in the samples collected at 9.7 feet, 7.0 feet and 7.3 feet bgs respectively. One VOC was detected, 2,2,4–trimethyl pentane, at a concentration of 2,400 ppbv at 19 feet bgs from boring AH01SB001. This VOC is fuel-related and is not a known carcinogen. No analytes were detected in the subsequent shallow sample collected from AH01SB005 approximately 15 feet to the northeast.

B2.5 Contamination Exposure and Migration

VOC and non-VOC contamination at the site presented a threat to human health, surface water, and groundwater. However, most of the contamination was removed from the site during the soil excavation. Furthermore, the concentrations of TPH in the subsurface have probably decreased over time due to the naturally occurring degradation processes. Therefore, significant impacts to groundwater are not expected.

B2.6 Current and Potential Future Site and Resource Uses

AOC H-1 is currently being used as a gas station and a mini-mart. In the future, it will likely continue to be used for commercial/industrial or community support purposes.

B2.7 Human Health Risk Assessment

A human health risk assessment (HHRA) was completed for the site. The potential COCs for the risk assessment were SVOCs, metals, and PCBs. in soil. The exposure area for AOC H-1 is located in the eastern portion of the site (Figure B-2). It includes Building 900 and represents a paved area of approximately 0.5 acre. The risk results are summarized below and in the risk tables (Attachment 1).

B2.7.1 Risk Characterization

The potential cancer risks for AOC H-1 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 3×10^{-7}
- Future adult resident (0-to-10-foot-bgs depth interval): 3×10^{-7}

- Future adult resident (0-to-2-foot-bgs depth interval excluding produce pathway): 1×10^{-7}
- Future adult resident (0-to-10-foot-bgs depth interval excluding produce pathway): 7×10^{-8}

- Future adult resident (0-to-2-foot-bgs depth interval) and groundwater: 3×10^{-6}
- Future adult resident (0-to-10-foot-bgs depth interval) and groundwater: 3×10^{-6}

- Outdoor occupational worker: 2×10^{-8}
- Future construction worker: 6×10^{-7}

The main contributors to the cumulative potential cancer risks for the residential scenarios are the ingestion of PCBs in homegrown produce.

The non-cancer hazard indices for AOC H-1 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 4
- Future adult resident (0-to-10–foot-bgs depth interval): 2
- Future adult resident (0-to-2-foot depth interval excluding produce pathway): 2
- Future adult resident (0-to-10-foot-bgs depth interval excluding produce pathway): 1

- Future child resident (0-to-2-foot-bgs depth interval): 3
- Future child resident (0-to-10-foot-bgs depth interval): 2
- Future child resident (0-to-2-foot depth interval excluding produce pathway): 1
- Future child resident (0-to-10-foot-bgs depth interval excluding produce pathway): 0.9

The potential COC that contributes to the hazard indices greater than 1 is vanadium through the homegrown produce and incidental soil ingestion pathways. The hazard indices do not exceed 1 for the outdoor occupation worker and future construction worker scenarios. Table B2-5 presents the non-cancer hazard indices and the various exposure scenarios and exposure routes at AOC H-1.

Based on the risk assessment, the potential cancer risk from groundwater exposure for future adult residents is 2×10^{-6}. The main contributors to the potential cancer risk are chloroform, 1,2-DCA, and TCE. For groundwater, the non-cancer hazard index for the future adult resident is 0.1and the hazard index for the future child resident is 0.08. The main contributor to the hazard indices is TCE.

B2.8 Uncertainties

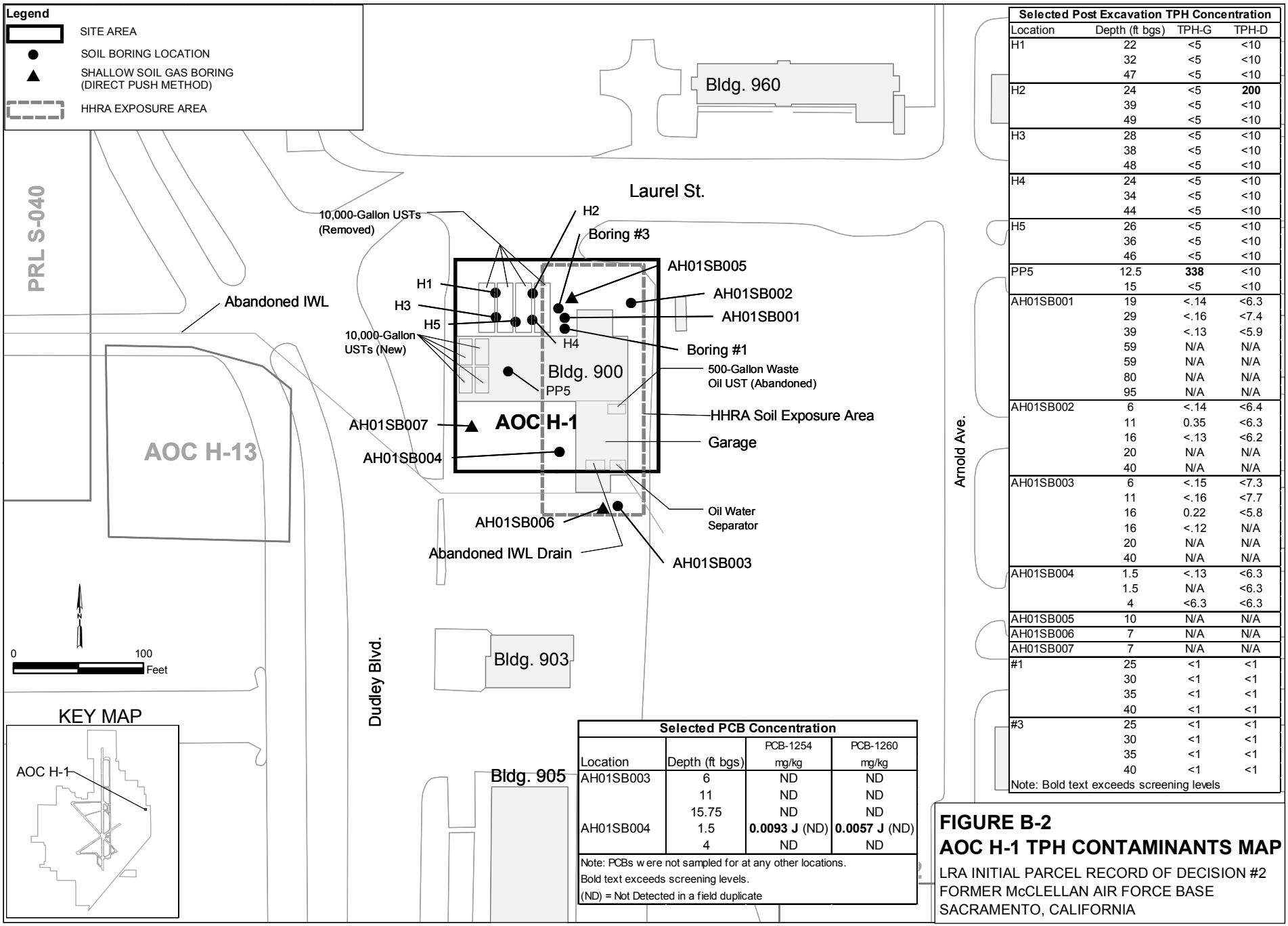
The sampling and analyses performed during the remedial investigation were sufficient and appropriate for the potential contaminants and release mechanisms at this site.

There are uncertainties associated with the risk estimates for AOC H-1. The main uncertainty is that the future reuse plans for this site are indefinite, but do not include residential or other "sensitive" use scenarios (day-cares, schools, hospitals, etc.). Currently the site continues to be used as a gas station and mini-mart. Hence, the use of the residential scenario for the site should be considered hypothetical at this time.

Vanadium was detected at concentrations that appear greater than the "combined" background concentration at selected locations. The maximum concentration of vanadium is only slightly greater than the "combined" background level. There is no known source of vanadium at the site. The levels of vanadium at AOC H-1 appear to be representative of naturally occurring variations in background levels rather than indicative of site-related contamination. Therefore, the risk associated with vanadium at this site may be representative of background.

B2.9 Basis for No Action

Concentrations of PCBs present a potential (but unlikely) threat to surface water; and TPH-G and TPH-D present potential (but unlikely) threats to groundwater. There are no known contaminant concentrations that pose a threat to human health. Therefore, no action is necessary at this site to protect human health or welfare or the environment.



Selected Post Excavation TPH Concentration

Location	Depth (ft bgs)	TPH-G	TPH-D
H1	22	<5	<10
	32	<5	<10
	47	<5	<10
H2	24	<5	**200**
	39	<5	<10
	49	<5	<10
H3	28	<5	<10
	38	<5	<10
	48	<5	<10
H4	24	<5	<10
	34	<5	<10
	44	<5	<10
H5	26	<5	<10
	36	<5	<10
	46	<5	<10
PP5	12.5	**338**	<10
	15	<5	<10
AH01SB001	19	<.14	<6.3
	29	<.16	<7.4
	39	<.13	<5.9
	59	N/A	N/A
	59	N/A	N/A
	80	N/A	N/A
	95	N/A	N/A
AH01SB002	6	<.14	<6.4
	11	0.35	<6.3
	16	<.13	<6.2
	20	N/A	N/A
	40	N/A	N/A
AH01SB003	6	<.15	<7.3
	11	<.16	<7.7
	16	0.22	<5.8
	16	<.12	N/A
	20	N/A	N/A
	40	N/A	N/A
AH01SB004	1.5	<.13	<6.3
	1.5	N/A	<6.3
	4	<6.3	<6.3
AH01SB005	10	N/A	N/A
AH01SB006	7	N/A	N/A
AH01SB007	7	N/A	N/A
#1	25	<1	<1
	30	<1	<1
	35	<1	<1
	40	<1	<1
#3	25	<1	<1
	30	<1	<1
	35	<1	<1
	40	<1	<1

Note: Bold text exceeds screening levels

Selected PCB Concentration

Location	Depth (ft bgs)	PCB-1254 mg/kg	PCB-1260 mg/kg
AH01SB003	6	ND	ND
	11	ND	ND
	15.75	ND	ND
AH01SB004	1.5	**0.0093 J** (ND)	**0.0057 J** (ND)
	4	ND	ND

Note: PCBs were not sampled for at any other locations.
Bold text exceeds screening levels.
(ND) = Not Detected in a field duplicate

FIGURE B-2
AOC H-1 TPH CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

SAC \\ZION\SACGIS\PROJ\MCCLELLAN\340972_TO400\MAPFILES\IP2_ROD\LRA_AOC_H1.MXD LRA_AOC_H1.PDF 6/17/2008 10:57:42

Attachment B2
AOC H-1 Human Health Risk Assessment

ATTACHMENT B2

AOC H-1 Human Health Risk Assessment

The baseline human health risk assessment estimates what risks the site poses if no action were taken. This section of the ROD summarizes the results of the updated baseline risk assessment for AOC H-1. This risk assessment was originally presented in the OU E-H RICS2 (Jacobs, 2000). This update uses the same risk assessment methodology as OU E-H for all exposure pathways. In addition, for chemicals that have had toxicity value updates since the OU E-H RICS2 was published, the most recent toxicity criteria have been used.

Identification of Chemicals of Concern

Potential contaminants of concern (COCs) for AOC H-1 include SVOCs, metals, and PCBs. Tables B2-1a and B2-1b present the groundwater and soil data summaries, respectively, for the COCs (tables are located at the end of this attachment).

Tables B2-1a and B2-1b include the range of potential COC concentrations, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the exposure point concentrations (EPCs), and how the EPCs were derived for each of the media and exposure areas of AOC H-1. In general, the lower value of the maximum concentration or the upper 95th percent confidence limit on the mean was used as the EPC for potential COCs detected in more than one sample.

Exposure Assessment

A conceptual model was developed that describes the potential exposure pathways associated with soil and groundwater at AOC H-1 (see Figure 2-3 in Section 2.4 of the ROD). Although AOC H-1 will likely be used for commercial/industrial or community support purposes in the future; several exposure scenarios were evaluated in the human health risk assessment to provide information for future risk-management decisions.

The following exposure scenarios were quantitatively evaluated in the human health risk assessment:

- Exposure of hypothetical future residents (adults and children) to soil (0 to 2 feet bgs) and groundwater
- Exposure of hypothetical future residents (adults and children) to soil (0 to 10 feet bgs) and groundwater
- Exposure of outdoor workers to soil (0 to 2 feet bgs)
- Exposure of construction workers to soil (0 to 15 feet bgs)

The exposure routes that were considered in the risk assessment for residents and workers potentially exposed to soil include incidental soil ingestion, inhalation of VOCs (ambient air

for outdoor workers and construction workers) and resuspended particulates, and dermal contact with soil. For the residential scenarios, the ingestion of homegrown produce was also included. For groundwater, the ingestion, inhalation of VOCs, and dermal contact exposure routes were evaluated.

Toxicity Assessment

The toxicity data that were used in the human health risk assessment are summarized on Tables B2-2 and B2-3. Health effects are divided into two categories: cancer and non-cancer effects.

Table B1-2 presents the slope factors used to estimate potential excess lifetime cancer risks associated with exposure to potential COCs in soil, air, and groundwater at AOC H-1. As shown on Table B2-2, the oral slope factor was used to estimate potential risks associated with dermal exposure.

Table B2-3 presents the reference doses (RfDs) used to evaluate the potential for non-cancer health effects. The toxicity information for polychlorinated biphenyls indicates that exposure is associated with a number of toxic effects, including cancer. For purposes of evaluating non-cancer effects, the RfD is based on effects on the immune system. The oral RfDs were used to estimate potential health effects associated with dermal exposure. In addition, when inhalation reference concentrations are not available for some of the COCs, the oral RfDs were used to evaluate potential health effects from the inhalation exposure route.

The hierarchy of sources for toxicity values follows EPA and Air Force guidance (EPA, 2003 and USAF, 2006) and is listed below in order of preference:

1. EPA Integrated Risk Information System (IRIS) online database (EPA, 2007)
2. EPA's Provisional Peer Reviewed Toxicity Values (as cited in the 2004 EPA Region 9 Preliminary Remediation Goal [PRG] table [EPA, 2004])
3. California Environmental Protection Agency (Cal-EPA) cancer potency factors and reference exposure levels (REL) online database (Cal-EPA, 2007)
4. Other EPA sources (i.e., Health Effects Assessment Summary Table [HEAST], National Center for Environmental Assessment [NCEA] provisional toxicity values, and route-extrapolated toxicity values as cited in the 2004 EPA Region 9 PRG table [EPA, 2004]).

Toxicity criteria for several contaminants have changed since the human health risk assessment was first presented. The risk estimates have been updated with the most current toxicity factors.

The following cancer toxicity slope factors were updated:

- Chloroform – Inhalation: 0.080 to 0.081 $(mg/kg\text{-}day)^{-1}$
- Trichloroethene – Oral: 0.015 to 0.013 $(mg/kg\text{-}day)^{-1}$; Inhalation: 0.01 to 0.007 $(mg/kg\text{-}day)^{-1}$
- Bis(2-ethylhexyl)phthalate – Inhalation: 0.014 to 0.0084 $(mg/kg\text{-}day)^{-1}$

The following non-cancer toxicity reference doses were also updated:

- Cobalt – Oral: 0.06 to 0.02 mg/kg-day; Inhalation: 2.9×10^{-4} to 5.7×10^{-6} mg/kg-day
- Chloroform – Inhalation: 0.01 to 0.086 mg/kg-day
- 1,2-Dichloroethane – Oral: 0.0029 to 0.02 mg/kg-day; Inhalation: 0.0029 to 0.11 mg/kg-day
- Trichloroethene – Oral: 0.006 to 0.0003 mg/kg-day; Inhalation – 0.006 to 0.17 mg/kg-day
- Vanadium – Oral: 0.007 to 0.001 mg/kg-day; Inhalation – 0.007 to 0.001 mg/kg-day

Risk Characterization

The toxicity values described above were used in the human health risk assessment along with the exposure information to estimate the potential risks from contacting potential COCs in soil, air, and groundwater. For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a results of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{SF} \quad (1)$$

Where:

Risk = a unitless probability (e.g., 1×10^{-6}) of an individual's developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(\text{mg/kg-day})^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in a million chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with an RfD derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of the receptor average daily exposure to the route-specific reference dose is called a hazard quotient (HQ). An HQ less than one indicates that the receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index is generated by adding the HQs over the exposure routes. A hazard index less than one indicates that, based on the sum of all HQs from different exposure routes, toxic noncarcinogenic effects are unlikely.
A hazard index greater than one indicates that site-related exposure may present a risk to human health.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD} \quad (2)$$

Where:

CDI = chronic daily intake (milligrams per kilogram per day [mg/kg-day])
RfD = reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term.)

Table B2-4 presents the potential cancer risk estimates for the various exposure scenarios and exposure routes at AOC H-1. These risk estimates are based on reasonable maximum exposure and were developed taking into account various conservative assumptions about the frequency and duration of receptors exposure to soil and the toxicity of the potential COCs.

Residential and occupational exposure scenarios were evaluated for AOC H-1. The risk results for these scenarios are summarized below and presented in the risk summary tables at the end of this section.

The potential cancer risks for AOC H-1 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 3×10^{-7}
- Future adult resident (0-to-10-foot-bgs depth interval): 3×10^{-7}
- Future adult resident (0-to-2-foot-bgs depth interval excluding produce pathway): 1×10^{-7}
- Future adult resident (0-to-10-foot-bgs depth interval excluding produce pathway): 7×10^{-8}
- Future adult resident (0-to-2-foot-bgs depth interval) and groundwater: 3×10^{-6}
- Future adult resident (0-to-10-foot-bgs depth interval) and groundwater: 3×10^{-6}
- Outdoor occupational worker: 2×10^{-8}
- Future construction worker: 6×10^{-7}

The main contributors to the cumulative potential cancer risks for the residential scenarios are the ingestion of PCBs in homegrown produce.

The non-cancer hazard indices for AOC H-1 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 4
- Future adult resident (0-to-10-foot-bgs depth interval): 2
- Future adult resident (0-to-2-foot depth interval excluding produce pathway): 2
- Future adult resident (0-to-10-foot-bgs depth interval excluding produce pathway): 1
- Future child resident (0-to-2-foot-bgs depth interval): 3
- Future child resident (0-to-10-foot-bgs depth interval): 2
- Future child resident (0-to-2-foot depth interval excluding produce pathway): 1
- Future child resident (0-to-10-foot-bgs depth interval excluding produce pathway): 0.9

The potential COC that contributes to the hazard indices greater than 1 is vanadium through the homegrown produce and incidental soil ingestion pathways. The hazard indices do not exceed 1 for the outdoor occupation worker and future construction worker scenarios. Table B2-5 presents the non-cancer hazard indices and the various exposure scenarios and exposure routes at AOC H-1.

Based on the risk assessment, the potential cancer risk from groundwater exposure for future adult residents is 2×10^{-6}. The main contributors to the potential cancer risk are chloroform, 1,2-DCA, and TCE. For groundwater, the non-cancer hazard index for the future adult resident is 0.1and the hazard index for the future child resident is 0.08. The main contributor to the hazard indices is TCE.

Uncertainties

There are uncertainties associated with the risk estimates for AOC H-1. The main uncertainty is that the current reuse plans for this site are indefinite, but do not include residential or other "sensitive" use scenarios (day-cares, schools, hospitals, etc.). Hence, the use of the residential scenario for the site should be considered hypothetical at this time.

There is considerable uncertainty associated with the homegrown produce pathway. Since the homegrown produce pathway is the major contributor to the hazard quotient estimates for the residential scenarios for the site, the uncertainties from this pathway are reflected in the hazard indices estimates which may be overestimated or underestimated because of the uncertainties with the plant partition coefficients.

Barium and cadmium were detected at concentrations above background levels but were eliminated as COCs for the HHRA based on the statistical background comparisons. There is some uncertainty associated with the elimination of metals as COCs based on the background comparisons. However, site-specific background concentrations of barium and cadmium at the former McClellan AFB are less than risk-based screening levels and therefore, the potential cancer risk associated with background levels of cadmium is less than 1×10^{-6} and the hazard quotients for background levels of barium and cadmium are less than 1. In addition, the main contributor to the hazard indices for soil is vanadium. Although vanadium was retained as a COPC, the concentrations at AOC H-1 are not indicative of site-related contamination but rather are most likely representative of naturally occurring variations in background concentrations. The concentrations of vanadium range from 52 to 110 mg/kg at AOC H-1. Background levels for vanadium in McClellan soils range from 61.7 mg/kg for surface soil to 80.5 mg/kg in subsurface soil (silts and clays). Hazard indices that include vanadium may be overestimated for site conditions at AOC H-1.

References

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Jacobs. 2000a. *Operable Units E-H: Remedial Investigation Characterization Summaries 2.* Final. June.

Text: Vol. 2, AOC H-1, pgs. 1-19
Hits Table: Vol. 2, AOC H-1, Attachment 1, pgs. 1-2
All Data: Vol. 4, Appendix A, AOCH1, pgs. 8-18, 32-44
HHRA Data: Vol. 6, Appendix C1, Section 9.10 pgs. 9-41 to 9-45, Tables 9.10.7 to 9.10.11

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U.S. Environmental Protection Agency (EPA). 2007. Integrated Risk Information System (IRIS). On-line data base.

U.S. Environmental Protection Agency (EPA). 2004. Region 9 Preliminary Remediation Goal (PRG) table. October.

U.S. Environmental Protection Agency (EPA). 2003. "Human Health Toxicity Values in Superfund Risk Assessments." OSWER Directive 9285.7-53. December 5.

Table B2-1a
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
AOC H-1

Scenario Timeframe:	**Future**						
Medium	**Groundwater**						
Exposure Medium	**Groundwater**						
		Concentration Detected (µg/L)					
Exposure Point	**Chemical of Concern**	**Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration (µg/L)[a]**	**Statistical Measure[b]**	**Exposure Point Concentration[c] (µg/L)**
AOC H-1 - Groundwater On-site Direct Contact	Chloroform	1.9E-01	2.0E-01	2/2	--	Max Detect	2.0E-01
	1,2-Dichloroethane	1.1E-01	1.1E-01	1/2	--	Max Detect	1.1E-01
	Trichloroethene	2.7E-01	3.1E-01	2/2	--	Max Detect	3.1E-01

[a] Due to the limited data set, a statistical analysis could not be conducted to determine the 95th UCL concentration.

[b] The statistical measure indicates the basis for the exposure point concentration.

[c] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.

95th UCL = 95 percent upper confidence limit on the mean.

Note:

Data obtained from Interim Basewide Remedial Investigation Report Parts 2E-2H- Remedial Investigation Characterization Summaries 2 Volume 6 of 8 - Appendix C1, Draft Final, March 2000

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Table B2-1b
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
AOC H-1

Scenario Timeframe:	**Future**						
Medium	**Soil**						
Exposure Medium	**Soil**						
		Concentration Detected (mg/kg)					
Exposure Point	**Chemical of Concern**	**Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration (mg/kg)**	**Statistical Measure[a]**	**Exposure Point Concentration[b] (mg/kg)**
AOC H-1 - Soil On-site Direct Contact (0-2 ft bgs)	Cobalt	8.7E+00	8.7E+00	1/1	--	Max Detect	8.7E+00
	Vanadium	5.2E+01	5.2E+01	1/1	--	Max Detect	5.2E+01
	Di(2-ethylhexyl)phthalate	7.1E-02	7.1E-02	1/1	--	Max Detect	7.1E-02
	PCBs	1.5E-02	1.5E-02	1/1	9.2E-01	Max Detect	1.5E-02
AOC H-1 - Soil On-site Direct Contact (0-10 ft bgs)	Cobalt	8.7E+00	2.5E+01	4/4	2.5E+01	95UCL Normal	2.5E+01
	Vanadium	5.2E+01	6.8E+01	4/4	6.7E+01	95UCL Normal	6.7E+01
	Di(2-ethylhexyl)phthalate	7.1E-02	7.1E-02	1/6	6.0E-02	95UCL Lognormal	6.0E-02
	PCBs	1.5E-02	1.5E-02	1/4	9.2E-01	Max Detect	1.5E-02
AOC H-1 - Soil On-site Direct Contact (0-15 ft bgs)	Cobalt	7.2E+00	2.5E+01	5/5	2.1E+01	Max Detect	2.1E+01
	Vanadium	5.2E+01	1.1E+02	5/5	1.0E+02	Max Detect	1.0E+02
	Di(2-ethylhexyl)phthalate	2.6E-02	7.1E-02	3/8	4.9E-02	Max Detect	4.9E-02
	PCBs	1.5E-02	1.5E-02	1/5	1.7E-02	Max Detect	1.5E-02

[a] The statistical measure indicates the basis for the exposure point concentration.

[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.

95th UCL = 95 percent upper confidence limit on the mean.

Note:

Data obtained from Interim Basewide Remedial Investigation Report Parts 2E-2H- Remedial Investigation Characterization Summaries 2 Volume 6 of 8 - Appendix C1, Draft Final, March 2000

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Table B2-2
Cancer Toxicity Data Summary
AOC H-1

Pathway: Ingestion, Dermal						
Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence[a]	Source	Date
Cobalt						
Chloroform	3.1E-02	3.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
1,2-Dichloroethane	9.1E-02	9.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Di(2-ethylhexyl)phthalate	1.4E-02	1.4E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
PCBs	2.0E+00	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Trichloroethene	1.3E-02	1.3E-02	$(mg/kg\text{-}day)^{-1}$	B2/C	Cal-EPA	2007
Pathway: Inhalation						
Chemical of Concern	Inhalation Cancer Slope Factor		Slope Factor Units	Weight of Evidence[a]	Source	Date
Cobalt	9.8E+00		$(mg/kg\text{-}day)^{-1}$		PPRTV	2004
Chloroform	8.1E-02		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
1,2-Dichloroethane	9.1E-02		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Di(2-ethylhexyl)phthalate	8.4E-03		$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
PCBs	2.0E+00		$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Trichloroethene	7.0E-03		$(mg/kg\text{-}day)^{-1}$	B2/C	Cal-EPA	2007

[a]Weight of Evidence Classification:

A - human carcinogen
B1 and B2 - probable human carcinogen
C - possible human carcinogen
D - not classifiable as a human carcinogen
E - evidence of noncarcinogenicity for humans
Reference = USEPA 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December.

Note:
Data obtained from Interim Basewide Remedial Investigation Report Parts 2E-2H- Remedial Investigation Characterization Summaries 2 Volume 6 of 8 - Appendix C1, Draft Final, March 2000
Cal-EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System

Table B2-3
Non-Cancer Toxicity Data Summary
AOC H-1

Pathway: Ingestion, Dermal									
Chemical of Concern	Chronic/ subchronic	Oral RfD	Oral RfD Units	Dermal RfD	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Cobalt	Chronic	2.0E-02	mg/kg-day	2.0E-02	mg/kg-day	--	--	PPRTV	2004
Vanadium	Chronic	1.0E-03	mg/kg-day	1.0E-03	mg/kg-day	--	--	NCEA	2004
Chloroform	Chronic	1.0E-02	mg/kg-day	1.0E-02	mg/kg-day	Liver	1000	IRIS	2007
1,2-Dichloroethane	Chronic	2.0E-02	mg/kg-day	2.0E-02	mg/kg-day	--	--	NCEA	2004
Di(2-ethylhexyl)phthalate	Chronic	2.0E-02	mg/kg-day	2.0E-02	mg/kg-day	Liver	1000	IRIS	2007
PCBs	Chronic	2.0E-05	mg/kg-day	2.0E-05	mg/kg-day	--	--	IRIS	2007
Trichloroethene	Chronic	3.0E-04	mg/kg-day	3.0E-04	mg/kg-day	--	3000	NCEA	2004
Pathway: Inhalation									
Chemical of Concern	Chronic/ subchronic	Inhalation RfD	Inhalation RfD Units			Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Cobalt	Chronic	5.7E-06	mg/kg-day			--	--	PPRTV	2004
Vanadium	Chronic	1.0E-03	mg/kg-day			--	--	NCEA	2004
Chloroform	Chronic	8.6E-02	mg/kg-day			--	--	Cal-EPA	2007
1,2-Dichloroethane	Chronic	1.1E-01	mg/kg-day			--	--	Cal-EPA	2007
Di(2-ethylhexyl)phthalate	Chronic	2.0E-02	mg/kg-day			--	--	ROUTE	
PCBs	Chronic	2.0E-05	mg/kg-day			--	--	ROUTE	
Trichloroethene	Chronic	1.7E-01	mg/kg-day			--	--	Cal-EPA	2007

Notes:
Blank cells indicate information is not available or not applicable.
Data obtained from Interim Basewide Remedial Investigation Report Parts 2E-2H- Remedial Investigation Characterization Summaries 2 Volume 6 of 8 - Appendix C1, Final, March 2000

Cal-EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
mg/kg-day = milligrams per kilogram per day
NCEA = National Center for Environmental Assessment
PPRTV = Provisional Peer Reviewed Toxicity Value
RfD = reference dose
ROUTE = route-to-route extrapolated value (e.g., oral RfD used for inhalation RfD)

Table B2-4
Risk Characterization Summary - Carcinogens
AOC H-1

Scenario Timeframe:	**Future**									
Receptor Population:	**Resident**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-1 - Soil On-site Direct Contact (0-2 ft bgs)	Di(2-ethylhexyl)phthalate	7.1E-02	mg/kg	1.1E-09	8.4E-15	3.5E-10	7.8E-09	9.3E-09
			Cobalt	8.7E+00	mg/kg	--	7.9E-10	--	--	7.9E-10
			PCBs	1.5E-02	mg/kg	6.4E-08	6.8E-13	3.1E-08	2.3E-07	3.3E-07
			TOTAL			**6.5E-08**	**7.9E-10**	**3.1E-08**	**2.4E-07**	**3.E-07**
		AOC H-1 - Soil On-site Direct Contact (0-10 ft bgs)	Di(2-ethylhexyl)phthalate	6.0E-02	mg/kg	1.3E-09	8.4E-15	4.2E-10	9.6E-09	1.1E-08
			Cobalt	2.5E+01	mg/kg	--	2.2E-09	--	--	2.2E-09
			PCBs	1.5E-02	mg/kg	4.7E-08	5.0E-13	2.3E-08	1.7E-07	2.4E-07
			TOTAL			**4.8E-08**	**2.2E-09**	**2.3E-08**	**1.8E-07**	**3.E-07**
Groundwater	Groundwater	AOC H-1 - Groundwater On-site Direct Contact	Chloroform	2.0E-01	µg/l	9.2E-08	1.2E-06	7.9E-09	--	1.3E-06
			1,2-Dichloroethane	1.1E-01	µg/l	1.5E-07	7.4E-07	6.6E-09	--	9.0E-07
			Trichloroethene	3.1E-01	µg/l	6.0E-08	1.6E-07	1.0E-08	--	2.3E-07
			TOTAL			**3.0E-07**	**2.1E-06**	**2.5E-08**	**--**	**2.E-06**

AOC H-1 TOTAL (soil [0-2 ft bgs] + groundwater) = 3.E-06
AOC H-1 TOTAL (soil [0-10 ft bgs] + groundwater) = 3.E-06

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Table B2-4
Risk Characterization Summary - Carcinogens
AOC H-1

Scenario Timeframe:	**Future**									
Receptor Population:	**Outdoor Occupational**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-1 - Soil On-site Direct Contact (0-2 ft bgs)	Di(2-ethylhexyl)phthalate	7.1E-02	mg/kg	1.7E-10	4.6E-15	4.0E-10	--	5.7E-10
			Cobalt	8.7E+00	mg/kg	--	3.7E-10	--	--	3.7E-10
			PCBs	1.5E-02	mg/kg	5.2E-09	2.3E-13	1.8E-08	--	2.3E-08
			TOTAL			**5.4E-09**	**3.7E-10**	**1.8E-08**	**--**	**2.E-08**

Scenario Timeframe:	**Future**									
Receptor Population:	**Construction Worker**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-1 - Soil On-site Direct Contact (0-15 ft bgs)	Di(2-ethylhexyl)phthalate	4.9E-02	mg/kg	4.6E-11	1.1E-12	4.4E-11	--	9.1E-11
			Cobalt	2.1E+01	mg/kg	--	5.8E-07	--	--	5.8E-07
			PCBs	1.5E-02	mg/kg	2.8E-09	1.1E-10	3.9E-09	--	6.8E-09
			TOTAL			**2.8E-09**	**5.8E-07**	**3.9E-09**	**--**	**6.E-07**

Note:
Data obtained from Interim Basewide Remedial Investigation Report Parts 2E-2H- Remedial Investigation Characterization Summaries 2 Volume 6 of 8 - Appendix C1, Draft Final, March 2000

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Table B2-5
Risk Characterization Summary - Non-Carcinogens
AOC H-1

Scenario Timeframe: **Future**
Receptor Population: **Resident**
Receptor Age: **Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-1 - Soil On-site Direct Contact (0-2 ft bgs)	Cobalt	8.7E+00	mg/kg	--	1.5E-02	3.8E-04	4.5E-04	2.3E-02	3.8E-02
			Vanadium	5.2E+01	mg/kg	--	1.5E+00	1.1E-05	4.4E-02	2.2E+00	3.7E+00
			Di(2-ethylhexyl)phthalate	7.1E-02	mg/kg	Liver	3.5E-05	2.5E-10	1.0E-05	1.8E-04	2.3E-04
			PCBs	1.5E-02	mg/kg	--	1.5E-02	1.0E-07	6.5E-03	3.7E-02	5.9E-02
			TOTAL				**1.5E+00**	**3.9E-04**	**5.1E-02**	**2.2E+00**	**4**
		AOC H-1 - Soil On-site Direct Contact (0-10 ft bgs)	Cobalt	2.5E+01	mg/kg	--	1.7E-02	4.4E-04	5.1E-04	2.6E-02	4.4E-02
			Vanadium	6.7E+01	mg/kg	--	9.8E-01	6.8E-06	2.9E-02	1.4E+00	2.4E+00
			Di(2-ethylhexyl)phthalate	6.0E-02	mg/kg	Liver	4.2E-05	3.0E-10	1.3E-05	2.2E-04	2.8E-04
			PCBs	1.5E-02	mg/kg	--	1.1E-02	7.6E-08	4.8E-03	2.7E-02	4.3E-02
			TOTAL				**1.0E+00**	**4.4E-04**	**3.4E-02**	**1.5E+00**	**2**
Groundwater	Groundwater	AOC H-1 - Groundwater On-site Direct Contact	Chloroform	2.0E-01	µg/L	Liver	1.8E-03	1.1E-03	1.4E-04	--	3.0E-03
			1,2-Dichloroethane	1.1E-01	µg/L	--	5.1E-04	4.3E-04	2.0E-05	--	9.6E-04
			Trichloroethene	3.1E-01	µg/L	--	9.4E-02	8.4E-04	1.4E-02	--	1.1E-01
			TOTAL				**9.6E-02**	**2.3E-03**	**1.4E-02**	**--**	**1.E-01**

AOC H-1 TOTAL (soil [0-2 ft bgs] + groundwater) = **4**
AOC H-1 TOTAL (soil [0-10 ft bgs] + groundwater) = **3**

Scenario Timeframe: **Future**
Receptor Population: **Resident**
Receptor Age: **Child**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-1 - Soil On-site Direct Contact (0-2 ft bgs)	Cobalt	8.7E+00	mg/kg	--	1.4E-02	8.1E-05	3.9E-04	1.7E-02	3.0E-02
			Vanadium	5.2E+01	mg/kg	--	1.3E+00	2.2E-06	3.9E-02	1.6E+00	3.0E+00
			Di(2-ethylhexyl)phthalate	7.1E-02	mg/kg	Liver	3.1E-05	5.3E-11	9.1E-06	1.3E-04	1.7E-04
			PCBs	1.5E-02	mg/kg	--	1.3E-02	2.2E-08	5.7E-03	2.7E-02	4.6E-02
			TOTAL				**1.4E+00**	**8.4E-05**	**4.5E-02**	**1.7E+00**	**3**
		AOC H-1 - Soil On-site Direct Contact (0-10 ft bgs)	Cobalt	2.5E+01	mg/kg	--	1.6E-02	3.1E-04	4.5E-04	1.9E-02	3.6E-02
			Vanadium	6.7E+01	mg/kg	--	8.4E-01	4.8E-06	2.5E-02	1.1E+00	1.9E+00
			Di(2-ethylhexyl)phthalate	6.0E-02	mg/kg	Liver	3.8E-05	2.1E-10	1.1E-05	1.6E-04	2.1E-04
			PCBs	1.5E-02	mg/kg	--	9.6E-03	5.3E-08	4.2E-03	2.0E-02	3.4E-02
			TOTAL				**8.7E-01**	**3.1E-04**	**2.9E-02**	**1.1E+00**	**2**
Groundwater	Groundwater	AOC H-1 - Groundwater On-site Direct Contact	Chloroform	2.0E-01	µg/L	Liver	1.3E-03	7.5E-04	8.6E-05	--	2.1E-03
			1,2-Dichloroethane	1.1E-01	µg/L	--	3.5E-04	3.0E-04	1.2E-05	--	6.6E-04
			Trichloroethene	3.1E-01	µg/L	--	6.6E-02	6.0E-04	8.6E-03	--	7.5E-02
			TOTAL				**6.8E-02**	**1.6E-03**	**8.7E-03**	**--**	**8.E-02**

AOC H-1 TOTAL (soil [0-2 ft bgs] + groundwater) = **3**
AOC H-1 TOTAL (soil [0-10 ft bgs] + groundwater) = **2**

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Table B2-5
Risk Characterization Summary - Non-Carcinogens
AOC H-1

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Occupational**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-1 - Soil On-site Direct Contact (0-2 ft bgs)	Cobalt	8.7E+00	mg/kg	--	2.1E-04	3.3E-05	4.8E-05	--	2.9E-04
			Vanadium	5.2E+01	mg/kg	--	2.5E-02	1.1E-06	5.8E-03	--	3.1E-02
			Di(2-ethylhexyl)phthalate	7.1E-02	mg/kg	Liver	1.7E-06	7.7E-11	4.0E-06	--	5.7E-06
			PCBs	1.5E-02	mg/kg	--	3.7E-04	1.6E-08	1.3E-03	--	1.7E-03
			TOTAL				**2.6E-02**	**3.4E-05**	**7.2E-03**	**--**	**3.E-02**

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-1 - Soil On-site Direct Contact (0-15 ft bgs)	Cobalt	2.1E+01	mg/kg	--	5.1E-03	7.1E-01	4.8E-04	--	7.2E-01
			Vanadium	1.0E+02	mg/kg	--	4.8E-01	2.0E-02	4.6E-02	--	5.5E-01
			Di(2-ethylhexyl)phthalate	4.9E-02	mg/kg	Liver	1.2E-05	4.8E-07	1.1E-05	--	2.3E-05
			PCBs	1.5E-02	mg/kg	--	4.8E-03	2.0E-04	6.9E-03	--	1.2E-02
			TOTAL				**4.9E-01**	**7.3E-01**	**5.4E-02**	**--**	**1**

Note:
Data obtained from Interim Basewide Remedial Investigation Report Parts 2E-2H- Remedial Investigation Characterization Summaries 2
Volume 6 of 8 - Appendix C1, Draft Final, March 2000

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SECTION B3

AOC H-2

B3.1 Site Overview and Features

AOC H-2 is located in the northern portion of OU H, within the proposed Core Aviation/ Industrial District. The site served as an aircraft revetment. A revetment was a "U"-shaped barricade formed by approximately 25-foot-high soil berms that were designed to protect aircraft from enemy ground attack or aircraft. Potential contamination in the former revetments includes areas where spills or leaks of fuels, oil, and hydraulic fluid may have occurred (Jacobs, 1998). The site has been redeveloped and is now overlain by a parking lot adjacent to industrial buildings (Buildings 237 and 241).

Based on a review of aerial photographs, all the revetments were in place by 1946. A 1953 photograph shows considerable changes to each revetment. The revetment in AOC H-2 had been replaced by an unpaved parking area for aircraft where there was no apparent activity. A 1964 aerial photograph continues to show no activity at AOC H-2. Disturbed soil is evident at AOC H-2 in 1973 and 1978 aerial photographs. No changes are evident at any sites in a 1982 photograph. By 1991, the site had been paved (Jacobs, 1998).

B3.2 Source of Contamination

Aircraft use and maintenance are the potential sources of contamination at AOC H-2. Current use as a vehicle parking area may also contribute to contaminant detections at this area. The primary contaminants include metals, TPH-D, and SVOCs.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Jacobs. 1998. *Operable Units E-H: Remedial Investigation Characterization Summaries*. Final. October.

  Text: Vol. 1, AOC H-2, pgs. 1-15
  Hits Table: Vol. 1, AOC H-2, Attachment 1, pg. 1
  All Data: Vol. 2, Appendix A, AOCH2, pgs. 2, 4-24

- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May.

B3.3 Sampling Strategy and Type of Contamination

No investigations were performed prior to the RI. The RI was conducted during September 1997 to assess the presence or absence of contamination and to identify potential contamination sources. The results were documented in Operable Units E-H Remedial Investigation Characterization Summaries (October 1998).

Three soil borings (AH02SB001 through AH02SB003) were advanced in 1997 during the RI to a maximum depth of approximately 6 feet below ground surface. Two soil samples were collected from each boring for laboratory analyses. All samples were analyzed for TPH-D and TPH-G (SW8015D and SW8015V, respectively), metals (SW6010), PCBs (SW8081), and SVOCs (SW8270). The samples were all collected from native soil. The samples were not analyzed for VOCs during the RI. No SSG samples were collected at AOC H-2 because solvent use was not part of the conceptual model. The asphalt extended 2 inches and the fill extended to a total of 1 foot bgs. No samples were collected above 1 foot bgs.

B3.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at AOC H-2. Metals, SVOCs, and TPH were determined to be present at the site, but no contaminant was found to be a risk to human health or the environment. Figure B-3 identifies the site location and significant site features.

B3.4.1 VOCs

VOCs in soil gas were not identified as potential COCs for AOC H-2.

B3.4.2 SVOCs

Only bis(2-ethylhexyl)phthalate (DEHP) and diethylphthalate (DEPH) were detected in soil samples at AOC H-2. DEHP was detected in borings AH02SB001 and AH02SB002 at 0.029 J mg/kg and 0.33 J mg/kg, respectively between 1 to 2 feet bgs. DEHP concentrations decreased with depth to below detection limits in both borings. DEPH was estimated at 0.034 J mg/kg in a sample collected at 5.25 feet bgs from boring AH02SB003 (Jacobs, 1998). Concentrations of these two compounds were below all the screening levels for the protection of human health and the environment. These compounds are common field and laboratory contaminants.

B3.4.3 TPH

TPH-D was detected in five samples collected from three borings, with a maximum concentration of 92 mg/kg (collected at 1.25 feet bgs from AH02SB002). TPH-D concentrations were below all screening levels for protection of the environment.

TPH-G was not detected in any of the samples.

B3.4.4 PCBs

PCBs were not detected in any samples.

B3.4.5 Metals

Seven samples from three borings were analyzed for metals using method SW6010. Five metals (arsenic, barium, cadmium, chromium, and selenium) were reported at concentrations exceeding combined background concentrations. SW6010 analysis for arsenic and cadmium is known to produce unreliable results due to interferences. In addition, the arsenic concentration in a field duplicate sample was less than the lithology-specific

background concentration for that sample; thus, the slightly elevated arsenic concentrations were not believed to represent contamination. With the exception of arsenic, none of the reported concentrations of the five metals exceeded screening levels.

B3.5 Contamination Exposure and Migration

Based on a review of the analytical data, contamination at this site does not pose a threat to groundwater and no direct exposure routes exist. Because of low contaminant concentrations, potential COCs were not selected. Additionally, contaminants are located beneath asphalt and do not pose a significant threat to groundwater.

Arsenic is the only constituent detected which was found to exceed the screening levels for the protection of groundwater or surface water. However, as discussed in the above section, the arsenic concentrations are not believed to represent contamination.

B3.6 Current and Potential Future Site and Resource Uses

Based on this review, no data gaps exist and AOC H-2 is recommended for unrestricted use. However, AOC H-2 resides within the proposed Core Aviation/Industrial District and the current and planned future use is industrial.

B3.7 Human Health Risk Assessment

With the exception of arsenic, none of the constituents detected during previous investigations exceed current risk-based screening levels for unrestricted use. As discussed in Section B3.4, the arsenic concentrations are not believed to represent contamination. A quantitative human health risk assessment was not performed for AOC H-2 during the RI because "no contamination" was identified at the site (Jacobs, 1998). Because no COCs were identified for this site, a risk summary table was not prepared.

B3.8 Uncertainties

The sampling and analyses performed during the remedial investigation were sufficient and appropriate for the potential contaminants and release mechanisms at this site. There were no uncertainties identified for this site.

B3.9 Basis for No Action

The low levels of contaminants present at AOC H-2 do not present a threat to human health or water quality. Therefore, no action is necessary at this site to protect human health or welfare or the environment.

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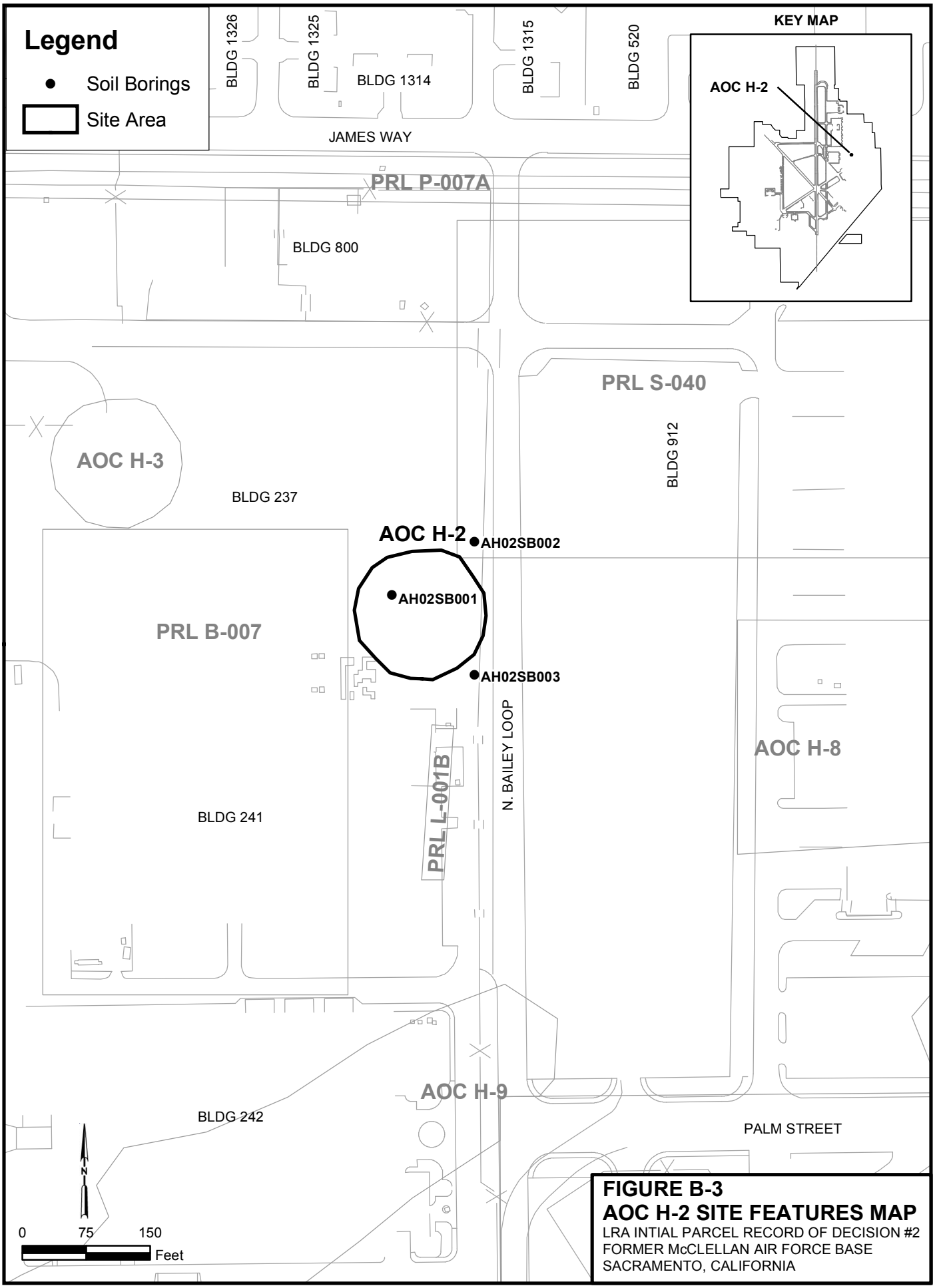

FIGURE B-3
AOC H-2 SITE FEATURES MAP
LRA INTIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

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SECTION B4

AOC H-3

B4.1 Site Overview and Features

AOC H-3 is located in the northern portion of OU H, within the proposed Core Aviation/ Industrial District. The site was one of several former aircraft revetments. Revetments were "U"-shaped barricades formed by approximately 25 feet high soil berms that were designed to protect aircraft from enemy ground attack or aircraft. Each revetment had a circular berm of soil, each with a spot for an aircraft to park in its center. Potential areas of contamination in the former revetments are areas where spills or leaks of fuels, oil, and hydraulic fluid may have occurred. The site has been redeveloped and is currently overlain by a building (Building 237) and the adjacent parking lot. A drainage ditch is located approximately 250 feet north of the site. This drainage ditch conveys site runoff to the storm water drainage system. However, there is no indication from aerial photographs that runoff from the former revetments was directed to this storm water ditch (Jacobs, 1998).

Based on a review of aerial photographs, all the revetments were in place by 1946. A 1953 photograph shows considerable changes to each revetment. AOC H-3 lies at the eastern boundary of this facility. Although AOC H-3 retained its general appearance, no berms in any of the revetments are visible in the 1953 photograph. In a 1957 photograph, the entire facility appears less active than in 1953. In a 1964 aerial photograph, AOC H-3 is identified by the U.S. EPA as the site of a conveyor. In a 1968 aerial photograph, the site is identified as a fill area. No changes are evident at AOC H-3 in 1973, 1978, or 1982 aerial photographs. By 1991, AOC H-3 was paved over (Jacobs, 1998). The site is now covered by Building 237.

B4.2 Source of Contamination

Low-concentrations of TPH-D and 1,1-dicholoroethylene (1,1-DCE) present in subsurface soils may be related to historic land use as an aircraft revetment. Metals detected in soils are not attributable to historic land use.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Jacobs. 1998. *Operable Units E-H: Remedial Investigation Characterization Summaries*. Final. October.

  Text: Vol. 1, AOC H-3, pgs. 1-15
  Hits Table: Vol. 1, AOC H-3, Attachment 1, pg. 1
  All Data: Vol. 2, Appendix A, AOCH3, pgs. 8, 10-17, 31-43

- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May.

B4.3 Sampling Strategy and Type of Contamination

No investigations were performed prior to the RI. The RI was conducted in September 1997 to assess the presence or absence of contamination and to identify potential contamination sources. The results were documented in Operable Units E-H Remedial Investigation Characterization Summaries (October 1998).

Because the site is covered by an industrial building (Building 237), only one soil boring, AH03SB001, was drilled and sampled during the RI in 1997. It was advanced on the western edge of the former revetment to a total of 11.25 feet bgs for collection of soil samples. Soil gas samples were collected from 19.8 to 94.8 feet bgs. A single water sample was collected at 118 feet bgs. All soil samples were analyzed for TPH-D and TPH-G (SW8015D and SW8015V, respectively), metals (SW6010), PCBs (SW8081), and SVOCs (SW8270). The soil samples were all collected from native soil. The asphalt is 2 inches thick, an aggregate base extends to 8 inches below grade, and the fill extends to a total of 3 feet bgs. No soil samples were collected above 3 feet bgs. No SSG samples (0 to 15 feet bgs) were collected because solvent use was not part of the conceptual model.

B4.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at AOC H-3. Metals and VOCs were determined to be present at the site, but no contaminant was found to be a risk to human health or the environment. All samples were collected from one boring, however samples were collected from various depths. Figure B-4 identifies the site location and significant site features.

B4.4.1 VOCs

Four soil gas samples were collected from 19.8 to 94.8 feet bgs. A single VOC detection of 1,1-DCE was reported at 39.8 feet at a concentration of 640 J ppbv.

B4.4.2 SVOCs

SVOCs were not detected in the samples.

B4.4.3 TPH

TPH-D was detected in a DI-WET sample from 3.25 feet bgs at an estimated concentration of 190 µg/L. TPH-D was not detected in the soil sample.

B4.4.4 PCBs

PCBs were not detected in the samples.

B4.4.5 Metals

Three metals (arsenic, cadmium, and selenium) were reported at concentrations exceeding combined background concentrations. The arsenic detection also exceeded the screening levels for the protection of human health and for the protection of groundwater. However, method SW6010 has been shown to produce unreliable results for arsenic and cadmium.

Arsenic was detected in the soil sample at 11 feet bgs. Therefore, the slightly elevated arsenic and cadmium concentrations are not believed to represent contamination, and therefore do not pose a risk to groundwater.

B4.5 Contamination Exposure and Migration

Based on a review of the analytical data, contamination at this site does not pose a threat to groundwater and no direct exposure routes exist. Because of low contaminant concentrations, potential COCs were not selected. Additionally, contaminants are located beneath asphalt and do not pose a significant threat to groundwater.

Arsenic is the only constituent detected which was found to exceed the screening levels for the protection of groundwater and surface water. As discussed in the above section, the arsenic concentrations are not believed to represent contamination, and therefore do not pose a risk to groundwater.

B4.6 Current and Potential Future Site and Resource Uses

AOC H-3 is currently covered by Building 237. In the future, the site will likely be used for commercial/industrial purposes.

B4.7 Human Health Risk Assessment

With the exception of arsenic, none of the constituents detected during previous investigations exceed current risk-based screening levels for unrestricted use. As discussed in Section B4.4, the arsenic concentrations are not believed to represent contamination. A quantitative human health risk assessment was not performed for AOC H-3 during the RI because "no contamination" was identified at the site (Jacobs, 1998). Because no potential COCs were identified for this site, a risk summary table was not prepared.

B4.8 Uncertainties

The sampling and analyses performed during the remedial investigation were sufficient and appropriate for the potential contaminants and release mechanisms at this site. There were no uncertainties identified for this site.

B4.9 Basis for No Action

The low levels of contaminants present at AOC H-3 do not present a threat to human health or water quality. Therefore, no action is required at this site to protect human health or welfare or the environment.

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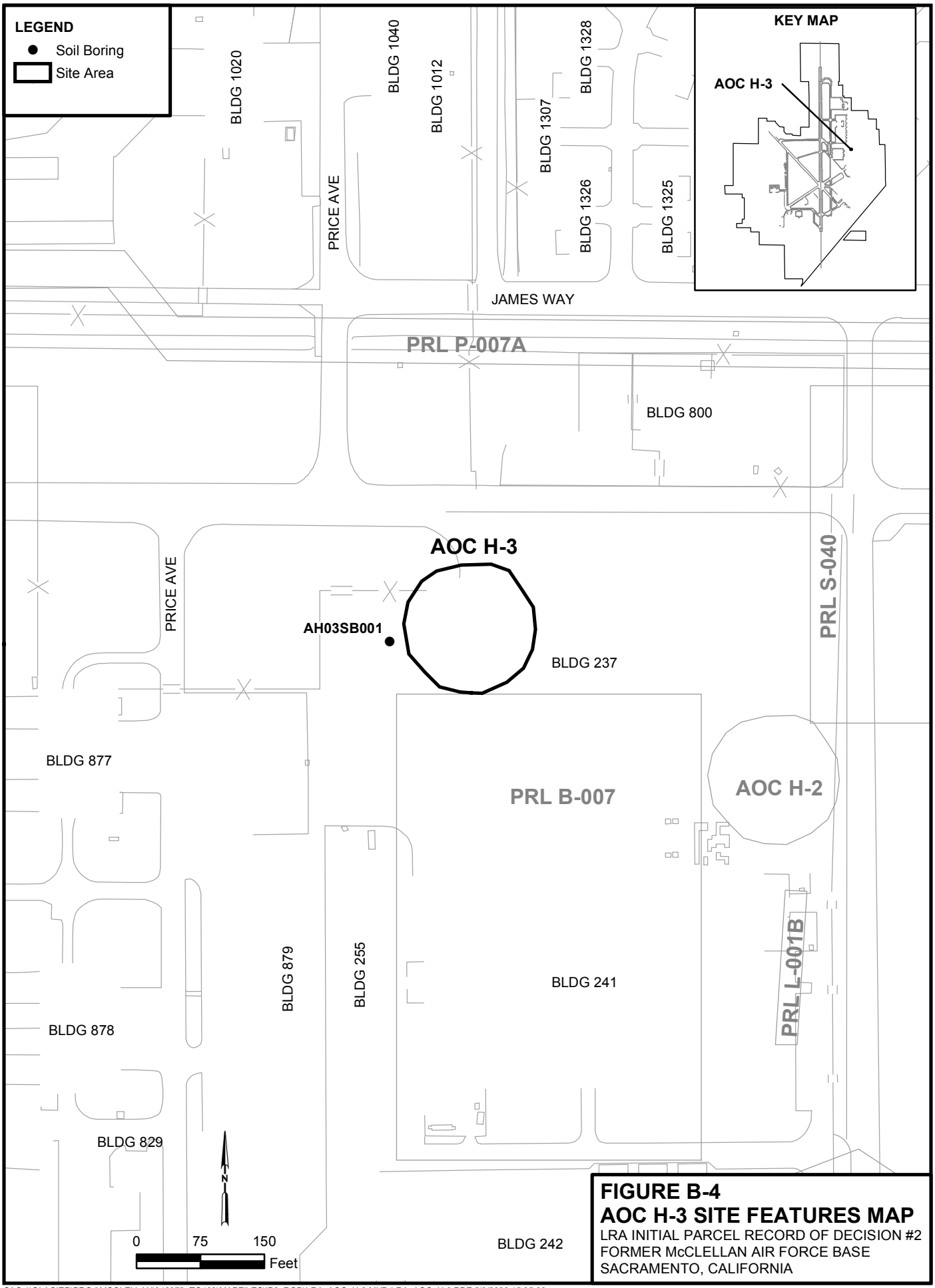

FIGURE B-4
AOC H-3 SITE FEATURES MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

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SECTION B5

AOC H-8

B5.1 Site Overview and Features

AOC H-8 is located in OU H in the East McClellan District. The site is a former POL storage and loading facility. Currently, the site is mostly covered by Buildings 910 and 911. The areas surrounding the buildings include asphalt parking lots and a landscaped area (approximately 150 feet long by 80 feet wide) west of Building 911. The area between Buildings 910 and 911 is unpaved soil and gravel.

Based on a review of aerial photographs, the area within AOC H-8 was undeveloped fields until at least 1960. By 1963, the area had been cleared and a horseshoe-shaped road was identified leading to a structure west of the site. In a 1969 aerial photograph, the site was identified as a POL storage and loading facility with one large, well-contained, vertical tank. In a 1973 aerial photograph, four horizontal tanks were identified at the POL storage facility. In this photograph, a surface stain is visible and approximately 100 feet east of the current southwest corner of Building 910. The POL storage facility is still visible in 1978 and 1982 aerial photographs. By 1984, the facility is no longer present at the site and Buildings 910 and 911, and the parking area cover portions of the site (Jacobs, 1998).

B5.2 Source of Contamination

The primary contaminants include SVOCs (primarily PAHs) and TPH-D. The most significant contaminant detections were reported in samples of surface soil from a single boring at the location of a former surface stain.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Radian. 1997. *Final Operable Units E, F, G and H Field Sampling Plans, McClellan Air Force Base, California*. April.
- Jacobs. 1998. *Operable Units E-H: Remedial Investigation Characterization Summaries*. Final.

  October. Text: Vol. 1, AOC H-8, pgs. 1-13
  Hits Table: Vol. 1, AOC H-8, Attachment 1, pg. 1
  All Data: Vol. 2, Appendix A, AOCH8, pgs. 2, 4-14
  HHRA Data: Vol. 4, Appendix C1, Section 7.2.8 pgs. 7-15 to 7-17,
  Tables 7.11a to 7.11d
- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May.

B5.3 Sampling Strategy and Type of Contamination

Two investigations have been conducted at AOC H-8 in association with the suspected contamination of the former POL facility. The first was a soil sampling event conducted by McClellan EM in June and July of 1990 in preparation for the expansion of Building 911. In August of 1997, an RI was conducted to characterize the site.

The McClellan 1990 investigation, part of a building expansion investigation, included 39 soil samples collected from 13 borings at various depths from 1 to 15 feet bgs. Two of the borings (B/911 #1 and B/911 #2) were located between Buildings 910 and 911, which are within the boundaries of AOC H-8.

During the 1997 RI, four soil borings (AH08SB001 through AH08SB004) were drilled, and twelve samples were collected and analyzed for TPH-D and TPH-G using methods M8015D and M8015V, respectively, and SVOCs using method SW8270. The FSP indicates that AH08SB01 was at the location of a historical surface stain. Soil borings AH08SB02 and AH08SB03 were drilled and sampled in areas where the aboveground storage tanks (ASTs) were observed in aerial photographs. AH08SB04 was drilled in an area where several samples were collected in the previous investigation and TPH was detected in one of those previous samples (Radian, 1997).

B5.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at AOC H-8. Metals, SVOCs (primarily PAHs) and TPH were determined to be present at the site. Figure B-5 identifies the site location and significant site features.

B5.4.1 Metals

During the McClellan 1990 Investigation, all metals were detected below background concentrations using method SW6010, with the exception of arsenic, which was detected at 7.6 mg/kg in boring B/911 #2. However, method SW6010 has been shown to produce unreliable results for arsenic. Because metals were not identified as potential COCs, RI samples were not analyzed for metals.

B5.4.2 SVOCs

During the 1990 investigation, there were trace SVOC detections of di-n-butylphthalate (DNBP) and bis(2-ethylhexyl)phthalate (DEPH) at 0.167 mg/kg and 1.62 mg/kg, respectively, which do not exceed any screening levels for the protection of human health and the environment.

During the RI, several PAHs were reported in soil samples collected from boring AH08SB001 at 0.25 foot bgs, which is located in the area of the former surface stain. These concentrations were reported as estimates (J flagged), except for a single detection of benzo(a)pyrene at 0.03 mg/kg which exceeded the screening level for protection of human health for unrestricted use. Concentrations of DEHP and DEPH were detected at 11 feet bgs (0.048 J mg/kg) and 5.75 feet bgs (0.61 J mg/kg) in boring AH08SB001 and boring

AH08SB004, respectively. The concentrations do not exceed any screening levels. It should be noted that DEHP is a common laboratory and field contaminant (Jacobs, 1998).

B5.4.3 TPH

TPH was detected in one sample at 65 mg/kg in 1990.

During the RI, TPH-D was detected in all surface samples collected from 0 to 1 foot bgs, with a maximum concentration of 10 mg/kg reported in boring AH08SB002 at 0.25 foot bgs. The maximum subsurface concentration of TPH-D was 13 mg/kg at 2.5 feet bgs in boring AH08SB004. Boring AH08SB04 was drilled in an area where several samples were collected in the previous investigation and TPH was detected in one of those previous samples (Radian, 1997). There were no detections of TPH-G with an MDL of 1 mg/kg in soil. All reported concentrations were below the screening levels for protection of surface water and groundwater.

B5.4.4 VOCs

Samples were not analyzed for VOCs because they were not identified as potential COCs for the site.

B5.5 Contamination Exposure and Migration

The primary contaminants include SVOCs (primarily PAHs) and TPH-D. TPH-D was not detected at concentrations that pose risk to human health. Exposure to soil was determined to pose a potential risk to human health due to benzo(a)pyrene, which was detected in a single surface sample within the perimeter of the former surface stain and is the only contaminant that exceeds the screening level for unrestricted use. None of the reported contaminants at the site present a threat to surface water and groundwater.

B5.6 Current and Potential Future Site and Resource Uses

AOC H-8 is currently covered by buildings 910 and 911 (Base Exchange and Commissary) and the associated paved parking lot. In the future, AOC H-8 will likely to be used for commercial/industrial or community support purposes.

B5.7 Human Health Risk Assessment

The baseline HHRA estimates what risks the site poses if no action were taken. This section of the ROD summarizes the results of the updated baseline risk assessment for AOC H-8. This risk assessment was originally presented in the OU E-H RICS2 (Jacobs, 1998). This update uses the same risk assessment methodology as OU E-H for all exposure pathways except those involving indoor air. For indoor air pathways, the SSG screening levels that are presented in Appendix C of this ROD were used as the basis for inhalation cancer risk and non-cancer hazard calculations; however, VOCs were not identified as potential COCs at this site. In addition, for chemicals that have had toxicity value updates since the OU E-H RICS2 was published, the most recent toxicity criteria have been used.

The contaminants identified at AOC H-8 for the HHRA are SVOCs (primarily PAHs) detected in surface soil in the vicinity of the former surface stain.

The potential cancer risks for AOC H-8 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 3×10^{-6}
- Future adult resident (0-to-2-foot-bgs depth interval excluding produce pathway): 8×10^{-7}
- Outdoor occupational worker: 3×10^{-7}
- Future construction worker: 6×10^{-8}

The main contributors to the cumulative potential cancer risks for the residential scenarios are the ingestion of PAHs in homegrown produce.

For AOC H-8, the non-cancer hazard indices for the future adult and child residential scenario are less than 1 for soil interval (0 to 2 feet bgs). In addition, the hazard indices are also less than 1 for the outdoor occupational worker and future construction worker scenarios. The potential for adverse non-cancer health effects for the adult resident and worker scenarios is unlikely at AOC H-8. Table B5-5 presents the non-cancer hazard indices and the various exposure scenarios and exposure routes at AOC H-8.

B5.8 Uncertainties

The sampling and analyses performed during the remedial investigation were sufficient and appropriate for the potential contaminants and release mechanisms at this site. There were no uncertainties identified for this site.

There are uncertainties associated with the risk estimates for AOC H-8. The main uncertainty is that the current reuse plans for this site are indefinite, but do not include residential or other "sensitive" use scenarios (day-cares, schools, hospitals, etc.). Hence, the use of the residential scenario for the site should be considered hypothetical at this time.

B5.9 Basis for No Action

All detected contaminants are below the screening levels except for a single detection of benzo(a)pyrene in surface soil. The concentration only slightly exceeded the unrestricted use screening level. No impact to surface water or groundwater is expected. The majority of the site has been redeveloped and is now principally overlain by the Base Commissary (Building 910); thus, the site is adequately characterized for its current use. Therefore, no action is required at this site to protect human health or welfare or the environment.

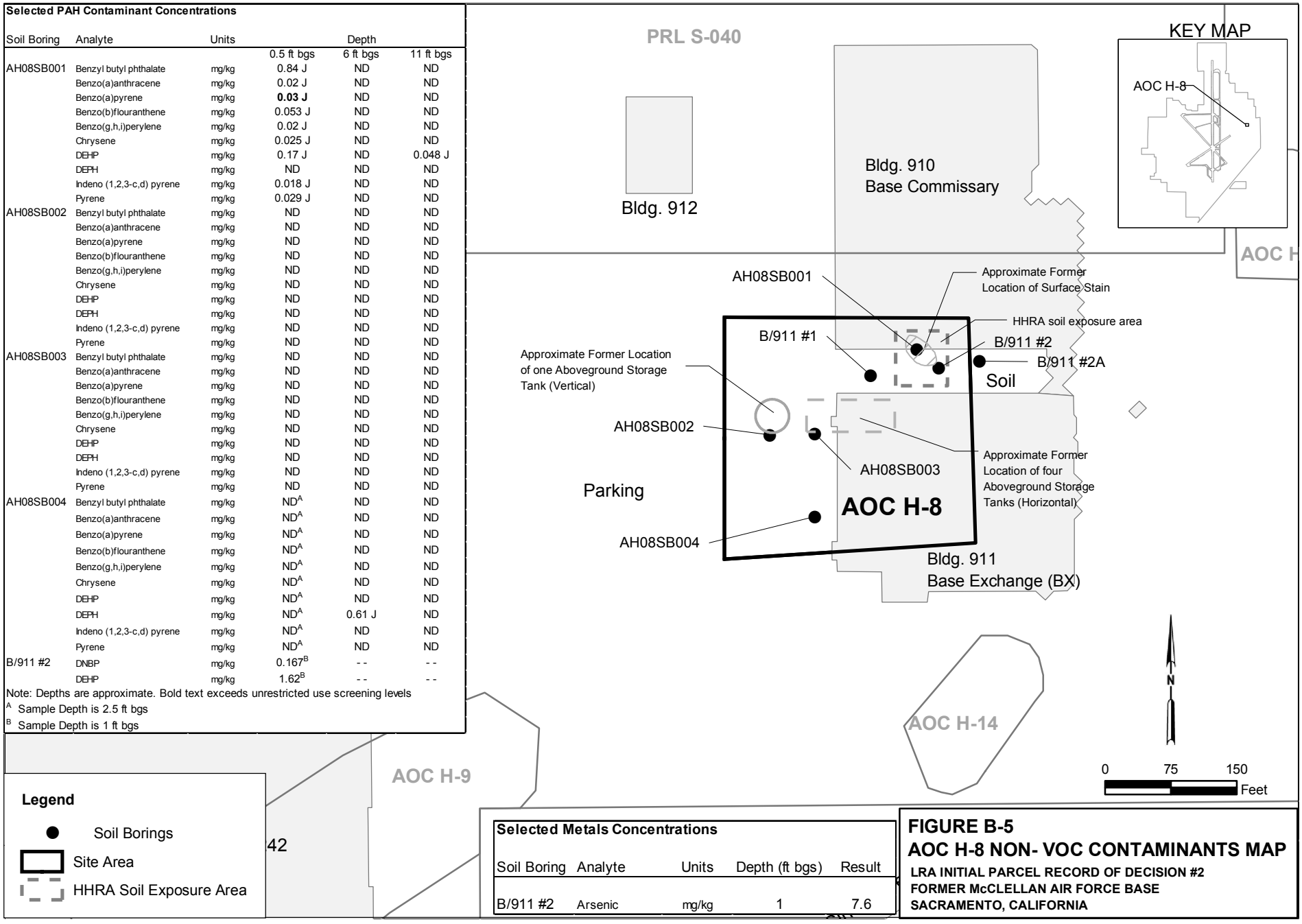
Selected PAH Contaminant Concentrations

Soil Boring	Analyte	Units	Depth		
			0.5 ft bgs	6 ft bgs	11 ft bgs
AH08SB001	Benzyl butyl phthalate	mg/kg	0.84 J	ND	ND
	Benzo(a)anthracene	mg/kg	0.02 J	ND	ND
	Benzo(a)pyrene	mg/kg	**0.03 J**	ND	ND
	Benzo(b)flouranthene	mg/kg	0.053 J	ND	ND
	Benzo(g,h,i)perylene	mg/kg	0.02 J	ND	ND
	Chrysene	mg/kg	0.025 J	ND	ND
	DEHP	mg/kg	0.17 J	ND	0.048 J
	DEPH	mg/kg	ND	ND	ND
	Indeno (1,2,3-c,d) pyrene	mg/kg	0.018 J	ND	ND
	Pyrene	mg/kg	0.029 J	ND	ND
AH08SB002	Benzyl butyl phthalate	mg/kg	ND	ND	ND
	Benzo(a)anthracene	mg/kg	ND	ND	ND
	Benzo(a)pyrene	mg/kg	ND	ND	ND
	Benzo(b)flouranthene	mg/kg	ND	ND	ND
	Benzo(g,h,i)perylene	mg/kg	ND	ND	ND
	Chrysene	mg/kg	ND	ND	ND
	DEHP	mg/kg	ND	ND	ND
	DEPH	mg/kg	ND	ND	ND
	Indeno (1,2,3-c,d) pyrene	mg/kg	ND	ND	ND
	Pyrene	mg/kg	ND	ND	ND
AH08SB003	Benzyl butyl phthalate	mg/kg	ND	ND	ND
	Benzo(a)anthracene	mg/kg	ND	ND	ND
	Benzo(a)pyrene	mg/kg	ND	ND	ND
	Benzo(b)flouranthene	mg/kg	ND	ND	ND
	Benzo(g,h,i)perylene	mg/kg	ND	ND	ND
	Chrysene	mg/kg	ND	ND	ND
	DEHP	mg/kg	ND	ND	ND
	DEPH	mg/kg	ND	ND	ND
	Indeno (1,2,3-c,d) pyrene	mg/kg	ND	ND	ND
	Pyrene	mg/kg	ND	ND	ND
AH08SB004	Benzyl butyl phthalate	mg/kg	ND[A]	ND	ND
	Benzo(a)anthracene	mg/kg	ND[A]	ND	ND
	Benzo(a)pyrene	mg/kg	ND[A]	ND	ND
	Benzo(b)flouranthene	mg/kg	ND[A]	ND	ND
	Benzo(g,h,i)perylene	mg/kg	ND[A]	ND	ND
	Chrysene	mg/kg	ND[A]	ND	ND
	DEHP	mg/kg	ND[A]	ND	ND
	DEPH	mg/kg	ND[A]	0.61 J	ND
	Indeno (1,2,3-c,d) pyrene	mg/kg	ND[A]	ND	ND
	Pyrene	mg/kg	ND[A]	ND	ND
B/911 #2	DNBP	mg/kg	0.167[B]	--	--
	DEHP	mg/kg	1.62[B]	--	--

Note: Depths are approximate. Bold text exceeds unrestricted use screening levels

[A] Sample Depth is 2.5 ft bgs

[B] Sample Depth is 1 ft bgs



Selected Metals Concentrations

Soil Boring	Analyte	Units	Depth (ft bgs)	Result
B/911 #2	Arsenic	mg/kg	1	7.6

FIGURE B-5
AOC H-8 NON- VOC CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

SAC \\ZION\SACGIS\PROJ\MCCLELLAN\340972_TO400\MAPFILES\IP2_ROD\LRA_AOC_H8V2.MXD LRA_AOC_H8V2.PDF SSCOPES 6/23/2008 09:45:25

Attachment B5
AOC H-8 Human Health Risk Assessment

ATTACHMENT B5

AOC H-8 Human Health Risk Assessment

The baseline human health risk assessment estimates what risks the site poses if no action were taken. This section of the ROD summarizes the results of the updated baseline risk assessment for AOC H-8. This risk assessment was originally presented in the OU E-H RICS2 (Jacobs, 1998). This update uses the same risk assessment methodology as OU E-H for all exposure pathways. For chemicals that have had toxicity value updates since the OU E-H RICS2 was published, the most recent toxicity criteria have been used.

Identification of Chemicals of Concern

Potential contaminants of concern (COCs) for AOC H-8 include SVOCs (primarily PAHs). Tables B5-1 presents the soil data summary for the COCs (tables are located at the end of this attachment).

Tables B5-1 includes the range of potential COC concentrations, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the exposure point concentrations (EPCs), and how the EPCs were derived for the media and exposure area of AOC H-8. In general, the lower value of the maximum concentration or the upper 95th percent confidence limit on the mean was used as the EPC for potential COCs detected in more than one sample.

Exposure Assessment

A conceptual model was developed that describes the potential exposure pathways associated with soil at AOC H-8 (see Figure 2-3 in Section 2.4 of the ROD). Although AOC H-8 will likely be used for commercial/industrial or community support purposes in the future; several exposure scenarios were evaluated in the human health risk assessment to provide information for future risk-management decisions.

The following exposure scenarios were quantitatively evaluated in the human health risk assessment:

- Exposure of hypothetical future residents (adults and children) to soil (0 to 2 feet bgs) and groundwater
- Exposure of occupational workers (0 to 2 feet bgs)
- Exposure of construction workers to soil (0 to 15 feet bgs)

The exposure routes that were considered in the risk assessment for residents and workers potentially exposed to soil include incidental soil ingestion, inhalation of organic contaminants (ambient air for outdoor workers and construction workers) and resuspended particulates, and dermal contact with soil. For the residential scenarios, the ingestion of homegrown produce was also included.

Toxicity Assessment

The toxicity data that were used in the human health risk assessment are summarized on Tables B5-2 and B5-3. Health effects are divided into two categories: cancer and non-cancer effects.

Table B5-2 presents the slope factors used to estimate potential excess lifetime cancer risks associated with exposure to potential COCs in soil at AOC H-8. As shown on Table B5-2, the oral slope factor was used to estimate potential risks associated with dermal exposure.

Table B5-3 presents the reference doses (RfDs) used to evaluate the potential for non-cancer health effects. The oral RfDs were used to estimate potential health effects associated with dermal exposure. In addition, when inhalation reference concentrations are not available for some of the COCs, the oral RfDs were used to evaluate potential health effects from the inhalation exposure route.

The hierarchy of sources for toxicity values follows EPA and Air Force guidance (EPA, 2003 and USAF, 2006) and is listed below in order of preference:

1. EPA Integrated Risk Information System (IRIS) – online database (EPA, 2007)
2. EPA's Provisional Peer Reviewed Toxicity Values (as cited in the 2004 EPA Region 9 Preliminary Remediation Goal [PRG] table [EPA, 2004])
3. California Environmental Protection Agency (Cal-EPA) cancer potency factors and reference exposure levels (REL) - online database (Cal-EPA, 2007)
4. Other EPA sources (i.e., Health Effects Assessment Summary Table [HEAST], National Center for Environmental Assessment [NCEA] provisional toxicity values, and route-extrapolated toxicity values as cited in the 2004 EPA Region 9 PRG table [EPA, 2004]).

Toxicity criteria for several contaminants have changed since the human health risk assessment was first presented. The risk estimates have been updated with the most current toxicity factors.

The following cancer toxicity slope factors were updated:

- Benzo(a)pyrene – Oral: 12 to 7.3 $(mg/kg\text{-}day)^{-1}$

There were no changes to the non-cancer toxicity reference doses for the COCs at this site.

Risk Characterization

The toxicity values described above were used in the human health risk assessment along with the exposure information to estimate the potential risks from contacting potential COCs in soil. For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a results of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$Risk = CDI \times SF \quad (2)$$

Where:

Risk = a unitless probability (e.g., 1×10^{-6}) of an individual's developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in a million chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with an RfD derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of the receptor average daily exposure to the route-specific reference dose is called a hazard quotient (HQ). An HQ less than one indicates that the receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index is generated by adding the HQs over the exposure routes. A hazard index less than one indicates that, based on the sum of all HQs from different exposure routes, toxic noncarcinogenic effects are unlikely.
A hazard index greater than one indicates that site-related exposure may present a risk to human health.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD} \qquad (2)$$

Where:

CDI = chronic daily intake (milligrams per kilogram per day [mg/kg-day])
RfD = reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term.)

Table B5-4 presents the potential cancer risk estimates for the various exposure scenarios and exposure routes at AOC H-8. These risk estimates are based on reasonable maximum exposure and were developed taking into account various conservative assumptions about the frequency and duration of receptors exposure to soil and the toxicity of the potential COCs.

Residential and occupational exposure scenarios were evaluated for AOC H-8. The risk results for these scenarios are summarized below and presented in the risk summary tables at the end of this section.

The potential cancer risks for AOC H-8 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 3×10^{-6}
- Future adult resident (0-to-2-foot-bgs depth interval excluding produce pathway): 8×10^{-7}
- Outdoor occupational worker: 3×10^{-7}
- Future construction worker: 6×10^{-8}

The main contributors to the cumulative potential cancer risks for the residential scenarios are the ingestion of PAHs in homegrown produce.

For AOC H-8, the non-cancer hazard indices for the future adult and child residential scenario are less than 1 for soil interval (0 to 2 feet bgs). In addition, the hazard indices are also less than 1 for the outdoor occupational worker and future construction worker scenarios. The potential for adverse non-cancer health effects for the adult resident and worker scenarios is unlikely at AOC H-8. Table B5-5 presents the non-cancer hazard indices and the various exposure scenarios and exposure routes at AOC H-8.

Uncertainties

There are uncertainties associated with the risk estimates for AOC H-8. The main uncertainty is that the current reuse plans for this site are indefinite, but do not include residential or other "sensitive" use scenarios (day-cares, schools, hospitals, etc.). Hence, the use of the residential scenario for the site should be considered hypothetical at this time.

Cal-EPA has a more conservative oral slope factor for benzo(a)pyrene than the EPA slope factor used for the risk calculations presented in Table B5-4. If the Cal-EPA slope factor is used, the cancer risks are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 4×10^{-6}
- Outdoor occupational worker: 4×10^{-7}
- Future construction worker: 9×10^{-8}

References

California Environmental Protection Agency (Cal-EPA). 2007. Office of Environmental Health Hazard Assessment (OEHHA). Cal-EPA – OEHHA Toxicity Criteria Database.

Jacobs. 1998. *Operable Units E-H: Remedial Investigation Characterization Summaries*. Final.

October. Text: Vol. 1, AOC H-8, pgs. 1-13
Hits Table: Vol. 1, AOC H-8, Attachment 1, pg. 1
All Data: Vol. 2, Appendix A, AOCH8, pgs. 2, 4-14
HHRA Data: Vol. 4, Appendix C1, Section 7.2.8 pgs. 7-15 to 7-17,
Tables 7.11a to 7.11d

U.S. Air Force (USAF). 2006. "Toxicity Values for Use in Risk Assessments and Establishing Risk-Based Cleanup Levels." Memorandum from Gregory R. Ottoman, Major, USAF. July 14.

U.S. Environmental Protection Agency (EPA). 2007. Integrated Risk Information System (IRIS). On-line data base.

U.S. Environmental Protection Agency (EPA). 2004. Region 9 Preliminary Remediation Goal (PRG) table. October.

U.S. Environmental Protection Agency (EPA). 2003. "Human Health Toxicity Values in Superfund Risk Assessments." OSWER Directive 9285.7-53. December 5.

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Table B5-1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
AOC H-8

Scenario Timeframe:	**Future**
Medium	**Soil**
Exposure Medium	**Soil**

Exposure Point	Chemical of Concern	Concentration Detected (mg/kg)		Frequency of Detection	95th UCL Concentration (mg/kg)	Statistical Measure[a]	Exposure Point Concentration[b] (mg/kg)
		Min	Max				
AOC H-8 - Soil On-site Direct Contact (0 to 2 ft bgs)	Benzo(a)anthracene	2.0E-02	2.0E-02	1/2	-	Maximum Result	2.0E-02
	Benzo(a)pyrene	3.0E-02	3.0E-02	1/2	-	Maximum Result	3.0E-02
	Benzo(b)fluoranthene	5.3E-02	5.3E-02	1/2	-	Maximum Result	5.3E-02
	Benzo(g,h,i)perylene	2.0E-02	2.0E-02	1/2	-	Maximum Result	2.0E-02
	Chrysene	2.5E-02	2.5E-02	1/2	-	Maximum Result	2.5E-02
	Indeno(1,2,3-c,d)pyrene	1.8E-02	1.8E-02	1/2	-	Maximum Result	1.8E-02
	Pyrene	2.9E-02	2.9E-02	1/2	-	Maximum Result	2.9E-02

[a] The statistical measure indicates the basis for the exposure point concentration.
[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.
95th UCL = 95 percent upper confidence limit on the mean.

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Table B5-2
Cancer Toxicity Data Summary
AOC H-8

Pathway: Ingestion, Dermal						
Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence[a]	Source	Date
Benzo(a)anthracene	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Benzo(a)pyrene	7.3E+00	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Benzo(b)fluoranthene	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Chrysene	1.2E-01	1.2E-01	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Indeno(1,2,3-c,d)pyrene	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Pathway: Inhalation						
Chemical of Concern	Inhalation Cancer Slope Factor		Slope Factor Units	Weight of Evidence[a]	Source	Date
Benzo(a)anthracene	3.90E-01		$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Benzo(a)pyrene	3.90E+00		$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Benzo(b)fluoranthene	3.90E-01		$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Chrysene	3.90E-02		$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Indeno(1,2,3-c,d)pyrene	3.90E-01		$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007

[a]Weight of Evidence Classification

A - human carcinogen
B1 and B2 - probable human carcinogen
C - possible human carcinogen
D - not classifiable as a human carcinogen
E - evidence of noncarcinogenicity for humans
Reference = USEPA 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December.

Cal-EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System

Table B5-3
Non-Cancer Toxicity Data Summary
AOC H-8

Pathway: Ingestion, Dermal									
Chemical of Concern	Chronic/ subchronic	Oral RfD	Oral RfD Units	Dermal RfD	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Benzo(a)anthracene	Chronic	3.0E-02	mg/kg-day	3.0E-02	mg/kg-day			SURROGATE	
Benzo(a)pyrene	Chronic	3.0E-02	mg/kg-day	3.0E-02	mg/kg-day			SURROGATE	
Benzo(b)fluoranthene	Chronic	3.0E-02	mg/kg-day	3.0E-02	mg/kg-day			SURROGATE	
Benzo(g,h,i)perylene	Chronic	3.0E-02	mg/kg-day	3.0E-02	mg/kg-day			SURROGATE	
Chrysene	Chronic	3.0E-02	mg/kg-day	3.0E-02	mg/kg-day			SURROGATE	
Indeno(1,2,3-c,d)pyrene	Chronic	3.0E-02	mg/kg-day	3.0E-02	mg/kg-day			SURROGATE	
Pyrene	Chronic	3.0E-02	mg/kg-day	3.0E-02	mg/kg-day	Kidney	3000/1	IRIS	2007
Pathway: Inhalation									
Chemical of Concern	Chronic/ subchronic	Inhalation RfD	Oral RfD Units			Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Benzo(a)anthracene	Chronic	3.0E-02	mg/kg-day					ROUTE	
Benzo(a)pyrene	Chronic	3.0E-02	mg/kg-day					ROUTE	
Benzo(b)fluoranthene	Chronic	3.0E-02	mg/kg-day					ROUTE	
Benzo(g,h,i)perylene	Chronic	3.0E-02	mg/kg-day					ROUTE	
Chrysene	Chronic	3.0E-02	mg/kg-day					ROUTE	
Indeno(1,2,3-c,d)pyrene	Chronic	3.0E-02	mg/kg-day					ROUTE	
Pyrene	Chronic	3.0E-02	mg/kg-day					ROUTE	

Notes:
Toxicity values used were accurate as of the date of report submittal and are not necessarily the most current values.
Blank cells indicate information is not available or not applicable.

Cal-EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
mg/kg-day = milligrams per kilogram per day
NCEA = National Center for Environmental Assessment
RfD = reference dose
ROUTE = route-to-route extrapolated value (e.g., oral RfD used for inhalation RfD)
SURROGATE = RfDs for pyrene used for Carcinogenic PAHs

Table B5-4
Risk Characterization Summary - Carcinogens
AOC H-8

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Carcinogenic Risk				
						Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-8 - Soil On-site Direct Contact (0 to 2 ft bgs)	Benzo(a)anthracene	2.0E-02	mg/kg	3.8E-08	8.8E-13	1.7E-08	1.7E-07	2.3E-07
			Benzo(a)pyrene	3.0E-02	mg/kg	3.4E-07	1.3E-11	1.6E-07	1.2E-06	1.7E-06
			Benzo(b)fluoranthene	5.0E-02	mg/kg	1.0E-07	2.3E-12	4.6E-08	3.4E-07	4.9E-07
			Chrysene	3.0E-02	mg/kg	4.7E-09	1.1E-13	2.2E-09	2.2E-08	2.9E-08
			Indeno(1,2,3-c,d)pyrene	2.0E-02	mg/kg	3.4E-08	7.9E-13	1.6E-08	9.6E-08	1.5E-07
			TOTAL			**5.2E-07**	**1.7E-11**	**2.4E-07**	**1.8E-06**	**3.E-06**

Scenario Timeframe:	**Future**
Receptor Population:	**Occupational**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Carcinogenic Risk				
						Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-8 - Soil On-site Direct Contact (0 to 2 ft bgs)	Benzo(a)anthracene	2.0E-02	mg/kg	4.2E-09	4.1E-13	1.5E-08	--	1.9E-08
			Benzo(a)pyrene	3.0E-02	mg/kg	3.8E-08	6.2E-12	1.3E-07	--	1.7E-07
			Benzo(b)fluoranthene	5.0E-02	mg/kg	1.1E-08	1.1E-12	3.9E-08	--	5.0E-08
			Chrysene	3.0E-02	mg/kg	5.2E-10	5.2E-14	1.8E-09	--	2.3E-09
			Indeno(1,2,3-c,d)pyrene	2.0E-02	mg/kg	3.8E-09	3.7E-13	1.3E-08	--	1.7E-08
			TOTAL			**5.8E-08**	**8.1E-12**	**2.0E-07**	**--**	**3.E-07**

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Carcinogenic Risk				
						Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-8 - Soil On-site Direct Contact (0 to 2 ft bgs)	Benzo(a)anthracene	2.0E-02	mg/kg	1.6E-09	2.2E-11	2.9E-09	--	4.5E-09
			Benzo(a)pyrene	3.0E-02	mg/kg	1.5E-08	3.3E-10	2.7E-08	--	4.2E-08
			Benzo(b)fluoranthene	5.0E-02	mg/kg	4.3E-09	5.8E-11	7.7E-09	--	1.2E-08
			Chrysene	3.0E-02	mg/kg	2.0E-10	2.7E-12	3.6E-10	--	5.6E-10
			Indeno(1,2,3-c,d)pyrene	2.0E-02	mg/kg	1.4E-09	2.0E-11	2.6E-09	--	4.0E-09
			TOTAL			**2.2E-08**	**4.3E-10**	**4.0E-08**	**--**	**6.E-08**

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Table B5-5
Risk Characterization Summary - Non-Carcinogens
AOC H-8

Scenario Timeframe:	**Future**										
Receptor Population:	**Resident**										
Receptor Age:	**Adult**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-8 - Soil On-site Direct Contact (0 to 2 ft bgs)	Benzo(a)anthracene	2.0E-02	mg/kg		7.3E-06	4.6E-10	3.1E-06	3.1E-05	4.1E-05
			Benzo(a)pyrene	3.0E-02	mg/kg		1.1E-05	6.9E-10	4.6E-06	3.5E-05	5.1E-05
			Benzo(b)fluoranthene	5.0E-02	mg/kg		1.9E-05	1.2E-09	8.2E-06	6.2E-05	8.9E-05
			Benzo(g,h,i)perylene	2.0E-02	mg/kg		7.3E-06	4.6E-10	3.1E-06	2.0E-05	3.0E-05
			Chrysene	3.0E-02	mg/kg		9.2E-06	5.8E-10	3.9E-06	3.9E-05	5.2E-05
			Indeno(1,2,3-c,d)pyrene	2.0E-02	mg/kg		6.6E-06	4.2E-10	2.8E-06	1.7E-05	2.7E-05
			Pyrene	3.0E-02	mg/kg		1.1E-05	6.8E-10	4.5E-06	2.7E-05	4.3E-05
			TOTAL				**7.1E-05**	**4.5E-09**	**3.0E-05**	**2.3E-04**	**3.E-04**

Scenario Timeframe:	**Future**										
Receptor Population:	**Resident**										
Receptor Age:	**Child**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-8 - Soil On-site Direct Contact (0 to 2 ft bgs)	Benzo(a)anthracene	2.0E-02	mg/kg		6.4E-06	3.2E-10	2.6E-06	2.3E-05	3.2E-05
			Benzo(a)pyrene	3.0E-02	mg/kg		9.6E-06	4.9E-10	3.9E-06	2.6E-05	3.9E-05
			Benzo(b)fluoranthene	5.0E-02	mg/kg		1.7E-05	8.6E-10	7.0E-06	4.5E-05	6.9E-05
			Benzo(g,h,i)perylene	2.0E-02	mg/kg		6.4E-06	3.2E-10	2.6E-06	1.4E-05	2.3E-05
			Chrysene	3.0E-02	mg/kg		8.0E-06	4.0E-10	3.3E-06	2.8E-05	4.0E-05
			Indeno(1,2,3-c,d)pyrene	2.0E-02	mg/kg		5.8E-06	2.9E-10	2.4E-06	1.3E-05	2.1E-05
			Pyrene	3.0E-02	mg/kg		9.3E-06	4.7E-10	3.8E-06	2.1E-05	3.4E-05
			TOTAL				**6.3E-05**	**3.1E-09**	**2.6E-05**	**1.7E-04**	**3.E-04**

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Table B5-5
Risk Characterization Summary - Non-Carcinogens
AOC H-8

Scenario Timeframe: **Future**
Receptor Population: **Occupational**
Receptor Age: **Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-8 - Soil On-site Direct Contact (0 to 2 ft bgs)	Benzo(a)anthracene	2.0E-02	mg/kg		3.3E-07	9.9E-11	1.1E-06	--	1.5E-06
			Benzo(a)pyrene	3.0E-02	mg/kg		4.9E-07	1.5E-10	1.7E-06	--	2.2E-06
			Benzo(b)fluoranthene	5.0E-02	mg/kg		8.6E-07	2.6E-10	3.0E-06	--	3.9E-06
			Benzo(g,h,i)perylene	2.0E-02	mg/kg		3.3E-07	9.9E-11	1.1E-06	--	1.5E-06
			Chrysene	3.0E-02	mg/kg		4.1E-07	1.2E-10	1.4E-06	--	1.8E-06
			Indeno(1,2,3-c,d)pyrene	2.0E-02	mg/kg		2.9E-07	8.9E-11	1.0E-06	--	1.3E-06
			Pyrene	3.0E-02	mg/kg		4.7E-07	1.4E-10	1.6E-06	--	2.1E-06
			TOTAL				**3.2E-06**	**9.6E-10**	**1.1E-05**	--	**1.E-05**

Scenario Timeframe: **Future**
Receptor Population: **Construction Worker**
Receptor Age: **Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-8 - Soil On-site Direct Contact (0 to 2 ft bgs)	Benzo(a)anthracene	2.0E-02	mg/kg		3.1E-06	1.3E-07	5.7E-06	--	8.9E-06
			Benzo(a)pyrene	3.0E-02	mg/kg		4.7E-06	2.0E-07	8.5E-06	--	1.3E-05
			Benzo(b)fluoranthene	5.0E-02	mg/kg		8.3E-06	3.5E-07	1.5E-05	--	2.4E-05
			Benzo(g,h,i)perylene	2.0E-02	mg/kg		3.1E-06	1.3E-07	5.7E-06	--	8.9E-06
			Chrysene	3.0E-02	mg/kg		3.9E-06	1.6E-07	7.1E-06	--	1.1E-05
			Indeno(1,2,3-c,d)pyrene	2.0E-02	mg/kg		2.8E-06	1.2E-07	5.1E-06	--	8.0E-06
			Pyrene	3.0E-02	mg/kg		4.5E-06	1.9E-07	8.2E-06	--	1.3E-05
			TOTAL				**3.0E-05**	**1.3E-06**	**5.5E-05**	--	**9.E-05**

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SECTION B6

AOC H-12

B6.1 Site Overview and Features

AOC H-12 is located in the east-central portion of OU H. It consists of Building 929 and the surrounding area. Building 929 has a strip of grass on all sides and is approximately 20 feet east of a lined concrete drainage ditch. Dormitory housing exists approximately 150 feet to the east of AOC H-12 (Jacobs, 2000a). It was noted in the RICS that weed control around the drainage ditch, prior to the lining of the ditch in the 1960s, was historically achieved through the application of PCB-laden oil.

Two concrete pads, each approximately 5 feet by 5 feet and previously used to support weather equipment, remain in the grassy area along the ditch. An additional concrete pad 30 feet by 15 feet is located approximately 60 feet north from Building 929. Its intended use is unknown. The lawn area surrounding the building slopes gently away from the building in all directions. Three floor drains were observed in the concrete floor of Building 929 located in the former paint spray booth.

Surface water from the Base and offbase areas to the east flows through a covered drain pipe south of the site into the ditch located on the west side of Building 929.

B6.2 Source of Contamination

The site was formerly a maintenance area for weather equipment during the late 1960's through the 1980's. The detected contaminants include metals, SVOCs (including PCBs), and VOCs. It is suspected that PCB laden oils that were used for weed control contaminated these soils.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Jacobs. 2000. *Operable Units E-H: Remedial Investigation Characterization Summaries 2*. Final. June.

  Text: Vol. 2, AOC H-12, pgs. 1-17
  Hits Table: Vol. 2, AOC H-12, Attachment 1, pg. 1-5
  All Data: Vol. 4, Appendix A, AOC H12, pgs. 10, 12-49
  HHRA Data: Vol. 6, Appendix C1, Section 9.13, pgs. 9-53 to 9-57, Tables 9.13.5 to 9.13.10

- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May.

- CH2M HILL. 2007. *Phase 1 LRA Initial Parcel #2 Pre-Decision Work Plan*. Final. August

- CH2M HILL. 2007. Pre-Decision Sampling Results for AOC H-12 (located in Appendix D of this document).

B6.3 Sampling Strategy and Type of Contamination

Investigations at AOC H-12 include sampling within the drainage ditch, an RI during 1997 and 1998, and sampling during the pre-decision sampling effort. Nine soil borings and ten hand augers were drilled and sampled, and seven sediment samples were collected from the concrete-lined ditch. Sampling within the drainage ditch reportedly took place prior to the RI; however, documentation of details regarding the sampling efforts or results has not been located. One soil sample was apparently collected and analyzed by Methods SW8010 and SW8020 in 1987 at Building 929 to identify any VOC contamination. During the early 1990s, an oily film was observed on the water in the drainage ditch. Water in the drainage ditch drains both on Base and offbase areas before surfacing near Building 929; therefore, the oily film may have originated from off base. Sampling details or results were not documented. During September 1997 and October and November 1998, RI soil and soil gas samples were collected and analyzed.

In 2007, soil and soil gas samples were collected during the pre-decision sampling effort from 14 soil borings and 21 hand augers. Soil samples were analyzed for mercury and PCBs, and soil gas samples were analyzed for VOCs by Method TO-15. Two indoor air samples and one ambient air sample were also collected.

B6.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at AOC H-12. SVOCs (including PCBs and PAHs), TPH, metals, and VOCs were determined to be present at the site. PCBs may pose a risk to human health and the environment. Figure B-6 identifies the site location and significant site features.

B6.4.1 SVOCs

Several PAHs were reported at trace concentrations in the soil sample from AH12SB001 at 14.5 feet bgs. However, no PAHs were detected in two shallower samples from the same boring. All reported detections were estimated concentrations (J-flagged), and were below all screening levels. PCBs were reported above detection limits in boring AH12HA004 (0.047 mg/kg) at 0.25 foot bgs and in boring AH12HA007 (0.13 mg/kg) at 0.25 foot bgs. Both of these concentrations are above the screening levels for the protection of surface water quality and one exceeds the screening level for protection of human health.

B6.4.2 TPH

Detections of TPH-D were reported at several of the soil sampling locations across AOC H-12. A maximum concentration of 26 mg/kg at 3.5 feet bgs from AH12SB006 was reported. Typical detections at the site were less than 10 mg/kg, and none exceeded the screening levels for the protection of surface water or groundwater. TPH-G was not reported above the detection limits at AOC H-12 (Jacobs, 2000a).

B6.4.3 VOCs

Soil gas samples were collected from borings AH12SB001 through AH12SB003 and AH12SB009 and analyzed with method M18MS. Only one of these samples was collected

from a depth less than 15 feet bgs (at AH12SB009). No TO-14 confirmation samples were collected. Chloroform was detected in two samples from boring AH12SB001 at depths of 20 and 39.8 feet bgs. The detections were 1,400 and 3,800 ppbv, respectively. For reference, the SSG PCGs for chloroform for unrestricted and industrial use, which apply to the 0-to-15-foot-bgs interval, are 2.2 and 36 ppbv, respectively.

In samples collected during the pre-decision sampling effort, nine VOCs were detected at concentrations exceeding unrestricted use screening levels in soil gas samples collected between 5 and 15 feet bgs. Three VOCs, including carbon tetrachloride, chloroform, and naphthalene, had concentrations greater than industrial use screening levels. The maximum detected concentration was chloroform at 1,160 ppbv from AH12SB012 at 15 feet bgs. The maximum concentration of carbon tetrachloride was also reported in a 15-foot sample from AH12SB012 at a concentration of 124 ppbv. Naphthalene was detected at a maximum concentration of 234 ppbv from AH12SB020 at 15 feet bgs. TCE was detected at concentrations below industrial screening levels, and the maximum concentration was reported in a 15-foot sample from AH12SB022 located northeast of the site. Concentrations of VOCs exceeding unrestricted use screening levels are shown on Figure B-6A.

Two indoor air samples and one ambient air sample were collected at AOC H-12. The two indoor air samples were collected within Building 929, and the ambient air sample was collected just outside the building. The northern sample was located near a floor drain, and the southern sample was located in an office. Because the building is unoccupied, the building was not vented prior to sample collection and the ventilation system was not operational prior to or during sample collection. Chloroform was detected in all three samples at concentrations greater than unrestricted and industrial use screening levels for indoor air. Benzene was the only other VOC detected at concentrations greater than screening levels for indoor air. It was detected in Indoor Air sample 2, collected near a floor drain, at concentrations greater than unrestricted and industrial use screening levels. Several other VOCs were detected, but all concentrations were less than screening levels for indoor air. These indoor air samples were not collected as part of an approved CERCLA work plan but provide further support for the Alternative 3 remedy at AOC H-12. More details on the ambient air samples and indoor air samples can be found in Attachment 4 of Appendix D.

B6.4.4 Metals

Soil samples collected from AH12HA001 through AH12HA010 were analyzed using method SW7471 (mercury) only. Samples collected from AH12SB001 though AH12SB008 were analyzed using method SW7471 (mercury) and SW6010. Twelve metals were detected above combined background values (arsenic, barium, beryllium, calcium, cadmium, cobalt, copper, manganese, mercury, selenium, thallium, and vanadium). Of these metals, only mercury exceeded screening levels for protection of human health and the environment.

Mercury was reported above combined background levels in 4 of the 13 soil borings located outside the concrete-lined ditch. The maximum mercury concentration reported outside the ditch was 11.9 mg/kg from the 0.25-foot bgs sample from AH12HA007. The detections were from near-surface samples (less than 0.5 foot bgs) and decreased to below detection limits with depth. Reported concentrations of mercury in surface soils exceed the screening levels for protection of surface water and human health. However, in soil samples collected during the pre-decision sampling effort, mercury was detected in several surface samples collected

from AOC H-12, and all concentrations were less than screening levels. The maximum concentration was 0.22 mg/kg from AH12HA017.

B6.4.5 Sediments

Sediment samples from the ditch contained SVOCs, metals, and a single detection of TPH-D. Because the ditch is routinely scraped clean during maintenance activities, the contaminants detected during the RI are no longer believed to be present (Jacobs, 2000a).

B6.5 Contamination Exposure and Migration

Routes for human exposure include contact with skin, ingestion, and inhalation for contaminated soils and SSG at AOC H-12. Only mercury and PCB-1260 are present in the surface soils at concentrations that exceed screening levels for protection of surface water quality. Therefore, contamination at the site does not present a threat to groundwater.

B6.6 Current and Potential Future Site and Resource Uses

Building 929 is currently unoccupied. In the future, Building 929 will likely continue to be used for commercial/industrial or community support purposes

B6.7 Human Health Risk Assessment

The exposure area for AOC H-12 extends beyond the boundaries of the site. Sediment data collected from the drainage ditch were not evaluated in the risk assessment, because the ditch is lined with concrete and scraped annually. Analytes considered in the risk assessment include metals, PAHs, phthalate esters, and PCBs in soil and VOCs in soil gas. The risk results are summarized below and in the risk tables (Attachment B6).

B6.7.1 Risk Characterization

The potential cancer risks for AOC H-12 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 6×10^{-7}
- Future adult resident (0-to-10-foot-bgs depth interval): 4×10^{-4}
- Outdoor occupational worker: 7×10^{-8}
- Indoor occupational worker (0-to-15-foot-bgs depth interval inhalation pathway only): 2×10^{-5}
- Future construction worker: 5×10^{-6}

The main contributor to the cumulative potential cancer risk for the residential scenario for soil 0 to 10 feet bgs is exposure to arsenic through the homegrown produce pathway and the ingestion pathway and chloroform and naphthalene by the indoor air pathway. The main contributor to the potential cancer risk for the indoor occupational scenario for soil gas 0 to 15 feet bgs is exposure to chloroform through the inhalation pathway. For the construction

worker scenario, the main contributor to the potential cancer risk is total chromium by the inhalation exposure route.

The potential non-cancer risks for AOC H-12 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 1
- Future adult resident (0-to-10-foot-bgs depth interval): 3
- Future child resident (0-to-2-foot-bgs depth interval): 4
- Future child resident (0-to-10-foot-bgs depth interval): 7
- Outdoor occupational worker: < 1
- Indoor occupational worker (0-to-15-foot-bgs depth interval): < 1
- Future construction worker: 2

The main contributors to the hazard index for the adult residential scenario for soil 0 to 10 feet bgs are thallium and vanadium by the homegrown produce pathway and naphthalene by the indoor air pathway. The main contributors to the hazard index for the child residential scenario for soil 0 to 2 feet bgs are thallium and vanadium through the homegrown produce pathway. The main contributors to the hazard index for the child residential scenario for soil 0 to 10 feet bgs are thallium and vanadium through the homegrown produce pathway and naphthalene by the indoor air pathway. For the construction worker scenario, the main exposure route is the inhalation of particulates, and cobalt and barium are the main contributors to the hazard index.

Lead was a COC in soil for the 0-to-10-foot-bgs and 0-to-15-foot-bgs depth intervals. The maximum detected concentration in both of these depth intervals (27 mg/kg) is less than the residential screening level of 150 mg/kg.

Screening-level potential cumulative cancer risks and non-cancer hazard indices for the indoor air samples collected at Building 929 and the ambient air sample were estimated. The indoor air screening levels were used as the basis of the cancer risk and non-cancer hazard calculations. The cumulative potential cancer risks for detected concentrations of VOCs in Indoor Air sample 1 are 7×10^{-6} for the residential scenario and 4×10^{-6} for the occupational scenario. For Indoor Air sample 2, the potential cancer risks are 2×10^{-5} for the residential scenario and 1×10^{-5} for the occupational scenario. The main risk drivers are chloroform, ethylbenzene, and benzene (Indoor Air sample 2 only). The hazard indices for both indoor air samples for both residential and occupational scenarios are less than 1. For the ambient air sample, the potential cancer risks are 4×10^{-6} for the residential scenario and 2×10^{-6} for the occupational scenario. The hazard indices for both residential and occupational scenarios are less than 1.

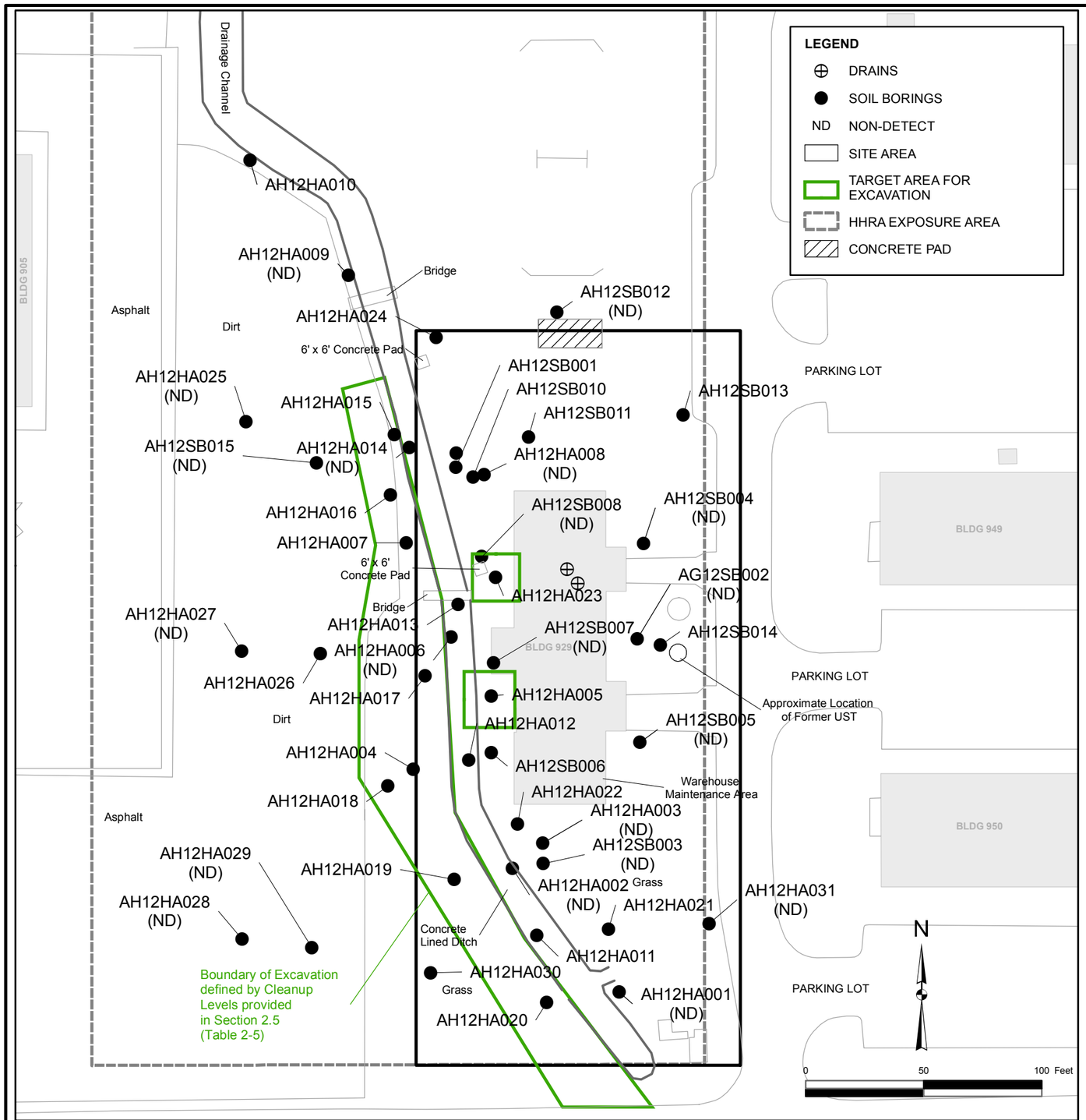
B6.8 Uncertainties

The sampling and analyses performed during the previous investigations were sufficient and appropriate for the potential contaminants and release mechanisms at this site. There were no uncertainties identified for this site.

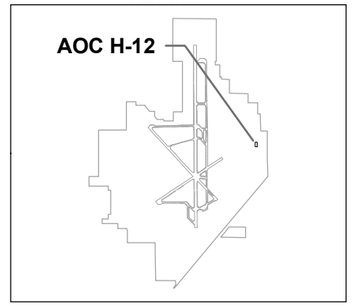
There are several uncertainties associated with the HHRA. Please see Attachment B6 for more details.

B6.9 Basis for Action

The response action selected in this ROD is necessary to protect human health and surface water quality from contamination in soil. Non-VOCs in surface soil at concentrations that may impact surface water will be excavated to levels suitable for unrestricted use. In addition, to address VOC contamination, an institutional control will be implemented at AOC H-12 to require a deed covenant for the vapor intrusion remedy. The boundary for the institutional control encompasses an area that includes all sampling locations with detected VOC concentrations that exceed the institutional control compliance levels for unrestricted use provided in Section 2.5 (see Table 2-2). In addition to AOC H-12 (in Lot 60D), the boundary for the institutional control has been extended to cover Lot 64 to the east, Lots 60C and 61 to the west, and the southernmost portion of Lot 60A to the north (see Figure B-6).



KEY MAP



CONCENTRATIONS OF PCB-1260

Boring	Depth (feet bgs)	Concentration (mg/kg)
AH12HA004	0.25	0.0472
AH12HA007	0.25	0.13
AH12HA011*	0.5	0.0119
AH12HA012*	0.5	0.0114
AH12HA013*	0.5	0.0139
AH12HA014*	0.5	0.00897
AH12HA015*	0.5	0.0341
AH12HA016*	0.5	0.0121
AH12HA017*	0.5	**0.0723**
AH12HA018*	0.5	0.0205 (FD)
	0.5	0.0274
AH12HA019*	0.5	0.0242
AH12HA020*	0.5	0.0356
AH12HA021*	0.5	0.0199
AH12HA022*	0.5	0.0198 (FD)
	0.5	0.0189
AH12HA023*	0.5	0.0316
AH12HA024*	0.5	0.0224
AH12HA026*	0.5	0.0102
AH12HA030*	0.5	0.00901
AH12SB010*	0.5	0.0113 (FD)
	0.5	0.0103
AH12SB011*	0.5	0.00977
	0.5	0.0118
AH12SB013*	0.5	0.00792 (FD)

All concentrations shown exceed the screening level for the protection of surface water. Concentrations in **BOLD** exceed unrestricted use screening levels.

CONCENTRATIONS OF MERCURY

Boring	Depth (feet bgs)	Concentration (mg/kg)
AH12HA004	0.25	0.2
AH12HA005	**0.25**	**6.97**
AH12HA007	**0.25**	**11.9**
AH12HA013*	0.5	0.19J
AH12HA015*	0.5	0.2J
AH12HA017*	0.5	0.22J
AH12HA019*	0.5	0.11J
AH12HA020*	0.5	0.16J
AH12HA023*	0.5	0.13J
AH12SB006	0	0.11J

Note: Concentrations in **BOLD** exceed screening levels for unrestricted use and the protection of surface water. Samples with concentrations less than background are not shown.

Note: Only sample locations where soil samples were analyzed for PCBs and/or mercury are shown.
* = Pre-Decision sample location
bgs = below ground surface
FD = field duplicate sample
J = estimated concentration
mg/kg = milligrams per kilogram

FIGURE B-6a
AOC H-12 PCB-1260 AND MERCURY CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

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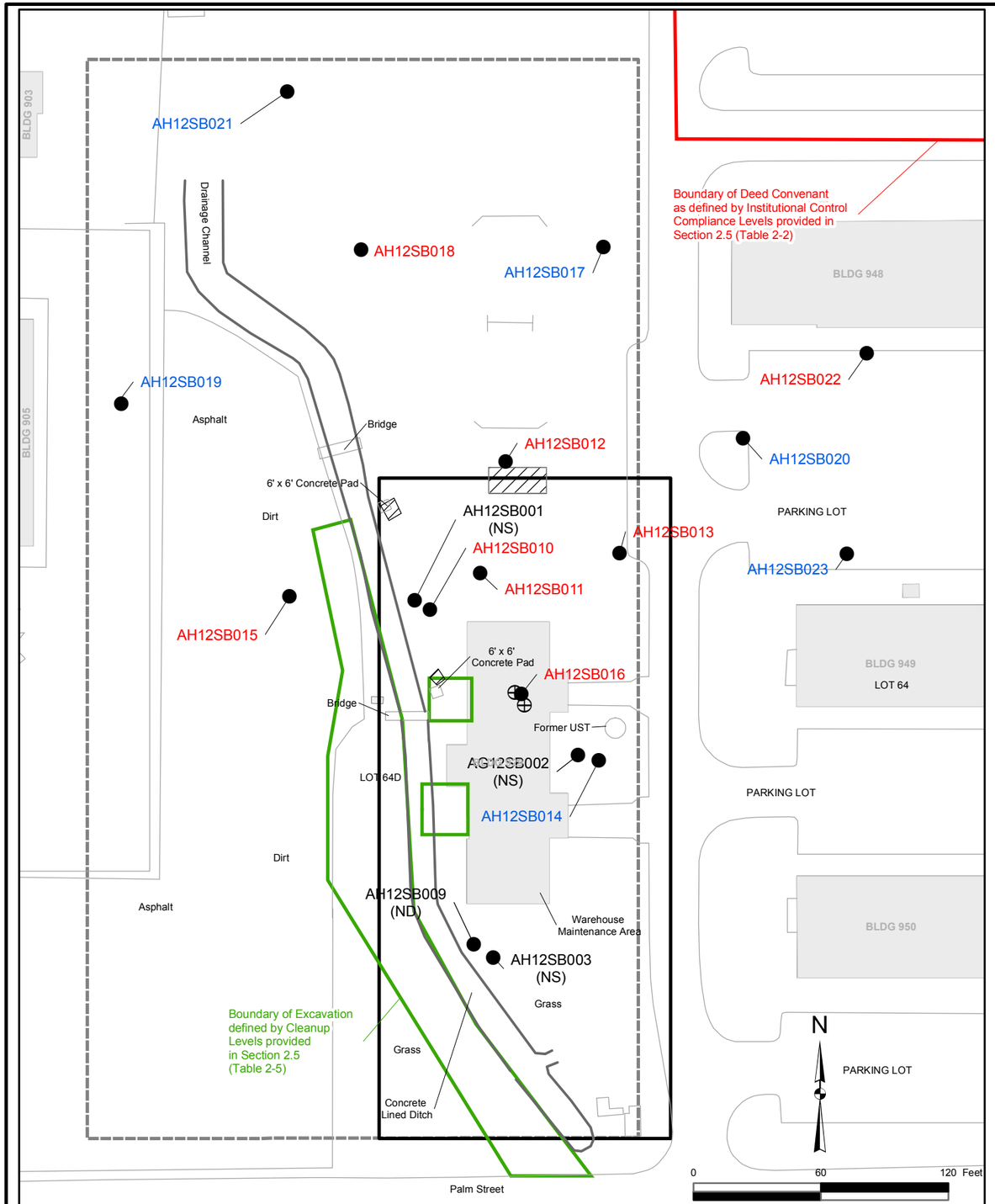
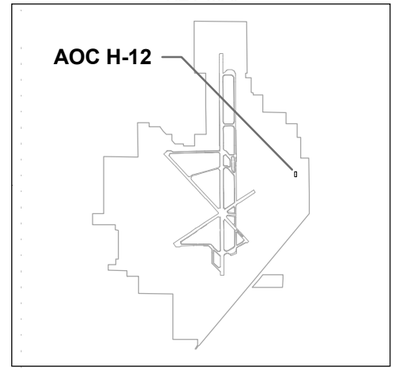


VOCs IN SOIL GAS

Boring	Depth (feet bgs)	Contaminant	Concentration (ppbv)
AH12SB010*	15	Carbon Tetrachloride	9.75 (FD)
		Chloroform	**59.9 (FD)**
		Carbon Tetrachloride	8.85
		Chloroform	**51.4**
AH12SB011*	5	Carbon Tetrachloride	3.66J
		Chloroform	**50.4**
		Tetrachloroethylene	6.41J
	15	Carbon Tetrachloride	3.97J
		Chloroform	**690**
		Tetrachloroethylene	6.58J
AH12SB012*	15	Benzene	12.6J
		Carbon Tetrachloride	**92.2**
		Chloroform	**892**
		Naphthalene	37.1J
		TCE	56.3
		Tetrachloroethylene	43.6
		Benzene	18.3J (FD)
		Carbon Tetrachloride	**124 (FD)**
		Chloroform	**1,160 (FD)**
		Naphthalene	191(FD)
		TCE	77.8 (FD)
		Tetrachloroethylene	57.4 (FD)
AH12SB013*	5	Benzene	10.3J
		Naphthalene	197
	15	12-DCA	8.39J
		Carbon Tetrachloride	212
		Chloroform	**40**
		Naphthalene	20.4J
		TCE	34
		Tetrachloroethylene	18.1
AH12SB014*	5	Chloroform	2.65J
	15	Benzene	28.3J
		Methylene Chloride	405
AH12SB015*	7	Carbon Tetrachloride	7.26J
		Chloroform	318
	15	Carbon Tetrachloride	12.9
		Chloroform	**56.1**
AH12SB016*	7	Benzene	10.6
		Carbon Tetrachloride	6.43J
		Chloroform	36
	15	1,4-DCB	6.39J
		Carbon Tetrachloride	416
		Chloroform	**293**
		Tetrachloroethylene	7.69J
AH12SB017*	5	Chloroform	4.64J
		Naphthalene	18.8
	15	Carbon Tetrachloride	11.7J
		Chloroform	23.7
		TCE	29.8
		Tetrachloroethylene	24.2
AH12SB018*	**5**	Naphthalene	29.8
	15	Carbon Tetrachloride	9.01
		Chloroform	**84**
		Naphthalene	4.16J
		Tetrachloroethylene	6.42J
AH12SB019*	15	Carbon Tetrachloride	7.34
		Chloroform	10.5
AH12SB020*	**5**	Naphthalene	234
	15	Carbon Tetrachloride	6.93J
		Chloroform	10.3J
		TCE	817
		Tetrachloroethylene	23.9J
AH12SB021*	**5**	Naphthalene	37.9
	15	Chloroform	2.94J
AH12SB022*	6	Naphthalene	7.53J
	15	Benzene	30.5J
		Carbon Tetrachloride	35.7J
		Chloroform	**51.8J**
		TCE	126
		Tetrachloroethylene	76.1J
AH12SB023*	7	Naphthalene	6.23J
	15	Carbon Tetrachloride	4.89J
		Chloroform	12.2J
		TCE	65.4
		Tetrachloroethylene	13.8J

KEY MAP



LEGEND

- DRAINS
- SOIL BORING
- ND NON-DETECT
- NS NOT SAMPLED
- SITE AREA
- BOUNDARY OF INSTITUTIONAL CONTROLS
- TARGET AREA FOR EXCAVATION
- HHRA EXPOSURE AREA
- CONCRETE PAD

BORINGS SHOWN IN RED INDICATE CONTAMINANTS EXCEED INDUSTRIAL USE SCREENING LEVELS.

BORINGS SHOWN IN BLUE INDICATE CONTAMINANTS EXCEED UNRESTRICTED USE COMPLIANCE LEVELS (TABLE C2-2).

* Pre-Decision sample location
bgs = below ground surface
FD = field duplicate sample
J = estimated concentration
All concentrations shown exceed unrestricted use screening levels
Concentrations in BOLD exceed industrial use screening levels.
Value for naphthalene based on non-carcinogenic risk.

FIGURE B-6b
AOC H-12 VOC CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION # 2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

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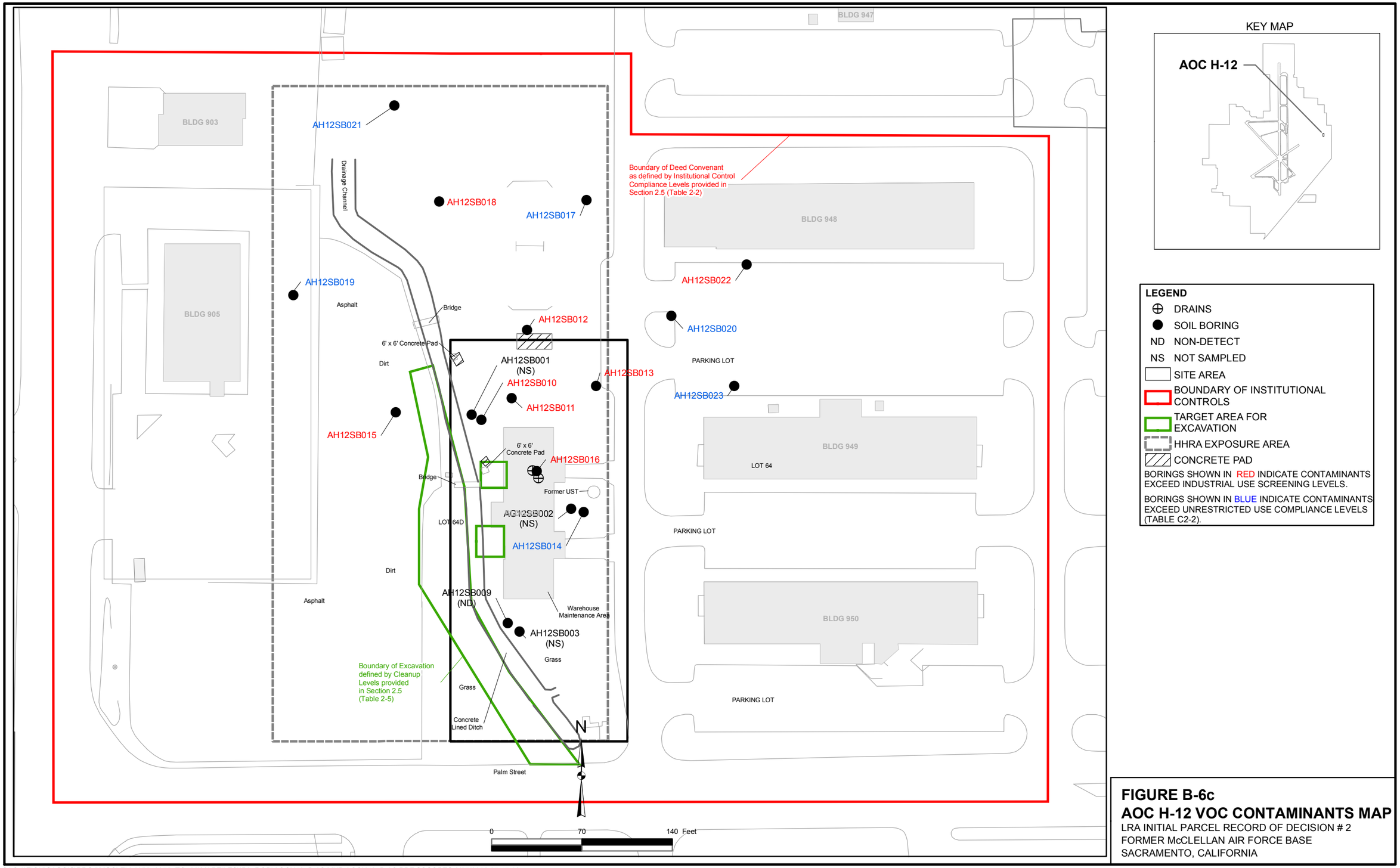

KEY MAP

LEGEND

- DRAINS
- SOIL BORING
- ND NON-DETECT
- NS NOT SAMPLED
- SITE AREA
- BOUNDARY OF INSTITUTIONAL CONTROLS
- TARGET AREA FOR EXCAVATION
- HHRA EXPOSURE AREA
- CONCRETE PAD

BORINGS SHOWN IN RED INDICATE CONTAMINANTS EXCEED INDUSTRIAL USE SCREENING LEVELS.

BORINGS SHOWN IN BLUE INDICATE CONTAMINANTS EXCEED UNRESTRICTED USE COMPLIANCE LEVELS (TABLE C2-2).

FIGURE B-6c
AOC H-12 VOC CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION # 2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

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Attachment B6
AOC H-12 Human Health Risk Assessment

ATTACHMENT B6

AOC H-12 Human Health Risk Assessment

The baseline human health risk assessment estimates what risks the site poses if no action were taken. This section of the ROD summarizes the results of the baseline risk assessment for AOC H-12. The risk assessment for AOC H-12 was originally presented in the OU E-H RICS2 (Jacobs 2000). This risk assessment update for AOC H-12 uses data collected during the RI and pre-decision data collected in 2007. The risk assessment update uses the same risk assessment methodology as described in the OU A RICS Addendum (Jacobs, 2002) for all exposure pathways except those involving indoor air. For indoor air pathways (i.e., inhalation exposure route for volatile organic compounds for the residential and indoor occupational scenarios), the SSG screening levels that are presented in Appendix C of this ROD and the SSG exposure point concentrations (see Table B6-1a) were used as the basis for inhalation cancer risk and non-cancer hazard calculations.

Identification of Chemicals of Concern

Data used for the risk assessment are from investigations at AOC H-12 including an RI during 1997 and 1998, and sampling during the 2007 pre-decision sampling effort. In 2007, soil and soil gas samples were collected during the pre-decision sampling effort from 14 soil borings and 21 hand augers. Soil samples were analyzed for mercury and PCBs, and soil gas samples were analyzed for VOCs by Method TO-15. Sediment data collected from the drainage ditch were not evaluated in the risk assessment, because the ditch is lined with concrete and maintained with periodic scraping.

In addition, two indoor air samples and one ambient air sample were collected at AOC H-12. The two indoor air samples were collected within Building 929, and the ambient air sample was collected just outside the building. Chloroform was detected in all three samples at concentrations greater than unrestricted and industrial use screening levels. However, the levels of chloroform in the indoor samples were less than the level measured in the ambient air sample. Benzene and ethylbenzene were also detected greater than screening levels (see discussion of ethylbenzene in the Uncertainties section). Benzene was detected in Indoor Air sample 2, collected near a floor drain, at concentrations greater than unrestricted and industrial use screening levels. Ethylbenzene was detected at concentrations greater than unrestricted and industrial use screening levels in both indoor air samples. Several other VOCs were detected, but all concentrations were less than screening levels. Screening-level cumulative risk and hazard index calculations for the indoor air samples and the ambient air sample are presented in the risk characterization section of this risk assessment. More details on the ambient air samples and indoor air samples can be found in Attachment 4 of Appendix D.

Potential contaminants of concern (COCs) for AOC H-12 include metals, TPH, VOCs, and SVOCs (including PCBs and PAHs). Tables B6-1a and B6-1b present the soil gas and soil data summaries, respectively, for the COCs (tables are located at the end of this attachment).

Tables B6-1a and B6-1b include the range of potential COC concentrations, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the exposure point concentrations (EPCs), and how the EPCs were derived for the media and exposure area of AOC H-12. In general, the lower value of the maximum concentration or the upper 95th percent confidence limit on the mean was used as the EPC for potential COCs detected in more than one sample. In addition, Table B6-1b includes a comparison to site-specific background concentrations for metals. Metals data were compared to depth-specific and lithology-specific background values. A means comparison to background values was also conducted using the Wilcoxon rank sum test to determine if concentrations are significantly different than background if concentrations at AOC H-12 exceeded the site-specific background values. If the maximum detected concentration for metals exceeded the site-specific background concentration and the means comparison showed that concentrations were significantly different than background, the metal was retained as a COC.

Exposure Assessment

A conceptual model was developed that describes the potential exposure pathways associated with soil and soil gas at AOC H-12 (see Figure 2-3 in Section 2.4 of the ROD). Although AOC H-12 will likely be used for commercial/industrial or community support purposes in the future; several exposure scenarios were evaluated in the human health risk assessment to provide information for future risk-management decisions.

The exposure area for the risk assessment for AOC H-12 is shown on Figures B-6a and B-6b. The exposure area includes the samples collected within the site boundaries and samples to the north and west of the site that were used to characterize the extent of contamination.

The following exposure scenarios were quantitatively evaluated in the human health risk assessment:

- Exposure of hypothetical future residents (adults and children) to soil (0 to 2 feet bgs and 0 to 10 feet bgs)
- Exposure of outdoor occupational workers to soil (0 to 2 feet bgs)
- Exposure of indoor workers to VOCs in indoor air
- Exposure of construction workers to soil (0 to 15 feet bgs)

The exposure routes that were considered in the risk assessment for residents and workers potentially exposed to soil include incidental soil ingestion, inhalation of VOCs (indoor air for residents and ambient air for outdoor workers and construction workers) and resuspended particulates, and dermal contact with soil. For the residential scenarios, the ingestion of homegrown produce was also included. For the indoor worker, potential risk associated with inhalation of VOCs in indoor air was evaluated.

Toxicity Assessment

The toxicity data that were used in the human health risk assessment are summarized on Tables B6-2 and B6-3. Health effects are divided into two categories: cancer and non-cancer effects.

Table B6-2 presents the slope factors used to estimate potential excess lifetime cancer risks associated with exposure to potential COCs in soil at AOC H-12. As shown on Table B6-3, the oral slope factor was used to estimate potential risks associated with dermal exposure.

Table B6-3 presents the reference doses (RfDs) used to evaluate the potential for non-cancer health effects. The oral RfDs were used to estimate potential health effects associated with dermal exposure. In addition, when inhalation reference concentrations are not available for some of the COCs, the oral RfDs were used to evaluate potential health effects from the inhalation exposure route.

The hierarchy of sources for toxicity values follows EPA and Air Force guidance (EPA, 2003 and USAF, 2006) and is listed below in order of preference:

1. EPA Integrated Risk Information System (IRIS) – online database (EPA, 2007)
2. EPA's Provisional Peer Reviewed Toxicity Values (as cited in the 2004 EPA Region 9 Preliminary Remediation Goal [PRG] table [EPA, 2004])
3. California Environmental Protection Agency (Cal-EPA) cancer potency factors and reference exposure levels (REL) - online database (Cal-EPA, 2007)
4. Other EPA sources (i.e., Health Effects Assessment Summary Table [HEAST], National Center for Environmental Assessment [NCEA] provisional toxicity values, and route-extrapolated toxicity values as cited in the 2004 EPA Region 9 PRG table [EPA, 2004]).

Risk Characterization

Cal-EPA and EPA toxicity values described above were used in the human health risk assessment along with the exposure information to estimate the potential risks from contacting potential COCs in soil and air at AOC H-12. For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a results of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{SF} \qquad (2)$$

Where:

Risk = a unitless probability (e.g., 1×10^{-6}) of an individual's developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(\text{mg/kg-day})^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in a million chance of developing cancer as

a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with an RfD derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of the receptor average daily exposure to the route-specific reference dose is called a hazard quotient (HQ). An HQ less than one indicates that the receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index is generated by adding the HQs over the exposure routes. A hazard index less than one indicates that, based on the sum of all HQs from different exposure routes, toxic noncarcinogenic effects are unlikely. A hazard index greater than one indicates that site-related exposure may present a risk to human health.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD} \qquad (2)$$

Where:

CDI = chronic daily intake (milligrams per kilogram per day [mg/kg-day])
RfD = reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term.)

Table B6-4 presents the potential cancer risk estimates using soil and soil gas data for the various exposure scenarios and exposure routes at AOC H-12. These risk estimates are based on reasonable maximum exposure and were developed taking into account various conservative assumptions about the frequency and duration of receptors exposure to soil and the toxicity of the potential COCs.

Residential and occupational exposure scenarios were evaluated for AOC H-12. The risk results for these scenarios are summarized below and presented in the risk summary tables at the end of this section.

The potential cancer risks for AOC H-12 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 6×10^{-7}
- Future adult resident (0-to-10-foot-bgs depth interval): 4×10^{-4}
- Outdoor occupational worker: 7×10^{-8}
- Indoor occupational worker (0-to-15-foot-bgs depth interval inhalation pathway only): 2×10^{-5}
- Future construction worker: 5×10^{-6}

The main contributor to the cumulative potential cancer risk for the residential scenario for soil 0 to 10 feet bgs is exposure to arsenic through the homegrown produce pathway and the ingestion pathway and chloroform and naphthalene by the indoor air pathway. The main contributor to the potential cancer risk for the indoor occupational scenario for soil gas 0 to 15 feet bgs is exposure to chloroform through the inhalation pathway. For the construction worker scenario, the main contributor to the potential cancer risk is total chromium by the inhalation exposure route.

The potential non-cancer risks for AOC H-12 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 1
- Future adult resident (0-to-10-foot-bgs depth interval): 3
- Future child resident (0-to-2-foot-bgs depth interval): 4
- Future child resident (0-to-10-foot-bgs depth interval): 7
- Outdoor occupational worker: < 1
- Indoor occupational worker (0-to-15-foot-bgs depth interval): < 1
- Future construction worker: 2

The main contributors to the hazard index for the adult residential scenario for soil 0 to 10 feet bgs are thallium and vanadium by the homegrown produce pathway and naphthalene by the indoor air pathway. The main contributors to the hazard index for the child residential scenario for soil 0 to 2 feet bgs are thallium and vanadium through the homegrown produce pathway. The main contributors to the hazard index for the child residential scenario for soil 0 to 10 feet bgs are thallium and vanadium through the homegrown produce pathway and naphthalene by the indoor air pathway. For the construction worker scenario, the main exposure route is the inhalation of particulates, and cobalt and barium are the main contributors to the hazard index. Table B6-5 presents the non-cancer hazard indices and the various exposure scenarios and exposure routes at AOC H-12.

Lead was a COC in soil for the 0-to-10-foot-bgs and 0-to-15-foot-bgs depth intervals. The maximum detected concentration in both of these depth intervals (27 mg/kg) is less than the residential screening level of 150 mg/kg.

Table B6-6 presents screening-level potential cumulative cancer risks and non-cancer hazard indices for the indoor air exposure pathways using the indoor air samples collected at Building 929. In addition, screening-level potential cumulative cancer risks and non-cancer hazard indices for the ambient air sample are presented in Table B6-6. The indoor air screening levels were used as the basis of the cancer risk and non-cancer hazard calculations. The cumulative potential cancer risks for detected concentrations of VOCs in Indoor Air sample 1 are 7×10^{-6} for the residential scenario and 4×10^{-6} for the occupational scenario. For Indoor Air sample 2, the potential cancer risks are 2×10^{-5} for the residential scenario and 1×10^{-5} for the occupational scenario. The main risk drivers are chloroform, ethylbenzene, and benzene (Indoor Air sample 2 only). The hazard indices for both indoor air samples for both residential and occupational scenarios are less than 1. For the ambient air sample, the potential cancer risks are 4×10^{-6} for the residential scenario and 2×10^{-6} for the occupational scenario. The hazard indices for both residential and occupational scenarios are less than 1.

Uncertainties

There are uncertainties associated with the risk estimates for AOC H-12. The main uncertainty is that the current reuse plans for this site are indefinite, but do not include residential or other "sensitive" use scenarios (day-cares, schools, hospitals, etc.). Hence, the use of the residential scenario for the site should be considered hypothetical at this time.

Two of the main risk drivers in soil for the residential scenario are arsenic and vanadium. Although these metals were retained as COCs, the concentrations measured at AOC H-12 are similar to background levels for the former McClellan AFB. The maximum detected concentration of arsenic at AOC H-12 in the 0-to-10-foot-bgs depth interval was 7.5 mg/kg. Background levels of arsenic in soil range from 3.7 (subsurface sands) to 5.8 mg/kg (surface soil). For vanadium the maximum detected concentration in the 0-to-10-foot-bgs depth interval of soil was 84 mg/kg and background levels range from 61.7 mg/kg (surface soil) to 80.5 mg/kg (subsurface silts and clays). The levels of arsenic and vanadium at AOC H-12 appear to be representative of naturally occurring conditions rather than site-related contamination. Therefore, site-related cumulative risks and hazards that include arsenic and vanadium may be overestimated for AOC H-12.

The main risk driver for the construction worker scenario is total chromium. For the 0-to-15-foot-bgs depth interval, the maximum detected concentration for total chromium was 45 mg/kg. The background levels of total chromium range from 41.5 mg/kg in subsurface sands to 53.9 mg/kg in silts and clays. Although total chromium was retained as a COC for this depth interval, the levels of total chromium AOC H-12 appear to be representative of naturally occurring conditions rather than site-related contamination. Therefore, site-related cumulative risks for the construction worker that include total chromium may be overestimated for AOC H-12.

For several compounds, Cal-EPA presents more conservative toxicity values than the EPA values used in the risk calculations presented in Tables B6-4 and B6-5. The following chemicals have more conservative Cal-EPA cancer slope factors and non cancer reference doses:

- Arsenic – Oral Slope Factor: 9.5 $(mg/kg\text{-}day)^{-1}$
- Beryllium – Inhalation Reference Dose: 2.0E-06 (mg/kg-day)
- Benzene – Oral Slope Factor: 1.0E-01 $(mg/kg\text{-}day)^{-1}$; Inhalation Slope Factor: 1.0E-01 $(mg/kg\text{-}day)^{-1}$
- Benzo(a)pyrene – Oral Slope Factor: 12 $(mg/kg\text{-}day)^{-1}$
- Carbon Tetrachloride – Oral Slope Factor: 1.5E-01 $(mg/kg\text{-}day)^{-1}$; Inhalation Slope Factor: 1.5E-01 $(mg/kg\text{-}day)^{-1}$; Inhalation Reference Dose: 7.0E-04 (mg/kg-day)
- 1,1-Dichloroethene – Inhalation Reference Dose: 2.0E-02 (mg/kg-day)
- Styrene – Inhalation Reference Dose: 2.6E-01 (mg/kg-day)
- N-nitrosodiphenylamine – Oral Slope Factor: 9.0E-03 $(mg/kg\text{-}day)^{-1}$

- 1,1,2-Trichloroethane – Oral Slope Factor: 7.2-02 $(mg/kg\text{-}day)^{-1}$; Inhalation Slope Factor: 5.7E-02 $(mg/kg\text{-}day)^{-1}$
- 1,4-Dichlorobenzene – Inhalation Reference Dose: 2.3E-01 (mg/kg-day)
- Cadmium – Inhalation Slope Factor: 15 $(mg/kg\text{-}day)^{-1}$
- Mercury – Inhalation Reference Dose: 2.6E-05 (mg/kg-day)
- Methylene Chloride – Oral Slope Factor: 1.4E-02 $(mg/kg\text{-}day)^{-1}$; Inhalation Slope Factor: 3.5E-03 $(mg/kg\text{-}day)^{-1}$

Use of these toxicity values would yield more conservative estimates for cancer risks and hazard indices than are presented in Tables B6-4 and B6-5. For AOC H-12, the differences in reference doses have no significant impact on the hazard index results. For the cancer risk estimates, the results are greater using the Cal-EPA slope factors primarily due to the differences in slope factors between Cal-EPA and EPA for arsenic, benzene, carbon tetrachloride, and methylene chloride. The cancer risk estimates using the more conservative Cal-EPA slope factors are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 6×10^{-7}
- Future adult resident (0-to-10-foot-bgs depth interval): 7×10^{-4}
- Outdoor occupational worker: 7×10^{-8}
- Indoor occupational worker: 2×10^{-5}
- Future construction worker: 7×10^{-6}

An additional uncertainty involves exposure assumptions for the construction worker scenario. One of the main exposure routes contributing to the hazard index for the construction worker is the inhalation of particulates (barium and cobalt). There is considerable uncertainty associated with the assumptions used for this scenario. The particulate emission factor (PEF) used for the construction worker calculations is 1E+06 m^3/kg which corresponds to a particulate concentration in air of 1 mg/m^3. This is DTSC's default PEF for construction workers and is based on a maximum concentration of dust in air of 10 mg/m^3 recommended by the American Conference of Governmental Industrial Hygienists and the assumption that 10 percent of the dust particulates are in the respirable size range. This assumption may be overly conservative for conditions at AOC H-12 during construction activities. In addition, the exposure duration for the construction worker is 1 year which corresponds to a subchronic period of exposure. However, since subchronic reference doses are not available, chronic reference doses were used for calculating the cobalt and barium hazard quotients. Based on these these factors, the hazard estimate for the construction worker is likely to be overestimated.

The homegrown produce pathway is the main contributor to the risk for the surface and subsurface soil residential scenarios and HI for the surface soil residential scenarios. There is considerable uncertainty associated with the modeling of this pathway and exposure is most likely overestimated.

An additional uncertainty relates to the classification of ethylbenzene as a carcinogen. EPA does not classify ethylbenzene as a carcinogen, whereas Cal-EPA considers ethylbenzene carcinogenic by the oral and inhalation exposure routes and provides oral and inhalation

slope factors in the OEHHA database. The cumulative cancer risk calculations presented for AOC H-12 (Tables B6-4 and B6-6) include ethylbenzene. However, since ethylbenzene was detected at low concentrations in soil gas, this uncertainty does not have a significant impact on the risk results for soil scenarios for this site. If ethylbenzene is excluded from the cancer risk calculations for soil exposure scenarios, the cumulative risks are essentially equal to the cumulative risks that include ethylbenzene. For the indoor air samples, if ethylbenzene is excluded from the cancer risk calculations, the potential cumulative cancer risks are range from 3×10^{-6} to 1×10^{-5} for the residential scenario and 1×10^{-6} to 7×10^{-6} for the occupational scenario.

Several metals were eliminated as COCs based on the background comparison. There is uncertainty associated with the cumulative risk and hazard estimates because of the elimination of metals based on the background comparison. Therefore, estimates of potential cancer risks and non cancer hazards associated with background levels are discussed below. The metals eliminated based on the background comparison are as follows:

- Soil 0-to-2-foot-bgs depth interval: aluminum, arsenic, barium, beryllium, total chromium, cobalt, copper, iron, lead, manganese, molybdenum, nickel, and zinc.
- Soil 0-to-10-foot-bgs depth interval: aluminum, beryllium, total chromium, cobalt, copper, iron, manganese, molybdenum, nickel, and zinc.
- Soil 0-to-15-foot-bgs depth interval: aluminum, iron, manganese, molybdenum, nickel, and zinc.

For the 0-to-2-foot-bgs depth interval, detected concentrations of aluminum, arsenic, barium, beryllium, cobalt, copper, lead, manganese, molybdenum, and zinc did not exceed the site-specific background levels. Therefore, these metals were eliminated as COCs. For total chromium, iron, and nickel in the 0-to-2-foot-bgs depth interval, there were exceedances of the site-specific background concentrations by detected concentrations; however, the means comparison showed that the AOC H-12 concentrations were not significantly different than background. Therefore, these metals were also eliminated as COCs. Of these metals eliminated as COCs, only the EPC for arsenic exceeded residential screening levels indicating that potential cancer risks for arsenic exceeds 1×10^{-6}.For arsenic, the potential cancer risk associated with the EPC for AOC H-12 is 4×10^{-5}. This risk estimate was calculated using the residential screening level that includes the homegrown produce pathway.

For the 0-to-10-foot-bgs depth interval, detected concentrations of iron, manganese, molybdenum, and nickel did not exceed the site-specific background levels. Therefore, these metals were eliminated as COCs. For aluminum, beryllium, total chromium, cobalt, copper, and zinc, there were exceedances of the site-specific background concentrations by detected concentrations; however, the means comparison showed that the AOC H-12 concentrations were not significantly different than background. Therefore, these metals were also eliminated as COCs. Of these metals eliminated as COCs, only the EPCs for arsenic and iron exceeded residential screening levels indicating that potential cancer risks and/or hazard quotients exceed 1×10^{-6} or 1, respectively. For arsenic, the potential cancer risk associated with the EPC for AOC H-12 is 5×10^{-5}. For iron, the hazard quotient associated with the EPC

for AOC H-12 is 2. These risk and hazard estimates were calculated using the residential screening levels that include the homegrown produce pathway.

For the 0-to-15-foot-bgs depth interval, detected concentrations of iron, molybdenum, and nickel did not exceed the site-specific background levels. Therefore, these metals were eliminated as COCs. For aluminum, manganese, and zinc, there were exceedances of the site-specific background concentrations by detected concentrations; however, the means comparison showed that the AOC H-12 concentrations were not significantly different than background. Therefore, these metals were also eliminated as COCs. Of these metals eliminated as COCs, only the EPCs for iron and manganese exceeded residential screening levels indicating that the hazard quotients exceed 1. For iron and manganese, the hazard quotients associated with the EPCs for AOC H-12 are 2 and 3 respectively. These hazard estimates were calculated using the residential screening levels that include the homegrown produce pathway.

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Text: Vol. 2, AOC H-12, pgs. 1-17
Hits Table: Vol. 2, AOC H-12, Attachment 1, pg. 1-5
All Data: Vol. 4, Appendix A, AOC H12, pgs. 10, 12-49
HHRA Data: Vol. 6, Appendix C1, Section 9.13, pgs. 9-53 to 9-57, Tables 9.13.5 to 9.13.10

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Table B6-1a
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
AOC H-12

Scenario Timeframe:	**Future**							
Medium	**SoilGas**							
Exposure Medium	**SoilGas**							
Exposure Point	**Chemical of Concern**	**Concentration Detected (ppbv) Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration (ppbv)**	**Statistical Measure[a]**	**Exposure Point Concentration[b] (ppbv)**	**Exposure Point Concentration in Soil[c] (mg/kg)**
AOC H-12 - Soil Gas	1,1,2-TRICHLOROETHANE	5.5E-01	5.5E-01	1/23	1.54	Maximum Result	5.5E-01	2.7E-05
	1,1-DICHLOROETHANE	3.3E-01	4.8E+00	2/23	2.27	97.5% KM (Chebyshev) UCL	2.3E+00	2.7E-05
	1,1-DICHLOROETHENE	1.5E+00	6.4E+00	2/23	2.56	Too Few Unique Detected Values	2.6E+00	1.1E-05
	1,2,4-Trichlorobenzene	5.6E-01	5.6E-01	1/22	1.47	Maximum Result	5.6E-01	1.6E-04
	1,2,4-Trimethylbenzene	9.8E-01	1.0E+02	8/22	14.7	95% KM (t) UCL	1.5E+01	5.3E-04
	1,2-DICHLOROETHANE	8.4E+00	8.4E+00	1/23	2.79	Too Few Unique Detected Values	2.8E+00	2.5E-04
	1,3,5-Trimethylbenzene	4.0E-01	4.2E+01	11/22	7.48	95% KM (BCA) UCL	7.5E+00	2.7E-04
	1,4-DICHLOROBENZENE	6.4E+00	6.4E+00	1/23	2.15	Too Few Unique Detected Values	2.2E+00	3.6E-04
	2-Methylnaphthalene	1.9E+00	1.9E+00	1/22	10.20	Maximum Result	1.9E+00	1.9E-03
	Acetone	5.1E+01	8.7E+03	22/23	2,940	97.5% KM (Chebyshev) UCL	2.9E+03	1.2E+00
	Benzene	1.8E+00	2.8E+01	21/23	12.30	95% KM (Chebyshev) UCL	1.2E+01	6.3E-05
	Carbon Tetrachloride	1.7E-01	1.2E+02	16/23	22.1	95% KM (BCA) UCL	2.2E+01	7.6E-05
	Chloroform	7.5E-01	1.2E+03	18/23	682.0	99% KM (Chebyshev) UCL	6.8E+02	7.2E-03
	Dichlorodifluoromethane	5.0E-01	2.7E+00	4/22	0.930	95% KM (t) UCL	9.3E-01	2.0E-06
	Ethylbenzene	5.4E-01	3.5E+01	20/23	11.8	95% KM (Chebyshev) UCL	1.2E+01	1.1E-04
	Hexane	3.1E+00	5.0E+02	22/22	71	95% H-UCL	7.1E+01	3.7E-05
	METHYL ETHYL KETONE (2-BUTANONE)	2.5E+00	4.3E+03	20/23	1,380	97.5% KM (Chebyshev) UCL	1.4E+03	4.9E-01
	Methyl Isobutyl Ketone	6.6E+00	1.1E+03	4/20	175	95% KM (t) UCL	1.8E+02	3.7E-02
	TERT-BUTYL METHYL ETHER	7.4E+00	2.9E+01	3/22	10.9	95% KM (t) UCL	1.1E+01	4.8E-04
	Methylene Chloride	1.3E+00	4.1E+02	22/23	133	97.5% KM (Chebyshev) UCL	1.3E+02	1.5E-03
	Naphthalene	4.2E+00	2.0E+02	7/22	49.0	95% KM (t) UCL	4.9E+01	2.0E-02
	Styrene	6.4E+00	6.4E+00	1/22	2.03	Too Few Unique Detected Values	2.0E+00	2.6E-04
	TRICHLOROETHYLENE	1.4E-01	7.8E+01	13/23	15.1	95% KM (BCA) UCL	1.5E+01	1.0E-04
	Tetrachloroethylene	7.7E-01	5.7E+01	13/23	12.2	95% KM (BCA) UCL	1.2E+01	6.2E-05
	Toluene	2.4E+00	1.4E+02	22/23	65.6	97.5% KM (Chebyshev) UCL	6.6E+01	4.6E-04
	Trichlorofluoromethane	5.8E-01	8.0E+02	20/23	0,345	95% KM (Chebyshev) UCL	3.5E+02	6.2E-04
	Trichlorotrifluoroethane	3.8E-01	9.3E+00	9/23	2.67	95% KM (t) UCL	2.7E+00	2.0E-05
	m,p-Xylene	1.4E+00	1.3E+02	20/22	57.1	97.5% KM (Chebyshev) UCL	5.7E+01	6.0E-04
	n-Butylbenzene	1.4E+00	4.3E+01	2/22	30.8	99% KM (Chebyshev) UCL	3.1E+01	4.7E-04
	n-Propylbenzene	1.7E+00	7.4E+01	9/22	15.4	95% KM (BCA) UCL	1.5E+01	1.6E-04
	o-Xylene	5.3E-01	5.8E+01	18/23	23.7	97.5% KM (Chebyshev) UCL	2.4E+01	3.4E-04

[a] The statistical measure indicates the basis for the exposure point concentration.

[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.

[c] Exposure point concentrations for these VOCs in soil are estimated from measured shallow soil gas concentrations.

95th UCL = 95 percent upper confidence limit on the mean.

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Table B6-1b
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
AOC H-12

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point	Chemical of Concern	Concentration Detected (mg/kg) Min	Concentration Detected (mg/kg) Max	Frequency of Detection	95th UCL Concentration (mg/kg)	Statistical Measure[a]	Exposure Point Concentration[b] (mg/kg)	Background Concentration (mg/kg)	Maximum Detected Concentration > Background?	Background Exceeded by Means Comparison?	COC?
AOC H-12 - Soil On-site Direct Contact (0 - 2 ft bgs)	ALUMINUM	7.4E+03	1.4E+04	8/8	1.2E+04	95% Student's-t UCL	1.2E+04	1.46E+04	No	NA	No
	Arsenic	3.1E+00	5.3E+00	3/8	4.0E+00	95% KM (t) UCL	4.0E+00	5.80E+00	No	NA	No
	BARIUM	8.0E+01	1.5E+02	8/8	1.3E+02	95% Student's-t UCL	1.3E+02	2.09E+02	No	NA	No
	BERYLLIUM	3.6E-01	4.2E-01	8/8	4.0E-01	95% Student's-t UCL	4.0E-01	6.00E-01	No	NA	No
	CHROMIUM,TOTAL	1.7E+01	4.5E+01	8/8	3.1E+01	95% Approximate Gamma UCL	3.1E+01	4.25E+01	Yes	no	No
	CHRYSENE	2.1E-02	2.1E-02	1/18	4.2E-01	Maximum Result	2.1E-02	NA	NA	NA	Yes
	COBALT	6.3E+00	1.4E+01	8/8	1.2E+01	95% Student's-t UCL	1.2E+01	1.56E+01	No	NA	No
	COPPER	1.0E+01	2.3E+01	8/8	1.7E+01	95% Approximate Gamma UCL	1.7E+01	2.36E+01	No	NA	No
	Cadmium	7.3E-01	7.3E-01	1/8	5.8E-01	Too Few Unique Detected Values *	5.8E-01	5.00E-01	Yes	NA*	Yes
	DIETHYL PHTHALATE	1.1E-01	1.1E-01	1/18	2.6E-01	Maximum Result	1.1E-01	NA	NA	NA	Yes
	IRON	1.3E+04	2.5E+04	8/8	1.8E+04	95% Student's-t UCL	1.8E+04	2.36E+04	Yes	no	No
	LEAD	2.9E+00	2.7E+01	8/8	1.9E+01	95% Student's-t UCL	1.9E+01	1.37E+02	No	NA	No
	MANGANESE	2.4E+02	4.8E+02	8/8	4.2E+02	95% Student's-t UCL	4.2E+02	7.29E+02	No	NA	No
	MOLYBDENUM	6.3E-01	9.6E-01	8/8	8.7E-01	95% Student's-t UCL	8.7E-01	4.00E+00	No	NA	No
	Mercury	1.7E-02	1.2E+01	21/39	4.0E+00	99% KM (Chebyshev) UCL	4.0E+00	1.00E-01	Yes	NA*	Yes
	NICKEL	7.9E+00	5.1E+01	8/8	3.9E+01	95% Chebyshev (Mean, Sd) UCL	3.9E+01	3.48E+01	Yes	no	No
	PCB-1260 (AROCHLOR 1260)	9.0E-03	1.3E-01	21/41	3.0E-02	95% KM (t) UCL	3.0E-02	NA	NA	NA	Yes
	Selenium	2.4E+00	2.4E+00	2/8	2.4E+00	Too Few Unique Detected Values *	2.4E+00	4.00E-01	Yes	Yes	Yes
	Thallium	5.9E+00	5.9E+00	1/8	4.9E+00	Too Few Unique Detected Values *	4.9E+00	2.00E-01	Yes	Yes	Yes
	VANADIUM	4.2E+01	6.3E+01	8/8	5.3E+01	95% Approximate Gamma UCL	5.3E+01	6.17E+01	Yes	Yes	Yes
	ZINC	1.8E+01	5.2E+01	8/8	4.1E+01	95% Student's-t UCL	4.1E+01	1.59E+02	No	NA	No
	bis(2-ETHYLHEXYL)PHTHALATE	2.9E-02	3.3E+00	8/18	6.9E-01	95% KM (t) UCL	6.9E-01	NA	NA	NA	Yes

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Table B6-1b
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
AOC H-12

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point	Chemical of Concern	Concentration Detected (mg/kg) Min	Concentration Detected (mg/kg) Max	Frequency of Detection	95th UCL Concentration (mg/kg)	Statistical Measure[a]	Exposure Point Concentration[b] (mg/kg)	Background Concentration (mg/kg)	Maximum Detected Concentration > Background?	Background Exceeded by Means Comparison?	COC?
AOC H-12 - Soil On-site Direct Contact (0 - 10 ft bgs)	1,1,2-TRICHLOROETHANE	2.7E-05	2.7E-05	1/12	5.6E-03	Maximum Result	2.7E-05	NA	NA	NA	Yes
	1,2,4-Trimethylbenzene	3.2E-05	3.3E-03	6/11	3.5E-03	Maximum Result	3.3E-03	NA	NA	NA	Yes
	1,3,5-Trimethylbenzene	1.4E-05	1.4E-03	6/11	4.3E-04	95% KM (BCA) UCL	4.3E-04	NA	NA	NA	Yes
	ALUMINUM	4.7E+03	3.0E+04	15/15	1.8E+04	95% Approximate Gamma UCL	1.8E+04	2.36E+04	Yes	no	No
	Acetone	2.0E-02	1.9E-01	11/12	1.2E-01	95% KM (t) UCL	1.2E-01	NA	NA	NA	Yes
	Arsenic	3.1E+00	7.5E+00	8/15	4.5E+00	95% KM (t) UCL	4.5E+00	3.70E+00	Yes	Yes	Yes
	BARIUM	7.9E+01	4.4E+02	15/15	2.5E+02	95% H-UCL	2.5E+02	3.42E+02	Yes	Yes	Yes
	BERYLLIUM	1.5E-01	1.0E+00	15/15	5.6E-01	95% Student's-t UCL	5.6E-01	6.00E-01	Yes	no	No
	Benzene	1.1E-05	5.3E-05	10/12	3.9E-05	95% KM (t) UCL	3.9E-05	NA	NA	NA	Yes
	CHROMIUM,TOTAL	1.5E+01	4.5E+01	15/15	3.0E+01	95% Student's-t UCL	3.0E+01	4.15E+01	Yes	no	No
	CHRYSENE	2.1E-02	2.1E-02	1/44	2.0E-01	Maximum Result	2.1E-02	NA	NA	NA	Yes
	COBALT	4.7E+00	1.6E+01	15/15	1.1E+01	95% Student's-t UCL	1.1E+01	1.50E+01	Yes	no	No
	COPPER	1.0E+01	4.5E+01	15/15	2.5E+01	95% Approximate Gamma UCL	2.5E+01	2.67E+01	Yes	no	No
	Cadmium	6.8E-01	1.1E+00	3/15	7.7E-01	95% KM (t) UCL	7.7E-01	4.00E-01	Yes	NA*	Yes
	Carbon Tetrachloride	5.0E-07	2.2E-05	7/12	1.4E-05	95% KM (t) UCL	1.4E-05	NA	NA	NA	Yes
	Chloroform	7.9E-06	5.3E-04	8/12	2.3E-04	95% KM (BCA) UCL	2.3E-04	NA	NA	NA	Yes
	DIETHYL PHTHALATE	1.1E-01	3.9E-01	4/44	1.4E-01	95% KM (t) UCL	1.4E-01	NA	NA	NA	Yes
	Dichlorodifluoromethane	1.1E-06	1.1E-06	1/11	6.0E-06	Maximum Result	1.1E-06	NA	NA	NA	Yes
	Ethylbenzene	6.1E-06	3.2E-04	11/12	1.7E-04	95% KM (Chebyshev) UCL	1.7E-04	NA	NA	NA	Yes
	Hexane	4.6E-06	4.2E-05	11/11	2.4E-05	95% Student's-t UCL	2.4E-05	NA	NA	NA	Yes
	IRON	7.2E+03	3.4E+04	15/15	2.3E+04	95% Approximate Gamma UCL	2.3E+04	3.48E+04	No	NA	No
	LEAD	2.9E+00	2.7E+01	15/15	1.5E+01	95% Student's-t UCL	1.5E+01	6.80E+00	Yes	Yes	Yes
	MANGANESE	7.0E+01	9.3E+02	15/15	4.8E+02	95% Approximate Gamma UCL	4.8E+02	1.36E+03	No	NA	No
	METHYL ETHYL KETONE (2-BUTANONE)	4.1E-03	3.4E-02	11/12	2.5E-02	95% KM (Chebyshev) UCL	2.5E-02	NA	NA	NA	Yes
	MOLYBDENUM	5.2E-01	1.2E+00	13/15	8.6E-01	95% KM (t) UCL	8.6E-01	4.00E+00	No	NA	No
	Mercury	1.7E-02	1.2E+01	22/61	1.3E+00	95% KM (Chebyshev) UCL	1.3E+00	2.00E-01	Yes	NA*	Yes
	Methylene Chloride	1.8E-05	2.9E-04	11/12	1.8E-04	95% KM (Chebyshev) UCL	1.8E-04	NA	NA	NA	Yes
	NICKEL	7.9E+00	5.1E+01	15/15	2.7E+01	95% Approximate Gamma UCL	2.7E+01	5.22E+01	No	NA	No
	Naphthalene	1.2E-02	1.2E-01	4/55	2.6E-02	95% KM (t) UCL	2.6E-02	NA	NA	NA	Yes
	PCB-1260 (AROCHLOR 1260)	9.0E-03	1.3E-01	21/61	2.2E-02	95% KM (t) UCL	2.2E-02	NA	NA	NA	Yes
	Selenium	2.4E+00	2.4E+00	2/15	1.8E+00	Too Few Unique Detected Values *	1.8E+00	5.00E-01	Yes	Yes	Yes
	Styrene	2.6E-04	2.6E-04	1/11	6.2E-04	Maximum Result	2.6E-04	NA	NA	NA	Yes
	TRICHLOROETHYLENE	8.9E-07	8.7E-05	5/12	3.0E-05	95% KM (t) UCL	3.0E-05	NA	NA	NA	Yes
	Tetrachloroethylene	3.7E-06	3.1E-05	5/12	1.8E-05	95% KM (t) UCL	1.8E-05	NA	NA	NA	Yes
	Thallium	5.9E+00	1.0E+01	3/15	6.9E+00	95% KM (t) UCL	6.9E+00	ND	Yes	Yes	Yes
	Toluene	1.8E-05	4.4E-04	11/12	3.3E-04	95% KM (Chebyshev) UCL	3.3E-04	NA	NA	NA	Yes
	Trichlorofluoromethane	1.0E-06	1.6E-04	9/12	1.0E-04	95% KM (Chebyshev) UCL	1.0E-04	NA	NA	NA	Yes
	Trichlorotrifluoroethane	5.2E-06	1.1E-05	3/12	9.8E-06	95% KM (t) UCL	9.8E-06	NA	NA	NA	Yes
	VANADIUM	2.1E+01	8.4E+01	15/15	5.8E+01	95% Student's-t UCL	5.8E+01	7.57E+01	Yes	Yes	Yes
	ZINC	1.8E+01	9.1E+01	15/15	5.2E+01	95% Student's-t UCL	5.2E+01	5.86E+01	Yes	no	No
	bis(2-ETHYLHEXYL)PHTHALATE	2.9E-02	3.3E+00	12/44	3.1E-01	95% KM (t) UCL	3.1E-01	NA	NA	NA	Yes
	m,p-Xylene	1.5E-05	1.4E-03	11/11	5.0E-04	95% Approximate Gamma UCL	5.0E-04	NA	NA	NA	Yes
	n-Butylbenzene	2.2E-05	6.6E-04	2/11	8.6E-04	Maximum Result	6.6E-04	NA	NA	NA	Yes
	n-Propylbenzene	2.3E-05	7.6E-04	5/11	2.4E-04	95% KM (BCA) UCL	2.4E-04	NA	NA	NA	Yes
	o-Xylene	7.2E-06	7.9E-04	11/12	4.1E-04	95% KM (Chebyshev) UCL	4.1E-04	NA	NA	NA	Yes

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Table B6-1b
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
AOC H-12

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point	Chemical of Concern	Concentration Detected (mg/kg) Min	Concentration Detected (mg/kg) Max	Frequency of Detection	95th UCL Concentration (mg/kg)	Statistical Measure[a]	Exposure Point Concentration[b] (mg/kg)	Background Concentration (mg/kg)	Maximum Detected Concentration > Background?	Background Exceeded by Means Comparison?	COC?
AOC H-12 - Soil On-site Direct Contact (0 - 15 ft bgs)	1,1,2-TRICHLOROETHANE	2.7E-05	2.7E-05	1/23	3.4E-03	Maximum Result	2.7E-05	NA	NA	NA	Yes
	1,1-DICHLOROETHANE	1.9E-06	2.7E-05	2/23	5.7E-05	Maximum Result	2.7E-05	NA	NA	NA	Yes
	1,1-DICHLOROETHENE	2.5E-06	1.1E-05	2/23	1.1E-05	95% KM (BCA) UCL	1.1E-05	NA	NA	NA	Yes
	1,2,4-Trichlorobenzene	1.6E-04	1.6E-04	1/71	1.9E-01	Maximum Result	1.6E-04	NA	NA	NA	Yes
	1,2,4-Trimethylbenzene	3.2E-05	3.3E-03	8/22	5.3E-04	95% KM (t) UCL	5.3E-04	NA	NA	NA	Yes
	1,2-DICHLOROETHANE	2.5E-04	2.5E-04	1/23	2.1E-03	Maximum Result	2.5E-04	NA	NA	NA	Yes
	1,3,5-Trimethylbenzene	1.4E-05	1.4E-03	11/22	2.7E-04	95% KM (BCA) UCL	2.7E-04	NA	NA	NA	Yes
	1,4-DICHLOROBENZENE	3.6E-04	3.6E-04	1/72	1.6E-01	Maximum Result	3.6E-04	NA	NA	NA	Yes
	2-Methylnaphthalene	1.9E-03	1.9E-03	1/71	2.1E-01	Maximum Result	1.9E-03	NA	NA	NA	Yes
	ALUMINUM	4.7E+03	3.2E+04	20/20	2.0E+04	95% Student's-t UCL	2.0E+04	2.36E+04	Yes	no	No
	ANTHRACENE	3.9E-02	3.9E-02	1/49	1.4E-01	Maximum Result	3.9E-02	NA	NA	NA	Yes
	Acetone	2.0E-02	3.5E+00	22/23	1.2E+00	97.5% KM (Chebyshev) UCL	1.2E+00	NA	NA	NA	Yes
	Arsenic	3.1E+00	8.5E+00	12/20	4.9E+00	95% KM (t) UCL	4.9E+00	3.70E+00	Yes	Yes	Yes
	BARIUM	7.9E+01	1.6E+03	20/20	5.7E+02	95% Chebyshev (Mean, Sd) UCL	5.7E+02	3.42E+02	Yes	Yes	Yes
	BENZO(a)ANTHRACENE	4.0E-02	4.0E-02	1/49	1.4E-01	Maximum Result	4.0E-02	NA	NA	NA	Yes
	BENZO(b)FLUORANTHENE	4.2E-02	4.2E-02	1/49	1.3E-01	Maximum Result	4.2E-02	NA	NA	NA	Yes
	BENZO(k)FLUORANTHENE	4.7E-02	4.7E-02	1/49	1.4E-01	Maximum Result	4.7E-02	NA	NA	NA	Yes
	BERYLLIUM	1.5E-01	1.0E+00	20/20	5.8E-01	95% Student's-t UCL	5.8E-01	6.00E-01	Yes	Yes	Yes
	Benzene	9.2E-06	1.4E-04	21/23	6.3E-05	95% KM (Chebyshev) UCL	6.3E-05	NA	NA	NA	Yes
	CHROMIUM,TOTAL	1.5E+01	4.5E+01	20/20	3.0E+01	95% Student's-t UCL	3.0E+01	4.15E+01	Yes	Yes	Yes
	CHRYSENE	2.1E-02	2.1E-02	1/49	1.8E-01	Maximum Result	2.1E-02	NA	NA	NA	Yes
	COBALT	4.7E+00	4.7E+01	20/20	1.5E+01	95% Approximate Gamma UCL	1.5E+01	1.50E+01	Yes	Yes	Yes
	COPPER	1.0E+01	4.5E+01	20/20	2.7E+01	95% Student's-t UCL	2.7E+01	2.67E+01	Yes	Yes	Yes
	Cadmium	6.8E-01	1.6E+00	4/20	8.5E-01	95% KM (t) UCL	8.5E-01	4.00E-01	Yes	NA*	Yes
	Carbon Tetrachloride	5.0E-07	3.8E-04	16/23	7.6E-05	95% KM (BCA) UCL	7.6E-05	NA	NA	NA	Yes
	Chloroform	7.9E-06	1.2E-02	18/23	7.2E-03	99% KM (Chebyshev) UCL	7.2E-03	NA	NA	NA	Yes
	DI-n-BUTYLPHTHALATE	6.5E-02	6.5E-02	1/49	1.7E-01	Maximum Result	6.5E-02	NA	NA	NA	Yes
	DI-n-OCTYLPHTHALATE	5.5E-02	5.5E-02	1/49	1.1E-01	Maximum Result	5.5E-02	NA	NA	NA	Yes
	DIETHYL PHTHALATE	5.4E-02	3.9E-01	5/49	8.1E-02	95% KM (t) UCL	8.1E-02	NA	NA	NA	Yes
	Dichlorodifluoromethane	4.8E-07	2.6E-06	4/22	2.0E-06	95% KM (t) UCL	2.0E-06	NA	NA	NA	Yes
	Ethylbenzene	4.9E-06	3.2E-04	20/23	1.1E-04	95% KM (Chebyshev) UCL	1.1E-04	NA	NA	NA	Yes
	Hexane	1.7E-06	2.7E-04	22/22	3.7E-05	95% H-UCL	3.7E-05	NA	NA	NA	Yes
	IRON	7.2E+03	3.4E+04	20/20	2.5E+04	95% Approximate Gamma UCL	2.5E+04	3.48E+04	No	NA	No
	LEAD	2.9E+00	2.7E+01	20/20	1.4E+01	95% Approximate Gamma UCL	1.4E+01	6.80E+00	Yes	Yes	Yes

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Table B6-1b
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
AOC H-12

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point	Chemical of Concern	Concentration Detected (mg/kg) Min	Concentration Detected (mg/kg) Max	Frequency of Detection	95th UCL Concentration (mg/kg)	Statistical Measure[a]	Exposure Point Concentration[b] (mg/kg)	Background Concentration (mg/kg)	Maximum Detected Concentration > Background?	Background Exceeded by Means Comparison?	COC?
(Cont…)	MANGANESE	7.0E+01	7.3E+03	20/20	2.2E+03	95% Chebyshev (Mean, Sd) UCL	2.2E+03	1.36E+03	Yes	no	No
	METHYL ETHYL KETONE (2-BUTANONE)	8.9E-04	1.5E+00	20/23	4.9E-01	97.5% KM (Chebyshev) UCL	4.9E-01	NA	NA	NA	Yes
	Methyl Isobutyl Ketone	1.4E-03	2.4E-01	4/20	3.7E-02	95% KM (t) UCL	3.7E-02	NA	NA	NA	Yes
	MOLYBDENUM	5.2E-01	1.5E+00	18/20	8.9E-01	95% KM (t) UCL	8.9E-01	4.00E+00	No	NA	No
	Mercury	1.7E-02	1.2E+01	24/66	1.2E+00	95% KM (Chebyshev) UCL	1.2E+00	2.00E-01	Yes	NA*	Yes
	TERT-BUTYL METHYL ETHER	2.9E-04	1.1E-03	3/22	4.8E-04	95% KM (t) UCL	4.8E-04	NA	NA	NA	Yes
	Methylene Chloride	1.4E-05	4.5E-03	22/23	1.5E-03	97.5% KM (Chebyshev) UCL	1.5E-03	NA	NA	NA	Yes
	N-NITROSODIPHENYLAMINE	2.1E-02	2.1E-02	1/49	2.8E-01	Maximum Result	2.1E-02	NA	NA	NA	Yes
	NICKEL	7.9E+00	5.1E+01	20/20	2.8E+01	95% Student's-t UCL	2.8E+01	5.22E+01	No	NA	No
	Naphthalene	2.6E-03	1.2E-01	7/71	2.0E-02	95% KM (t) UCL	2.0E-02	NA	NA	NA	Yes
	PCB-1260 (AROCHLOR 1260)	9.0E-03	1.3E-01	21/61	2.2E-02	95% KM (t) UCL	2.2E-02	NA	NA	NA	Yes
	PHENANTHRENE	4.4E-02	4.4E-02	1/49	1.3E-01	Maximum Result	4.4E-02	NA	NA	NA	Yes
	PYRENE	4.7E-02	4.7E-02	1/49	1.8E-01	Maximum Result	4.7E-02	NA	NA	NA	Yes
AOC H-12 - Soil	Selenium	2.4E+00	5.6E+00	3/20	2.9E+00	95% KM (t) UCL	2.9E+00	5.00E-01	Yes	Yes	Yes
On-site Direct Contact	Styrene	2.6E-04	2.6E-04	1/22	3.1E-03	Maximum Result	2.6E-04	NA	NA	NA	Yes
(0 - 15 ft bgs)	TRICHLOROETHYLENE	8.9E-07	4.8E-04	13/23	1.0E-04	95% KM (BCA) UCL	1.0E-04	NA	NA	NA	Yes
	Tetrachloroethylene	3.7E-06	2.8E-04	13/23	6.2E-05	95% KM (BCA) UCL	6.2E-05	NA	NA	NA	Yes
	Thallium	5.9E+00	1.0E+01	6/20	7.4E+00	95% KM (t) UCL	7.4E+00	ND	Yes	Yes	Yes
	Toluene	1.6E-05	9.3E-04	22/23	4.6E-04	97.5% KM (Chebyshev) UCL	4.6E-04	NA	NA	NA	Yes
	Trichlorofluoromethane	1.0E-06	1.4E-03	20/23	6.2E-04	95% KM (Chebyshev) UCL	6.2E-04	NA	NA	NA	Yes
	Trichlorotrifluoroethane	1.9E-06	4.6E-05	9/23	2.0E-05	95% KM (t) UCL	2.0E-05	NA	NA	NA	Yes
	VANADIUM	2.1E+01	1.1E+02	20/20	6.4E+01	95% Student's-t UCL	6.4E+01	7.57E+01	Yes	Yes	Yes
	ZINC	1.8E+01	9.1E+01	20/20	5.4E+01	95% Student's-t UCL	5.4E+01	5.86E+01	Yes	no	No
	bis(2-ETHYLHEXYL)PHTHALATE	2.9E-02	3.3E+00	13/49	3.2E-01	95% KM (BCA) UCL	3.2E-01	NA	NA	NA	Yes
	m,p-Xylene	1.5E-05	1.4E-03	20/22	6.0E-04	97.5% KM (Chebyshev) UCL	6.0E-04	NA	NA	NA	Yes
	n-Butylbenzene	2.2E-05	6.6E-04	2/22	4.7E-04	99% KM (Chebyshev) UCL	4.7E-04	NA	NA	NA	Yes
	n-Propylbenzene	1.8E-05	7.6E-04	9/22	1.6E-04	95% KM (BCA) UCL	1.6E-04	NA	NA	NA	Yes
	o-Xylene	7.2E-06	7.9E-04	18/23	3.4E-04	97.5% KM (Chebyshev) UCL	3.4E-04	NA	NA	NA	Yes

[a] The statistical measure indicates the basis for the exposure point concentration.
[b] The exposure point concentration is the lower value of the maximum concentration or the 95 th UCL concentration.
95th UCL = 95 percent upper confidence limit on the mean.
NT = Chemical is a COC, however no toxicity values are available to evaluate risk and/or hazard.
NA = Not applicable.
* The full background data set for cadmium and mercury was not available, therefore a means comparison could not be performed.

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Table B6-2
Cancer Toxicity Data Summary
AOC H-12

Pathway: Ingestion, Dermal						
Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence[a]	Source	Date
1,1,2-Trichloroethane	5.7E-02	5.7E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2007
1,1-DICHLOROETHANE	5.7E-03	5.7E-03	$(mg/kg\text{-}day)^{-1}$	C	CalEPA	2007
1,2,4-Trichlorobenzene	3.6E-03	3.6E-03	$(mg/kg\text{-}day)^{-1}$		CalEPA	2007
1,2-DICHLOROETHANE	9.1E-02	9.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
1,4-DICHLOROBENZENE	5.4E-03	5.4E-03	$(mg/kg\text{-}day)^{-1}$	C	CalEPA	2007
Arsenic	1.5E+00	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Benzene	5.5E-02	5.5E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
BENZO(a)ANTHRACENE	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
BENZO(b)FLUORANTHENE	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
BENZO(k)FLUORANTHENE	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
BERYLLIUM				B1	IRIS	2007
bis(2-ETHYLHEXYL)PHTHALATE	1.4E-02	1.4E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Cadmium				B1		
Carbon Tetrachloride	1.3E-01	1.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Chloroform	3.1E-02	3.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
CHRYSENE	1.2E-01	1.2E-01	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
COBALT			$(mg/kg\text{-}day)^{-1}$	--		
CHROMIUM,TOTAL			$(mg/kg\text{-}day)^{-1}$	D		
Ethylbenzene	1.1E-02	1.1E-02	$(mg/kg\text{-}day)^{-1}$		CalEPA	2007
Methylene Chloride	7.5E-03	7.5E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
TERT-BUTYL METHYL ETHER	1.8E-03	1.8E-03	$(mg/kg\text{-}day)^{-1}$		CalEPA	2007
Naphthalene				C		
N-NITROSODIPHENYLAMINE	4.9E-03	4.9E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
PCB-1260 (AROCHLOR 1260)	2.0E+00	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Tetrachloroethylene	5.4E-01	5.4E-01	$(mg/kg\text{-}day)^{-1}$		CalEPA	2007
Trichloroethylene	1.3E-02	1.3E-02	$(mg/kg\text{-}day)^{-1}$	B2/C	CalEPA	2007

Pathway: Inhalation					
Chemical of Concern	InhalationCancer Slope Factor	Slope Factor Units	Weight of Evidence[a]	Source	Date
1,1,2-Trichloroethane	5.6E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2007
1,1-DICHLOROETHANE	5.7E-03	$(mg/kg\text{-}day)^{-1}$	C	CalEPA	2007
1,2,4-Trichlorobenzene					
1,2-DICHLOROETHANE	9.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
1,4-DICHLOROBENZENE	4.0E-02	$(mg/kg\text{-}day)^{-1}$	C	CalEPA	2007
Arsenic	1.5E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Benzene	2.7E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
BENZO(a)ANTHRACENE	3.9E-01	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
BENZO(b)FLUORANTHENE	3.9E-01	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
BENZO(k)FLUORANTHENE	3.9E-01	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
BERYLLIUM	8.4E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	2007
bis(2-ETHYLHEXYL)PHTHALATE	8.4E-03	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
Cadmium	6.3E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	2007
Carbon Tetrachloride	5.3E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Chloroform	8.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
CHRYSENE	3.9E-02	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
COBALT	9.8E+00	$(mg/kg\text{-}day)^{-1}$		PPRTV	2004
CHROMIUM,TOTAL	4.2E+01	$(mg/kg\text{-}day)^{-1}$	D	IRIS	2007
Ethylbenzene	8.7E-03	$(mg/kg\text{-}day)^{-1}$		CalEPA	2007
Methylene Chloride	1.6E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
TERT-BUTYL METHYL ETHER	9.1E-04	$(mg/kg\text{-}day)^{-1}$		CalEPA	2007
Naphthalene	1.2E-01	$(mg/kg\text{-}day)^{-1}$	C	CalEPA	2007
N-NITROSODIPHENYLAMINE	9.0E-03	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	2007
PCB-1260 (AROCHLOR 1260)	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Tetrachloroethylene	2.1E-02	$(mg/kg\text{-}day)^{-1}$		CalEPA	2007
Trichloroethylene	7.0E-03	$(mg/kg\text{-}day)^{-1}$	B2/C	CalEPA	2007

Cal-EPA = California Environmental Protection Agency
IRIS - Integrated Risk Information System
[a]Weight of Evidence Classification

A - human carcinogen
B1 and B2 - probable human carcinogen
C - possible human carcinogen
D - not classifiable as a human carcinogen
E - evidence of noncarcinogenicity for humans
Reference = USEPA 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December.

Table B6-3
Non-Cancer Toxicity Data Summary
AOC H-12

Pathway: Ingestion, Dermal									
Chemical of Concern	Chronic/ subchronic	Oral RfD	Dermal RfD	Oral RfD Units	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
1,1,2-TRICHLOROETHANE	Chronic	4.0E-03	4.0E-03	mg/kg-day	mg/kg-day		1000	IRIS	2007
1,1-DICHLOROETHANE	Chronic	1.0E-01	1.0E-01	mg/kg-day	mg/kg-day	Kidney	3000	HEAST	1997
1,2,4-Trichlorobenzene	Chronic	1.0E-02	1.0E-02	mg/kg-day	mg/kg-day		1000	IRIS	2007
1,2-DICHLOROETHANE	Chronic	2.0E-02	2.0E-02	mg/kg-day	mg/kg-day			NCEA	2004
1,4-DICHLOROBENZENE	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day			NCEA	2004
Arsenic	Chronic	3.0E-04	3.0E-04	mg/kg-day	mg/kg-day	Vascular	3	IRIS	2007
Benzene	Chronic	4.0E-03	4.0E-03	mg/kg-day	mg/kg-day	Blood		IRIS	2007
BENZO(a)ANTHRACENE	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day		3000	SURROGATE	
BENZO(b)FLUORANTHENE	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day			SURROGATE	
BENZO(k)FLUORANTHENE	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day			SURROGATE	
BERYLLIUM	Chronic	2.0E-03	2.0E-03	mg/kg-day	mg/kg-day	Small intestine; Lungs	300	IRIS	2007
bis(2-ETHYLHEXYL)PHTHALATE	Chronic	2.0E-02	2.0E-02	mg/kg-day	mg/kg-day	Liver	1000	IRIS	2007
Cadmium	Chronic	1.0E-03	1.0E-03	mg/kg-day	mg/kg-day	Significant proteinuria; Lung, trachea, bronchus cancer deaths	10	IRIS	2007
Carbon Tetrachloride	Chronic	7.0E-04	7.0E-04	mg/kg-day	mg/kg-day	Liver	1000	IRIS	2007
Chloroform	Chronic	1.0E-02	1.0E-02	mg/kg-day	mg/kg-day	Liver	100	IRIS	2007
CHRYSENE	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day		3000	SURROGATE	
CHROMIUM,TOTAL	Chronic	1.5E+00	1.5E+00	mg/kg-day	mg/kg-day		100	IRIS	2007
COBALT	Chronic	2.0E-02	2.0E-02	mg/kg-day	mg/kg-day	--		PPRTV	2004
Ethylbenzene	Chronic	1.0E-01	1.0E-01	mg/kg-day	mg/kg-day	Liver and kidney	1000	IRIS	2007
Methylene Chloride	Chronic	6.0E-02	6.0E-02	mg/kg-day	mg/kg-day		100	IRIS	2007
TERT-BUTYL METHYL ETHER	Chronic	8.6E-01	8.6E-01	mg/kg-day	mg/kg-day		100	ROUTE	
Naphthalene	Chronic	2.0E-02	2.0E-02	mg/kg-day	mg/kg-day	Decreased body weight	3000	IRIS	2007
N-NITROSODIPHENYLAMINE	Chronic	2.0E-02	2.0E-02	mg/kg-day	mg/kg-day		3000	PPRTV	2004
PCB-1260 (AROCHLOR 1260)	Chronic	2.0E-05	2.0E-05	mg/kg-day	mg/kg-day		300	IRIS	2007
Tetrachloroethylene	Chronic	1.0E-02	1.0E-02	mg/kg-day	mg/kg-day		1000	IRIS	2007
TRICHLOROETHYLENE	Chronic	3.0E-04	3.0E-04	mg/kg-day	mg/kg-day			NCEA	2004
1,1-DICHLOROETHENE	Chronic	5.0E-02	5.0E-02	mg/kg-day	mg/kg-day	Liver	100	IRIS	2007
1,2,4-Trimethylbenzene	Chronic	5.0E-02	5.0E-02	mg/kg-day	mg/kg-day	Lungs	3000	PPRTV	2004
1,3,5-Trimethylbenzene	Chronic	5.0E-02	5.0E-02	mg/kg-day	mg/kg-day	Lungs	3000	PPRTV	2004
2-Methylnaphthalene	Chronic	4.0E-03	4.0E-03	mg/kg-day	mg/kg-day		1000	IRIS	2007
Acetone	Chronic	9.0E-01	9.0E-01	mg/kg-day	mg/kg-day	Kidney	1000	IRIS	2007
ANTHRACENE	Chronic	3.0E-01	3.0E-01	mg/kg-day	mg/kg-day		3000	IRIS	2007
BARIUM	Chronic	2.0E-01	2.0E-01	mg/kg-day	mg/kg-day	Kidney	300	IRIS	2007
COPPER	Chronic	4.0E-02	4.0E-02	mg/kg-day	mg/kg-day	Gastro-intestinal system		HEAST	1997
Dichlorodifluoromethane	Chronic	2.0E-01	2.0E-01	mg/kg-day	mg/kg-day	Liver	100	IRIS	2007
DIETHYL PHTHALATE	Chronic	8.0E-01	8.0E-01	mg/kg-day	mg/kg-day		1000	IRIS	2007
DI-n-BUTYLPHTHALATE	Chronic	1.0E-01	1.0E-01	mg/kg-day	mg/kg-day		1000	IRIS	2007
DI-n-OCTYLPHTHALATE	Chronic	4.0E-02	4.0E-02	mg/kg-day	mg/kg-day		1000	PPRTV	2004
Hexane	Chronic	1.1E+01	1.1E+01	mg/kg-day	mg/kg-day			PPRTV	2004
LEAD	Chronic	NA	NA	mg/kg-day	mg/kg-day				
m,p-Xylene	Chronic	2.0E-01	2.0E-01	mg/kg-day	mg/kg-day		1000	IRIS	2007
Mercury	Chronic	3.0E-04	3.0E-04	mg/kg-day	mg/kg-day			IRIS	2007
METHYL ETHYL KETONE (2-BUTANONE	Chronic	6.0E-01	6.0E-01	mg/kg-day	mg/kg-day		1000	IRIS	2007
Methyl Isobutyl Ketone	Chronic	8.0E-02	8.0E-02	mg/kg-day	mg/kg-day		3000	HEAST	1997
n-Butylbenzene	Chronic	4.0E-02	4.0E-02	mg/kg-day	mg/kg-day			NCEA	2004
n-Propylbenzene	Chronic	4.0E-02	4.0E-02	mg/kg-day	mg/kg-day	Nervous system		NCEA	2004
o-Xylene	Chronic	2.0E-01	2.0E-01	mg/kg-day	mg/kg-day		1000	IRIS	2007
PHENANTHRENE	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day		3000	SURROGATE	
PYRENE	Chronic	3.0E-02	3.0E-02	mg/kg-day	mg/kg-day	Kidney	3000	IRIS	2007
Selenium	Chronic	5.0E-03	5.0E-03	mg/kg-day	mg/kg-day	Clinical selenosis	3	IRIS	2007
Styrene	Chronic	2.0E-01	2.0E-01	mg/kg-day	mg/kg-day	Blood and liver	1000	IRIS	2007
Thallium	Chronic	6.6E-05	6.6E-05	mg/kg-day	mg/kg-day		3000	IRIS	2007
Toluene	Chronic	8.0E-02	8.0E-02	mg/kg-day	mg/kg-day	Liver and kidney	3000	IRIS	2007
Trichlorofluoromethane	Chronic	3.0E-01	3.0E-01	mg/kg-day	mg/kg-day	Cellular	1000	IRIS	2007
Trichlorotrifluoroethane	Chronic	3.0E+01	3.0E+01	mg/kg-day	mg/kg-day		10	IRIS	2007
VANADIUM	Chronic	1.0E-03	1.0E-03	mg/kg-day	mg/kg-day	Liver and kidney	100	NCEA	2004

Table B6-3
Non-Cancer Toxicity Data Summary
AOC H-12

Pathway: Inhalation								
Chemical of Concern	Chronic/ subchronic	Inhalation RfD	Inhalation RfD Units		Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
1,1,2-TRICHLOROETHANE	Chronic	4.0E-03	mg/kg-day			1000	ROUTE	
1,1-DICHLOROETHANE	Chronic	1.4E-01	mg/kg-day		Kidney	3000	HEAST	1997
1,2,4-Trichlorobenzene	Chronic	1.0E-03	mg/kg-day			1000	PPRTV	2004
1,2-DICHLOROETHANE	Chronic	1.1E-01	mg/kg-day				CalEPA	2007
1,4-DICHLOROBENZENE	Chronic	2.3E-01	mg/kg-day				IRIS	2007
Arsenic	Chronic	8.6E-06	mg/kg-day		Vascular	3	CalEPA	2007
Benzene	Chronic	8.6E-03	mg/kg-day		Blood		IRIS	2007
BENZO(a)ANTHRACENE	Chronic	3.0E-02	mg/kg-day			3000	ROUTE	
BENZO(b)FLUORANTHENE	Chronic	3.0E-02	mg/kg-day				ROUTE	
BENZO(k)FLUORANTHENE	Chronic	3.0E-02	mg/kg-day				ROUTE	
BERYLLIUM	Chronic	5.7E-06	mg/kg-day		Small intestine; Lungs	300	IRIS	2007
bis(2-ETHYLHEXYL)PHTHALATE	Chronic	2.0E-02	mg/kg-day		Liver	1000	ROUTE	
Cadmium	Chronic	5.7E-06	mg/kg-day		Significant proteinuria; Lung, trachea, bronchus cancer deaths	10	CalEPA	2007
Carbon Tetrachloride	Chronic	1.1E-02	mg/kg-day		Liver	1000	CalEPA	2007
Chloroform	Chronic	8.6E-02	mg/kg-day		Liver	100	CalEPA	2007
CHROMIUM,TOTAL	Chronic	1.5E+00	mg/kg-day			3000	IRIS	2007
CHRYSENE	Chronic	3.0E-02	mg/kg-day			3000	ROUTE	
COBALT	Chronic	5.7E-06	mg/kg-day		--			
Ethylbenzene	Chronic	2.9E-01	mg/kg-day		Liver and kidney	1000	IRIS	2007
Methylene Chloride	Chronic	1.1E-01	mg/kg-day			100	CalEPA	2007
TERT-BUTYL METHYL ETHER	Chronic	8.6E-01	mg/kg-day			100	IRIS	2007
Naphthalene	Chronic	8.6E-04	mg/kg-day		Decreased body weight	3000	IRIS	2007
N-NITROSODIPHENYLAMINE	Chronic	2.0E-02	mg/kg-day			3000	ROUTE	
PCB-1260 (AROCHLOR 1260)	Chronic	2.0E-05	mg/kg-day			300	ROUTE	
Tetrachloroethylene	Chronic	1.0E-02	mg/kg-day			1000	CalEPA	2007
TRICHLOROETHYLENE	Chronic	1.7E-01	mg/kg-day				CalEPA	2007
1,1-DICHLOROETHENE	Chronic	5.7E-02	mg/kg-day		Liver	100	IRIS	2007
1,2,4-Trimethylbenzene	Chronic	1.7E-03	mg/kg-day		Lungs	3000	PPRTV	2004
1,3,5-Trimethylbenzene	Chronic	1.7E-03	mg/kg-day		Lungs	3000	PPRTV	2004
2-Methylnaphthalene	Chronic	8.6E-04	mg/kg-day			1000	IRIS	2007
Acetone	Chronic	9.0E-01	mg/kg-day		Kidney	1000		
ANTHRACENE	Chronic	3.0E-01	mg/kg-day			3000	ROUTE	
BARIUM	Chronic	1.4E-04	mg/kg-day		Kidney	300		
COPPER	Chronic	4.0E-02	mg/kg-day		Gastro-intestinal system		HEAST	1997
Dichlorodifluoromethane	Chronic	5.7E-02	mg/kg-day		Liver	100		
DIETHYL PHTHALATE	Chronic	8.0E-01	mg/kg-day			1000	ROUTE	
DI-n-BUTYLPHTHALATE	Chronic	1.0E-01	mg/kg-day			1000	ROUTE	
DI-n-OCTYLPHTHALATE	Chronic	4.0E-02	mg/kg-day			1000	ROUTE	
Hexane	Chronic	2.0E-01	mg/kg-day				IRIS	2007
LEAD	Chronic	NA	mg/kg-day					
m,p-Xylene	Chronic	2.9E-02	mg/kg-day			1000	IRIS	2007
Mercury	Chronic	8.6E-05	mg/kg-day				IRIS	2007
METHYL ETHYL KETONE (2-BUTANONE	Chronic	1.4E+00	mg/kg-day			1000	IRIS	2007
Methyl Isobutyl Ketone	Chronic	8.6E-01	mg/kg-day			3000	IRIS	2007
n-Butylbenzene	Chronic	4.0E-02	mg/kg-day				ROUTE	
n-Propylbenzene	Chronic	4.0E-02	mg/kg-day		Nervous system		ROUTE	
o-Xylene	Chronic	2.9E-02	mg/kg-day			1000	IRIS	2007
PHENANTHRENE	Chronic	3.0E-02	mg/kg-day			3000	ROUTE	
PYRENE	Chronic	3.0E-02	mg/kg-day		Kidney	3000	ROUTE	
Selenium	Chronic	5.7E-03	mg/kg-day		Clinical selenosis	3	CalEPA	2007
Styrene	Chronic	2.9E-01	mg/kg-day		Blood and liver	1000	IRIS	2007
Thallium	Chronic	6.6E-05	mg/kg-day			3000	IRIS	2007
Toluene	Chronic	1.4E+00	mg/kg-day		Liver and kidney	3000	IRIS	2007
Trichlorofluoromethane	Chronic	2.0E-01	mg/kg-day		Cellular	1000		
Trichlorotrifluoroethane	Chronic	8.6E+00	mg/kg-day			10	HEAST	1997
VANADIUM	Chronic	1.0E-03	mg/kg-day		Liver and kidney	100	NCEA	2004

Notes:
Blank cells indicate information is not available or not applicable.
Cal-EPA = California Environmental Protection Agency
HEAST - Health Effects Assessment Summary Tables
IRIS - Integrated Risk Information System
mg/kg-day = milligrams per kilogram per day
RfD = reference dose
ROUTE = route to route extrapolated value (e.g., oral RfD used for inhalation RfD).
SURROGATE = RfDs for pyrene used for other polynuclear aromatic hydrocarbons (IRIS 2007)

Table B6-4
Risk Characterization Summary - Carcinogens
AOC H-12

Scenario Timeframe:	**Future**									
Receptor Population:	**Resident**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-12 - Soil On-site Direct Contact (0-2 ft bgs)	CHRYSENE	2.1E-02	mg/kg	3.9E-09	4.5E-11	1.9E-09	1.8E-08	2.4E-08
			Cadmium	5.8E-01	mg/kg	--	3.4E-11	--	--	3.4E-11
			PCB-1260 (AROCHLOR 1260)	3.0E-02	mg/kg	9.5E-08	5.6E-13	4.6E-08	3.4E-07	4.8E-07
			bis(2-ETHYLHEXYL)PHTHALATE	6.9E-01	mg/kg	1.5E-08	5.4E-14	4.9E-09	3.6E-08	5.6E-08
			TOTAL			**1.1E-07**	**7.9E-11**	**5.3E-08**	**3.9E-07**	**5.6E-07**
Soil	Soil	AOC H-12 - Soil On-site Direct Contact (0-10 ft bgs)	1,1,2-TRICHLOROETHANE	2.7E-05	mg/kg	2.4E-12	2.0E-07	7.7E-13	--	2.0E-07
			Arsenic	4.5E+00	mg/kg	1.1E-05	6.3E-10	1.0E-06	3.7E-05	4.8E-05
			Benzene	3.9E-05	mg/kg	3.3E-12	1.2E-06	1.1E-12	--	1.2E-06
			Cadmium	7.7E-01	mg/kg	--	4.5E-11	--	--	4.5E-11
			bis(2-ETHYLHEXYL)PHTHALATE	3.1E-01	mg/kg	6.7E-09	2.4E-14	2.2E-09	1.6E-08	2.5E-08
			Carbon Tetrachloride	1.4E-05	mg/kg	2.8E-12	8.4E-06	9.1E-13	--	8.4E-06
			Chloroform	2.3E-04	mg/kg	1.1E-11	3.2E-04	3.7E-12	--	3.2E-04
			Chrysene	2.1E-02	mg/kg	3.9E-09	4.5E-11	1.9E-09	1.8E-08	2.4E-08
			Ethylbenzene	1.7E-04	mg/kg	2.9E-12	5.4E-07	9.4E-13	--	5.4E-07
			Methylene Chloride	1.8E-04	mg/kg	2.1E-12	8.9E-07	6.6E-13	--	8.9E-07
			Naphthalene	2.6E-02	mg/kg	--	3.6E-05	--	--	3.6E-05
			PCB-1260 (AROCHLOR 1260)	2.2E-02	mg/kg	6.8E-08	4.1E-13	3.3E-08	2.5E-07	3.5E-07
			Tetrachloroethylene	1.8E-05	mg/kg	1.5E-11	2.1E-06	4.8E-12	--	2.1E-06
			Trichloroethylene	3.0E-05	mg/kg	6.0E-13	6.6E-07	1.9E-13	--	6.6E-07
			TOTAL			**1.1E-05**	**3.7E-04**	**1.1E-06**	**3.7E-05**	**4.E-04**

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Table B6-4
Risk Characterization Summary - Carcinogens
AOC H-12

Scenario Timeframe:	**Future**									
Receptor Population:	**Outdoor Occupational**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-12 - Soil On-site Direct Contact (0-2 ft bgs)	bis(2-ETHYLHEXYL)PHTHALATE	6.9E-01	mg/kg	3.4E-09	2.5E-14	3.8E-09	--	7.2E-09
			CHRYSENE	2.1E-02	mg/kg	8.8E-10	2.1E-11	1.5E-09	--	2.4E-09
			Cadmium	5.8E-01	mg/kg	--	1.6E-11	--	--	1.6E-11
			PCB-1260 (AROCHLOR 1260)	3.0E-02	mg/kg	2.1E-08	2.6E-13	3.6E-08	--	5.7E-08
			TOTAL			**2.5E-08**	**3.7E-11**	**4.2E-08**	--	**7.E-08**

Scenario Timeframe:	**Future**									
Receptor Population:	**Indoor Occupational**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil Gas	Soil Gas	AOC H-12 - Soil On-site Direct Contact	1,1,2-TRICHLOROETHANE	5.5E-01	ppbv	--	1.2E-08	--	--	1.2E-08
			1,1-DICHLOROETHANE	2.3E+00	ppbv	--	3.6E-09	--	--	3.6E-09
			1,2,4-Trichlorobenzene	5.6E-01	ppbv	--	--	--	--	--
			1,2-DICHLOROETHANE	2.8E+00	ppbv	--	7.2E-08	--	--	7.2E-08
			1,4-DICHLOROBENZENE	2.2E+00	ppbv	--	3.7E-08	--	--	3.7E-08
			Benzene	1.2E+01	ppbv	--	7.4E-08	--	--	7.4E-08
			Chloroform	6.8E+02	ppbv	--	1.9E-05	--	--	1.9E-05
			Ethylbenzene	1.2E+01	ppbv	--	3.3E-08	--	--	3.3E-08
			Methylene Chloride	1.3E+02	ppbv	--	5.3E-08	--	--	5.3E-08
			Naphthalene	4.9E+01	ppbv	--	2.2E-06	--	--	2.2E-06
			TERT-BUTYL METHYL ETHER	1.1E+01	ppbv	--	2.5E-09	--	--	2.5E-09
			Tetrachloroethylene	1.2E+01	ppbv	--	1.2E-07	--	--	1.2E-07
			TRICHLOROETHYLENE	1.5E+01	ppbv	--	3.9E-08	--	--	3.9E-08
			TOTAL			--	**2.1E-05**	--	--	**2.E-05**

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Table B6-4
Risk Characterization Summary - Carcinogens
AOC H-12

Scenario Timeframe:	**Future**									
Receptor Population:	**Construction Worker**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-12 - Soil On-site Direct Contact (0-15 ft bgs)	1,1,2-TRICHLOROETHANE	2.7E-05	mg/kg	7.0E-14	6.4E-13	9.7E-14	--	8.1E-13
			1,1-DICHLOROETHANE	2.7E-05	mg/kg	7.2E-15	1.8E-13	1.0E-14	--	2.0E-13
			1,2,4-Trichlorobenzene	1.6E-04	mg/kg	2.6E-14	--	3.6E-14	--	6.2E-14
			1,2-DICHLOROETHANE	2.5E-04	mg/kg	1.0E-12	1.6E-11	1.5E-12	--	1.9E-11
			1,4-DICHLOROBENZENE	3.6E-04	mg/kg	8.9E-14	3.1E-12	1.2E-13	--	3.3E-12
			Arsenic	4.9E+00	mg/kg	3.4E-07	2.1E-07	1.4E-07	--	6.8E-07
			Benzene	6.3E-05	mg/kg	1.6E-13	1.8E-12	2.2E-13	--	2.1E-12
			Cadmium	8.5E-01	mg/kg	--	1.5E-08	--	--	1.5E-08
			BENZO(a)ANTHRACENE	4.0E-02	mg/kg	2.2E-09	4.4E-11	4.6E-09	--	6.8E-09
			BENZO(b)FLUORANTHENE	4.2E-02	mg/kg	2.3E-09	4.6E-11	4.8E-09	--	7.2E-09
			BENZO(k)FLUORANTHENE	4.7E-02	mg/kg	2.6E-09	5.1E-11	5.4E-09	--	8.0E-09
			BERYLLIUM	5.8E-01	mg/kg	--	1.4E-08	--	--	1.4E-08
			bis(2-ETHYLHEXYL)PHTHALATE	3.2E-01	mg/kg	2.1E-10	7.5E-12	2.8E-10	--	5.0E-10
			Carbon Tetrachloride	7.6E-05	mg/kg	4.6E-13	5.4E-12	6.3E-13	--	6.5E-12
			Chloroform	7.2E-03	mg/kg	1.0E-11	6.1E-10	1.4E-11	--	6.4E-10
			CHROMIUM,TOTAL	3.0E+01	mg/kg	--	3.5E-06	--	--	3.5E-06
			CHRYSENE	2.1E-02	mg/kg	1.2E-10	3.1E-12	2.4E-10	--	3.6E-10
			COBALT	1.5E+01	mg/kg	--	4.1E-07	--	--	4.1E-07
			Ethylbenzene	1.1E-04	mg/kg	5.8E-14	5.1E-13	8.0E-14	--	6.5E-13
			Methylene Chloride	1.5E-03	mg/kg	5.1E-13	2.7E-12	7.0E-13	--	3.9E-12
			TERT-BUTYL METHYL ETHER	4.8E-04	mg/kg	4.0E-14	2.6E-13	5.5E-14	--	3.6E-13
			Naphthalene	2.0E-02	mg/kg	--	1.6E-10	--	--	1.6E-10
			N-NITROSODIPHENYLAMINE	2.1E-02	mg/kg	4.7E-12	5.3E-13	6.6E-12	--	1.2E-11
			PCB-1260 (AROCHLOR 1260)	2.2E-02	mg/kg	2.0E-09	1.2E-10	4.2E-09	--	6.3E-09
			Tetrachloroethylene	6.2E-05	mg/kg	1.5E-12	1.4E-12	2.1E-12	--	5.1E-12
			TRICHLOROETHYLENE	1.0E-04	mg/kg	6.2E-14	6.2E-13	8.5E-14	--	7.7E-13
			TOTAL			**3.5E-07**	**4.2E-06**	**1.6E-07**	--	**5.E-06**

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Table B6-5
Risk Characterization Summary - Non-Carcinogens
AOC H-12

Scenario Timeframe:	**Future**										
Receptor Population:	**Resident**										
Receptor Age:	**Adult**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-12 Soil On-site Direct Contact (0-2 ft bgs)	bis(2-ETHYLHEXYL)PHTHALATE	6.9E-01	mg/kg	Liver	4.7E-05	5.9E-10	1.9E-05	2.2E-04	3.E-04
			Cadmium	5.8E-01	mg/kg	Significant proteinuria; Lung, trachea, bronchus cancer deaths	7.9E-04	1.7E-06	3.2E-06	3.1E-02	3.E-02
			CHRYSENE	2.1E-02	mg/kg		9.6E-07	7.0E-08	5.7E-07	8.7E-06	1.E-05
			PCB-1260 (AROCHLOR 1260)	3.0E-02	mg/kg		2.1E-03	2.6E-08	1.2E-03	1.5E-02	2.E-02
			DIETHYL PHTHALATE	1.1E-01	mg/kg		1.9E-07	2.4E-12	7.7E-08	6.7E-05	7.E-05
			Mercury	4.0E+00	mg/kg		1.8E-02	8.1E-07	7.4E-04	1.6E-01	2.E-01
			Selenium	2.4E+00	mg/kg	Clinical selenosis	6.4E-04	7.0E-09	2.6E-05	5.5E-03	6.E-03
			Thallium	4.9E+00	mg/kg		1.0E-01	1.3E-06	4.0E-03	4.2E-01	5.E-01
			VANADIUM	5.3E+01	mg/kg	Liver and kidney	7.2E-02	9.0E-07	2.9E-03	3.0E-01	4.E-01
			TOTAL				**1.9E-01**	**4.8E-06**	**8.9E-03**	**9.3E-01**	**1.E+00**

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Table B6-5
Risk Characterization Summary - Non-Carcinogens
AOC H-12

(Cont…)			1,1,2-TRICHLOROETHANE	2.7E-05	mg/kg		9.1E-09	2.1E-03	3.6E-09	--	2.E-03
			Arsenic	4.5E+00	mg/kg	Vascular	2.1E-02	9.0E-06	2.5E-03	1.4E-01	2.E-01
			Benzene	3.9E-05	mg/kg	Blood	1.3E-08	1.3E-02	5.3E-09	--	1.E-02
			bis(2-ETHYLHEXYL)PHTHALATE	3.1E-01	mg/kg	Liver	2.1E-05	2.6E-10	8.4E-06	9.9E-05	1.E-04
			Cadmium	7.7E-01	mg/kg	Significant proteinuria; Lung, trachea, bronchus cancer deaths	1.1E-03	2.3E-06	4.2E-06	4.1E-02	4.E-02
			Carbon Tetrachloride	1.4E-05	mg/kg	Liver	2.7E-08	3.4E-02	1.1E-08	--	3.E-02
			Chloroform	2.3E-04	mg/kg	Liver	3.2E-08	1.1E-01	1.3E-08	--	1.E-01
			CHRYSENE	2.1E-02	mg/kg		9.6E-07	7.0E-08	5.7E-07	8.7E-06	1.E-05
			Ethylbenzene	1.7E-04	mg/kg	Liver and kidney	2.3E-09	5.2E-04	9.3E-10	--	5.E-04
			Methylene Chloride	1.8E-04	mg/kg		4.0E-09	1.2E-02	1.6E-09	--	1.E-02
			Naphthalene	2.6E-02	mg/kg	Decreased body weight	1.8E-06	8.6E-01	1.1E-06	2.1E-04	9.E-01
			Tetrachloroethylene	1.8E-05	mg/kg		2.4E-09	2.4E-02	9.6E-10	--	2.E-02
			TRICHLOROETHYLENE	3.0E-05	mg/kg		1.4E-07	1.3E-03	5.4E-08	--	1.E-03
			1,2,4-Trimethylbenzene	3.3E-03	mg/kg	Lungs	9.1E-08	1.2E-01	3.6E-08	--	1.E-01
			1,3,5-Trimethylbenzene	4.3E-04	mg/kg	Lungs	1.2E-08	6.2E-02	4.7E-09	--	6.E-02
Soil	Soil	AOC H-12 Soil On-site Direct Contact (0-10 ft bgs)	Acetone	1.2E-01	mg/kg	Kidney	1.8E-07	2.2E-02	7.2E-08	--	2.E-02
			BARIUM	2.5E+02	mg/kg	Kidney	1.7E-03	3.0E-05	6.7E-05	7.0E-03	9.E-03
			Dichlorodifluoromethane	1.1E-06	mg/kg	Liver	7.7E-12	5.1E-09	3.1E-12	--	5.E-09
			DIETHYL PHTHALATE	1.4E-01	mg/kg		2.3E-07	2.9E-12	9.2E-08	8.0E-05	8.E-05
			Hexane	2.4E-05	mg/kg		3.0E-12	3.6E-03	1.2E-12	--	4.E-03
			METHYL ETHYL KETONE (2-BUTANONE)	2.5E-02	mg/kg		5.7E-08	8.3E-03	2.3E-08	--	8.E-03
			m,p-Xylene	5.0E-04	mg/kg		3.4E-09	7.8E-07	1.4E-09	--	8.E-07
			Mercury	1.3E+00	mg/kg		6.1E-03	2.7E-07	2.4E-04	5.2E-02	6.E-02
			n-Butylbenzene	6.6E-04	mg/kg		2.3E-08	1.2E-02	9.0E-09	--	1.E-02
			n-Propylbenzene	2.4E-04	mg/kg	Nervous system	8.1E-09	5.4E-03	3.2E-09	--	5.E-03
			o-Xylene	4.1E-04	mg/kg		2.8E-09	6.3E-07	1.1E-09	--	6.E-07
			PCB-1260 (AROCHLOR 1260)	2.2E-02	mg/kg		1.5E-03	1.9E-08	8.9E-04	1.1E-02	1.E-02
			Selenium	1.8E+00	mg/kg	Clinical selenosis	5.0E-04	5.5E-09	2.0E-05	4.3E-03	5.E-03
			Styrene	2.6E-04	mg/kg	Blood and liver	1.7E-09	8.2E-05	7.0E-10	--	8.E-05
			Thallium	6.9E+00	mg/kg		1.4E-01	1.8E-06	5.7E-03	6.0E-01	7.E-01
			Toluene	3.3E-04	mg/kg	Liver and kidney	5.7E-09	4.9E-04	2.3E-09	--	5.E-04
			Trichlorofluoromethane	1.0E-04	mg/kg	Cellular	4.6E-10	1.1E-07	1.8E-10	--	1.E-07
			Trichlorotrifluoroethane	9.8E-06	mg/kg		4.5E-13	6.9E-06	1.8E-13	--	7.E-06
			VANADIUM	5.8E+01	mg/kg	Liver and kidney	8.0E-02	9.9E-07	3.2E-03	3.3E-01	4.E-01
			TOTAL				**2.5E-01**	**1.3E+00**	**1.3E-02**	**1.2E+00**	**3.E+00**

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Table B6-5
Risk Characterization Summary - Non-Carcinogens
AOC H-12

Scenario Timeframe:	**Future**										
Receptor Population:	**Resident**										
Receptor Age:	**Child**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-12 Soil On-site Direct Contact (0-2 ft bgs)	bis(2-ETHYLHEXYL)PHTHALATE	6.9E-01	mg/kg	Liver	4.4E-04	1.4E-09	1.3E-04	6.1E-04	1.2E-03
			Cadmium	5.8E-01	mg/kg	Significant proteinuria; Lung, trachea, bronchus cancer deaths	7.4E-03	4.0E-06	2.1E-05	8.6E-02	9.3E-02
			CHRYSENE	2.1E-02	mg/kg		8.9E-06	1.6E-07	3.9E-06	2.4E-05	3.7E-05
			PCB-1260 (AROCHLOR 1260)	3.0E-02	mg/kg		1.9E-02	6.1E-08	8.4E-03	4.1E-02	6.8E-02
			DIETHYL PHTHALATE	1.1E-01	mg/kg		1.8E-06	5.6E-12	5.2E-07	1.8E-04	1.9E-04
			Mercury	4.0E+00	mg/kg		1.7E-01	1.9E-06	5.0E-03	4.3E-01	6.1E-01
			Selenium	2.4E+00	mg/kg	Clinical selenosis	6.0E-03	1.6E-08	1.7E-04	1.5E-02	2.1E-02
			Thallium	4.9E+00	mg/kg		9.4E-01	2.9E-06	2.7E-02	1.2E+00	2.1E+00
			VANADIUM	5.3E+01	mg/kg	Liver and kidney	6.7E-01	2.1E-06	1.9E-02	8.2E-01	1.5E+00
			TOTAL				**1.8E+00**	**1.1E-05**	**6.1E-02**	**2.6E+00**	**4.E+00**

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Table B6-5
Risk Characterization Summary - Non-Carcinogens
AOC H-12

(Cont…)			1,1,2-TRICHLOROETHANE	2.7E-05	mg/kg		8.5E-08	2.1E-03	2.5E-08	--	2.1E-03
			Arsenic	4.5E+00	mg/kg	Vascular	1.9E-01	2.1E-05	1.7E-02	3.9E-01	6.0E-01
			Benzene	3.9E-05	mg/kg	Blood	1.2E-07	1.3E-02	3.6E-08	--	1.3E-02
			bis(2-ETHYLHEXYL)PHTHALATE	3.1E-01	mg/kg	Liver	2.0E-04	6.1E-10	5.7E-05	2.7E-04	5.3E-04
			Cadmium	7.7E-01	mg/kg	Significant proteinuria; Lung, trachea, bronchus cancer deaths	9.8E-03	5.4E-06	2.9E-05	1.1E-01	1.2E-01
			Carbon Tetrachloride	1.4E-05	mg/kg	Liver	2.5E-07	3.4E-02	7.4E-08	--	3.4E-02
			Chloroform	2.3E-04	mg/kg	Liver	3.0E-07	1.1E-01	8.7E-08	--	1.1E-01
			CHRYSENE	2.1E-02	mg/kg		8.9E-06	1.6E-07	3.9E-06	2.4E-05	3.7E-05
			Ethylbenzene	1.7E-04	mg/kg	Liver and kidney	2.2E-08	5.2E-04	6.3E-09	--	5.2E-04
			Methylene Chloride	1.8E-04	mg/kg		3.7E-08	1.2E-02	1.1E-08	--	1.2E-02
			Naphthalene	2.6E-02	mg/kg	Decreased body weight	1.7E-05	8.6E-01	7.3E-06	5.8E-04	8.6E-01
			Tetrachloroethylene	1.8E-05	mg/kg		2.3E-08	2.4E-02	6.5E-09	--	2.4E-02
			TRICHLOROETHYLENE	3.0E-05	mg/kg		1.3E-06	1.3E-03	3.7E-07	--	1.3E-03
			1,2,4-Trimethylbenzene	3.3E-03	mg/kg	Lungs	8.5E-07	1.2E-01	2.5E-07	--	1.2E-01
			1,3,5-Trimethylbenzene	4.3E-04	mg/kg	Lungs	1.1E-07	6.2E-02	3.2E-08	--	6.2E-02
Soil	Soil	AOC H-12 Soil On-site Direct Contact (0-10 ft bgs)	Acetone	1.2E-01	mg/kg	Kidney	1.7E-06	2.2E-02	4.9E-07	--	2.2E-02
			BARIUM	2.5E+02	mg/kg	Kidney	1.6E-02	7.0E-05	4.6E-04	1.9E-02	3.6E-02
			Dichlorodifluoromethane	1.1E-06	mg/kg	Liver	7.2E-11	1.2E-08	2.1E-11	--	1.2E-08
			DIETHYL PHTHALATE	1.4E-01	mg/kg		2.2E-06	6.7E-12	6.3E-07	2.2E-04	2.2E-04
			Hexane	2.4E-05	mg/kg		2.8E-11	3.6E-03	8.0E-12	--	3.6E-03
			METHYL ETHYL KETONE (2-BUTANONE)	2.5E-02	mg/kg		5.3E-07	8.3E-03	1.5E-07	--	8.3E-03
			m,p-Xylene	5.0E-04	mg/kg		3.2E-08	1.8E-06	9.3E-09	--	1.9E-06
			Mercury	1.3E+00	mg/kg		5.7E-02	6.2E-07	1.7E-03	1.4E-01	2.0E-01
			n-Butylbenzene	6.6E-04	mg/kg		2.1E-07	1.2E-02	6.1E-08	--	1.2E-02
			n-Propylbenzene	2.4E-04	mg/kg	Nervous system	7.5E-08	5.4E-03	2.2E-08	--	5.4E-03
			o-Xylene	4.1E-04	mg/kg		2.6E-08	1.5E-06	7.5E-09	--	1.5E-06
			PCB-1260 (AROCHLOR 1260)	2.2E-02	mg/kg		1.4E-02	4.4E-08	6.1E-03	2.9E-02	4.9E-02
			Selenium	1.8E+00	mg/kg	Clinical selenosis	4.7E-03	1.3E-08	1.4E-04	1.2E-02	1.7E-02
			Styrene	2.6E-04	mg/kg	Blood and liver	1.6E-08	8.2E-05	4.7E-09	--	8.2E-05
			Thallium	6.9E+00	mg/kg		1.3E+00	4.2E-06	3.9E-02	1.6E+00	3.0E+00
			Toluene	3.3E-04	mg/kg	Liver and kidney	5.3E-08	4.9E-04	1.5E-08	--	4.9E-04
			Trichlorofluoromethane	1.0E-04	mg/kg	Cellular	4.3E-09	2.6E-07	1.2E-09	--	2.6E-07
			Trichlorotrifluoroethane	9.8E-06	mg/kg		4.2E-12	6.9E-06	1.2E-12	--	6.9E-06
			VANADIUM	5.8E+01	mg/kg	Liver and kidney	7.4E-01	2.3E-06	2.2E-02	9.1E-01	1.7E+00
			TOTAL				**2.4E+00**	**1.3E+00**	**8.6E-02**	**3.3E+00**	**7.E+00**

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Table B6-5
Risk Characterization Summary - Non-Carcinogens
AOC H-12

Scenario Timeframe:	**Future**										
Receptor Population:	**Outdoor Occupational**										
Receptor Age:	**Adult**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-12 Soil On-site Direct Contact (0-2 ft bgs)	bis(2-ETHYLHEXYL)PHTHALATE	6.9E-01	mg/kg	Liver	3.4E-05	4.2E-10	3.8E-05	--	7.2E-05
			Cadmium	5.8E-01	mg/kg	Significant proteinuria; Lung, trachea, bronchus cancer deaths	5.7E-04	1.2E-06	6.5E-06	--	5.7E-04
			CHRYSENE	2.1E-02	mg/kg		6.8E-07	5.0E-08	1.2E-06	--	1.9E-06
			PCB-1260 (AROCHLOR 1260)	3.0E-02	mg/kg		1.5E-03	1.9E-08	2.5E-03	--	4.0E-03
			DIETHYL PHTHALATE	1.1E-01	mg/kg		1.4E-07	1.7E-12	1.6E-07	--	3.0E-07
			Mercury	4.0E+00	mg/kg		1.3E-02	5.8E-07	1.5E-03	--	1.5E-02
			Selenium	2.4E+00	mg/kg	Clinical selenosis	4.6E-04	5.0E-09	5.2E-05	--	5.1E-04
			Thallium	4.9E+00	mg/kg		7.2E-02	9.0E-07	8.2E-03	--	8.0E-02
			VANADIUM	5.3E+01	mg/kg	Liver and kidney	5.1E-02	6.4E-07	5.9E-03	--	5.7E-02
			TOTAL				**1.4E-01**	**3.4E-06**	**1.8E-02**	**--**	**2.E-01**

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Table B6-5
Risk Characterization Summary - Non-Carcinogens
AOC H-12

Scenario Timeframe:	**Future**										
Receptor Population:	**Indoor Occupational**										
Receptor Age:	**Adult**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil Gas	Soil Gas	AOC H-12 Soil On-site Direct Contact	1,1,2-TRICHLOROETHANE	5.5E-01	ppbv		--	1.5E-04	--	--	1.5E-04
			1,1-DICHLOROETHANE	2.3E+00	ppbv	Kidney	--	1.3E-05	--	--	1.3E-05
			1,2,4-Trichlorobenzene	5.6E-01	ppbv		--	8.2E-04	--	--	8.2E-04
			1,2-DICHLOROETHANE	2.8E+00	ppbv		--	1.6E-03	--	--	1.6E-03
			1,4-DICHLOROBENZENE	2.2E+00	ppbv		--	1.1E-05	--	--	1.1E-05
			Benzene	1.2E+01	ppbv	Blood	--	8.9E-04	--	--	8.9E-04
			Carbon Tetrachloride	2.2E+01	ppbv	Liver	--	2.3E-03	--	--	2.3E-03
			Chloroform	6.8E+02	ppbv	Liver	--	7.6E-03	--	--	7.6E-03
			Ethylbenzene	1.2E+01	ppbv	Liver and kidney	--	3.6E-05	--	--	3.6E-05
			Naphthalene	4.9E+01	ppbv	Decreased body weight	--	5.9E-02	--	--	5.9E-02
			Tetrachloroethylene	1.2E+01	ppbv		--	1.7E-03	--	--	1.7E-03
			TRICHLOROETHYLENE	1.5E+01	ppbv		--	9.2E-05	--	--	9.2E-05
			1,1-DICHLOROETHENE	2.6E+00	ppbv	Liver	--	3.5E-05	--	--	3.5E-05
			1,2,4-Trimethylbenzene	1.5E+01	ppbv	Lungs	--	8.3E-03	--	--	8.3E-03
			1,3,5-Trimethylbenzene	7.5E+00	ppbv	Lungs	--	4.2E-03	--	--	4.2E-03
			2-Methylnaphthalene	1.9E+00	ppbv		--	2.6E-03	--	--	2.6E-03
			Acetone	2.9E+03	ppbv	Kidney	--	1.5E-03	--	--	1.5E-03
			Dichlorodifluoromethane	9.3E-01	ppbv	Liver	--	1.6E-05	--	--	1.6E-05
			Hexane	7.1E+01	ppbv		--	2.4E-04	--	--	2.4E-04
			METHYL ETHYL KETONE (2-BUTANONE)	1.4E+03	ppbv		--	5.7E-04	--	--	5.7E-04
			Methyl Isobutyl Ketone	1.8E+02	ppbv		--	1.6E-04	--	--	1.6E-04
			TERT-BUTYL METHYL ETHER	1.1E+01	ppbv		--	9.0E-06	--	--	9.0E-06
			Methylene Chloride	1.3E+02	ppbv		--	7.9E-04	--	--	7.9E-04
			m,p-Xylene	5.7E+01	ppbv		--	1.7E-03	--	--	1.7E-03
			n-Butylbenzene	3.1E+01	ppbv		--	8.3E-04	--	--	8.3E-04
			n-Propylbenzene	1.5E+01	ppbv	Nervous system	--	3.7E-04	--	--	3.7E-04
			o-Xylene	2.4E+01	ppbv		--	7.2E-04	--	--	7.2E-04
			Styrene	2.0E+00	ppbv	Blood and liver	--	5.6E-06	--	--	5.6E-06
			Toluene	6.6E+01	ppbv	Liver and kidney	--	3.4E-05	--	--	3.4E-05
			Trichlorofluoromethane	3.5E+02	ppbv	Cellular	--	1.9E-03	--	--	1.9E-03
			Trichlorotrifluoroethane	2.7E+00	ppbv		--	4.7E-07	--	--	4.7E-07
			TOTAL				**--**	**9.8E-02**	**--**	**--**	**1.E-01**

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Table B6-5
Risk Characterization Summary - Non-Carcinogens
AOC H-12

Scenario Timeframe:	**Future**										
Receptor Population:	**Construction Worker**										
Receptor Age:	**Adult**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	AOC H-12 Soil On-site Direct Contact (0-15 ft bgs)	1,1,2-TRICHLOROETHANE	2.7E-05	mg/kg		2.2E-08	2.0E-07	3.0E-08	--	2.5E-07
			1,1-DICHLOROETHANE	2.7E-05	mg/kg	Kidney	8.8E-10	1.5E-08	1.2E-09	--	1.8E-08
			1,2,4-Trichlorobenzene	1.6E-04	mg/kg		5.0E-08	7.1E-07	7.0E-08	--	8.3E-07
			1,2-DICHLOROETHANE	2.5E-04	mg/kg		4.0E-08	1.1E-07	5.6E-08	--	2.1E-07
			1,4-DICHLOROBENZENE	3.6E-04	mg/kg		3.9E-08	2.4E-08	5.3E-08	--	1.2E-07
			Arsenic	4.9E+00	mg/kg	Vascular	5.3E-02	1.1E-01	2.2E-02	--	1.9E-01
			Benzene	6.3E-05	mg/kg	Blood	5.1E-08	5.3E-07	7.1E-08	--	6.5E-07
			BENZO(a)ANTHRACENE	4.0E-02	mg/kg		4.3E-06	2.6E-07	8.9E-06	--	1.3E-05
			BENZO(b)FLUORANTHENE	4.2E-02	mg/kg		4.5E-06	2.7E-07	9.4E-06	--	1.4E-05
			BENZO(k)FLUORANTHENE	4.7E-02	mg/kg		5.1E-06	3.1E-07	1.0E-05	--	1.6E-05
			BERYLLIUM	5.8E-01	mg/kg	Small intestine; Lungs	9.4E-04	2.0E-02	1.3E-04	--	2.1E-02
			bis(2-ETHYLHEXYL)PHTHALATE	3.2E-01	mg/kg	Liver	5.1E-05	3.1E-06	7.1E-05	--	1.3E-04
			Cadmium	8.5E-01	mg/kg	Significant proteinuria; Lung, trachea, bronchus cancer deaths	2.7E-03	2.9E-02	3.8E-05	--	3.2E-02
			Carbon Tetrachloride	7.6E-05	mg/kg	Liver	3.5E-07	6.3E-07	4.9E-07	--	1.5E-06
			Chloroform	7.2E-03	mg/kg	Liver	2.3E-06	6.2E-06	3.2E-06	--	1.2E-05
			CHROMIUM,TOTAL	3.0E+01	mg/kg		6.5E-05	3.9E-06	8.9E-06	--	7.7E-05
			CHRYSENE	2.1E-02	mg/kg		2.3E-06	1.9E-07	4.7E-06	--	7.1E-06
			COBALT	1.5E+01	mg/kg		2.4E-03	5.1E-01	3.3E-04	--	5.1E-01
			Ethylbenzene	1.1E-04	mg/kg	Liver and kidney	3.7E-09	1.4E-08	5.1E-09	--	2.3E-08
			Naphthalene	2.0E-02	mg/kg	Decreased body weight	3.2E-06	1.1E-04	6.7E-06	--	1.2E-04
			N-NITROSODIPHENYLAMINE	2.1E-02	mg/kg		3.4E-06	2.1E-07	4.7E-06	--	8.3E-06
			Tetrachloroethylene	6.2E-05	mg/kg		2.0E-08	4.8E-07	2.8E-08	--	5.2E-07
			TRICHLOROETHYLENE	1.0E-04	mg/kg		1.1E-06	3.6E-08	1.5E-06	--	2.7E-06
			1,1-DICHLOROETHENE	1.1E-05	mg/kg	Liver	7.1E-10	2.6E-08	9.8E-10	--	2.8E-08
			1,2,4-Trimethylbenzene	5.3E-04	mg/kg	Lungs	3.4E-08	3.1E-06	4.7E-08	--	3.2E-06
			1,3,5-Trimethylbenzene	2.7E-04	mg/kg	Lungs	1.7E-08	3.8E-06	2.4E-08	--	3.9E-06
			2-Methylnaphthalene	1.9E-03	mg/kg		1.5E-06	1.0E-05	3.1E-06	--	1.5E-05
			Acetone	1.2E+00	mg/kg	Kidney	4.2E-06	2.0E-05	5.8E-06	--	3.1E-05
			ANTHRACENE	3.9E-02	mg/kg		4.2E-07	6.2E-08	8.7E-07	--	1.4E-06
			BARIUM	5.7E+02	mg/kg	Kidney	9.2E-03	7.9E-01	1.3E-03	--	8.0E-01
			COPPER	2.7E+01	mg/kg	Gastro-intestinal system	2.2E-03	1.3E-04	3.0E-04	--	2.6E-03

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Table B6-5
Risk Characterization Summary - Non-Carcinogens
AOC H-12

(Cont…)			Dichlorodifluoromethane	2.0E-06	mg/kg	Liver	3.2E-11	6.5E-09	4.4E-11	--	6.5E-09
			DI-n-BUTYLPHTHALATE	6.5E-02	mg/kg		2.1E-06	1.3E-07	2.9E-06	--	5.1E-06
			DIETHYL PHTHALATE	8.1E-02	mg/kg		3.3E-07	2.0E-08	4.5E-07	--	8.0E-07
			DI-n-OCTYLPHTHALATE	5.5E-02	mg/kg		4.4E-06	2.7E-07	6.1E-06	--	1.1E-05
			Hexane	3.7E-05	mg/kg		1.1E-11	2.6E-08	1.5E-11	--	2.6E-08
			METHYL ETHYL KETONE (2-BUTANONE)	4.9E-01	mg/kg		2.6E-06	3.6E-06	3.6E-06	--	9.9E-06
			Methyl Isobutyl Ketone	3.7E-02	mg/kg		1.5E-06	3.4E-07	2.1E-06	--	3.9E-06
			TERT-BUTYL METHYL ETHER	4.8E-04	mg/kg		1.8E-09	2.3E-08	2.5E-09	--	2.8E-08
			m,p-Xylene	6.0E-04	mg/kg		9.7E-09	6.6E-07	1.3E-08	--	6.8E-07
			Mercury	1.2E+00	mg/kg		1.3E-02	2.8E-03	1.8E-03	--	1.8E-02
			Methylene Chloride	1.5E-03	mg/kg		7.9E-08	1.0E-06	1.1E-07	--	1.2E-06
		AOC H-12	n-Butylbenzene	4.7E-04	mg/kg		3.8E-08	2.1E-07	5.2E-08	--	3.0E-07
Soil	Soil	Soil On-site	n-Propylbenzene	1.6E-04	mg/kg	Nervous system	1.3E-08	7.1E-08	1.8E-08	--	1.0E-07
		Direct Contact	o-Xylene	3.4E-04	mg/kg		5.5E-09	3.8E-07	7.6E-09	--	3.9E-07
		(0-15 ft bgs)	PCB-1260 (AROCHLOR 1260)	2.2E-02	mg/kg		3.5E-03	2.1E-04	7.3E-03	--	1.1E-02
			PHENANTHRENE	4.4E-02	mg/kg		4.7E-06	2.9E-07	9.8E-06	--	1.5E-05
			PYRENE	4.7E-02	mg/kg	Kidney	5.1E-06	3.9E-07	1.0E-05	--	1.6E-05
			Selenium	2.9E+00	mg/kg	Clinical selenosis	1.9E-03	9.9E-05	2.6E-04	--	2.2E-03
			Styrene	2.6E-04	mg/kg	Blood and liver	4.1E-09	1.3E-08	5.7E-09	--	2.3E-08
			Thallium	7.4E+00	mg/kg		3.6E-01	2.2E-02	5.0E-02	--	4.3E-01
			Toluene	4.6E-04	mg/kg	Liver and kidney	1.9E-08	1.6E-08	2.6E-08	--	6.0E-08
			Trichlorofluoromethane	6.2E-04	mg/kg	Cellular	6.6E-09	4.8E-07	9.1E-09	--	5.0E-07
			Trichlorotrifluoroethane	2.0E-05	mg/kg		2.2E-12	2.9E-10	3.0E-12	--	3.0E-10
			VANADIUM	6.4E+01	mg/kg	Liver and kidney	2.1E-01	1.2E-02	2.8E-02	--	2.5E-01
			TOTAL				**6.5E-01**	**1.5E+00**	**1.1E-01**	--	**2.E+00**

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Table B6-6
Screening-Level Risk Characterization Summary - Indoor Air
AOC H-12

Scenario Timeframe:	**Future**								
Receptor Population:	**Indoor Residential/Indoor Occupational**								
Receptor Age:	**Adult**								
						Carcinogenic Risk		**Noncancer Hazard**	
Medium	Exposure Medium	Sample	Chemical of Concern	Concentration	Concentration units	Residential	Occupational	Residential	Occupational
Indoor Air	Indoor Air	AOC H-12 - Indoor Air 1	Chloroform	0.053	ppbv	2.7E-06	1.5E-06	8.7E-04	5.9E-04
			Toluene	1.7	ppbv	--	--	1.3E-03	8.8E-04
			Ethylbenzene	0.88	ppbv	4.0E-06	2.4E-06	3.9E-03	2.7E-03
			m,p-Xylene	3.6	ppbv	--	--	1.6E-01	1.1E-01
			o-xylene	0.93	ppbv	--	--	4.0E-02	2.8E-02
			TOTAL			**7.E-06**	**4.E-06**	**2.E-01**	**1.E-01**

Scenario Timeframe:	**Future**								
Receptor Population:	**Indoor Residential/Indoor Occupational**								
Receptor Age:	**Adult**								
						Carcinogenic Risk		**Noncancer Hazard**	
Medium	Exposure Medium	Sample	Chemical of Concern	Concentration	Concentration units	Residential	Occupational	Residential	Occupational
Indoor Air	Indoor Air	AOC H-12 - Indoor Air 2	Chloroform	0.059	ppbv	3.0E-06	1.6E-06	9.7E-04	6.6E-04
			Benzene	0.95	ppbv	9.5E-06	5.7E-06	1.1E-01	6.9E-02
			Toluene	5.8	ppbv			4.4E-03	3.0E-03
			Ethylbenzene	2.2	ppbv	1.0E-05	6.1E-06	9.7E-03	6.7E-03
			m,p-Xylene	8.5	ppbv			3.7E-01	2.6E-01
			o-xylene	2.8	ppbv			1.2E-01	8.5E-02
			TOTAL			**2.E-05**	**1.E-05**	**6.E-01**	**4.E-01**

Scenario Timeframe:	**Future**								
Receptor Population:	**Residential/Occupational**								
Receptor Age:	**Adult**								
						Carcinogenic Risk		**Noncancer Hazard**	
Medium	Exposure Medium	Sample	Chemical of Concern	Concentration	Concentration units	Residential	Occupational	Residential	Occupational
Ambient Air	Ambient Air	AOC H-12 - Ambient Air	Chloroform	0.077	ppbv	3.9E-06	2.1E-06	1.3E-03	8.6E-04
			Toluene	1.9	ppbv			1.4E-03	9.8E-04
			m,p-Xylene	0.83	ppbv			3.6E-02	2.5E-02
			TOTAL			**4.E-06**	**2.E-06**	**4.E-02**	**3.E-02**

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SECTION B7

AOC H-13

B7.1 Site Overview and Features

AOC H-13 is located in the northeastern corner of OU H and is part of the East McClellan District. The site is bound by Dudley Boulevard on the east and PRL L-001 on the north. Building 900 (AOC H-1) is located to the east of AOC H-13. The site was formerly an auto hobby shop (Building 837) in the 1960's and 1970's. Based on a review of aerial photographs, the area surrounding AOC H-13 was an undeveloped field until 1966. At that time, construction for an automobile hobby shop was underway. Disturbed soil from construction activities was evident in aerial photos until the automobile hobby shop was complete in 1968. In 1973, an aerial photograph shows a parking lot had been added to the hobby shop. Storage units or buildings were also present along the east side of the automobile hobby shop. In a 1976 aerial photograph, a dark stain is visible on the parking lot surface south of the automobile hobby shop. By 1978, the storage units on the east side of the hobby shop had been replaced by a rectangular building and the dark stain was still visible on the parking lot surface (Jacobs, 1998).

By 1982, the hobby shop had expanded to the south with the addition of a small storage unit or building. In a 1989 aerial photograph, the automobile hobby shop had been removed and the area had become the parking lot for Buildings 910 and 911 (Base Exchange and Commissary). This remains the current use (Jacobs, 1998).

The industrial waste line (IWL, site PRL L-001) runs from the south end of the gas station (Building 900) east of AOC H-13, to the northeast corner of AOC H-13, and then directly west through the former aircraft maintenance and engine test area (PRL S-040). AOC H-13 was not connected to the IWL. This section of the IWL is no longer used but has not been removed.

B7.2 Source of Contamination

AOC H-13 was reportedly an automobile hobby shop at which hydraulic lifts, waste oil tanks, fuel, oil, grease, and solvents may have been used at the site. The primary contaminants detected at the site are TPH-D and metals. Low levels of these contaminants were detected at the site near the location of a former surface stain.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Jacobs. 1998. *Operable Units E-H: Remedial Investigation Characterization Summaries*. Final. October.

  Text: Vol. 1, AOC H-13, pgs. 1-10
  Hits Table: Vol. 1, AOC H-13, Attachment 1, pg. 1
  All Data: Vol. 2, Appendix A, AOCH13, pgs. 8-29

- Earth Imaging Geologic Services (EIGS)/Dolver. 2004. *Geophysical Survey Findings for AOC H-13 Located at The Former McClellan AFB, McClellan, California*. April 8.
- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May.

B7.3 Sampling Strategy and Type of Contamination

No investigations were conducted prior to the RI. In September 1997, RI activities at AOC H-13 included drilling two soil borings, one inside the approximate area of each of the former surface stains. A third boring was placed near the IWL line (PRL L-001) but within AOC H-13. Soil gas and soil samples were collected and analyzed from each boring. Since AOC H-13 was reportedly an automobile hobby shop, hydraulic lifts, waste oil tanks, fuel, oil, grease, and solvents may have been used at the site. Samples were analyzed for SVOCs, metals, TPH, and PCBs in soil and VOCs in soil gas.

On April 5, 2004, ground-penetrating radar (GPR) and magnetic induction surveys were conducted across the entire site. The purpose of the investigation was to identify any underground objects associated with the former auto hobby shop. These could include underground objects such as lifts, pipes, oil/water separators, and USTs. Another objective was to locate the back-filled excavation for any USTs that may have been undocumented and pulled from the site without the required soil sampling. No subsurface objects or back-fills were identified by the survey (EIGS, 2004).

B7.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at AOC H-13. Metals and TPH-D were determined to be present at the site, but were not found to pose a risk to human health or the environment. SVOCs and PCBs were not detected in any sample. Figure B-7 identifies the site location and significant site features.

B7.4.1 VOCs

TCE was reported in both deep soil gas samples from boring PL01SB037 located at an adjacent site (the IWL, PRL L-001, near the northeast corner of AOC H-13) using Method M18MS. The detected concentrations were 1,200 ppbv and 550 J ppbv at 20.8 and 40.8 feet bgs, respectively. No VOCs were detected in soil gas samples collected at 20 feet bgs and deeper that were analyzed using M18MS from borings AH013SB001 and AH013SB002. No SSG samples were collected at the site.

Soil gas samples were also collected at 20 feet bgs from borings located along the IWL. Boring PL01SB036 is located approximately 150 feet southeast of AOC H-13, and boring PS40SB010 is located approximately 150 feet west of AOC H-13. TCE was detected in soil gas at 810 ppbv from boring PL01SB036, but was not detected in PS40SB010. It is likely that the TCE detected in PL01SB036 and PL013B037 (discussed in the previous paragraph) originated from the IWL rather than AOC H-13.

B7.4.2 TPH

TPH-D was reported in four samples collected at AOC H-13. The maximum concentration reported was 13 mg/kg in boring AH13SB002 at 1.25 feet bgs. The concentrations do not exceed screening levels for protection of surface water or groundwater. TPH-G was not detected in any sample.

B7.4.3 Metals

Metals were analyzed using method SW6010 from samples collected in boring AH13SB001 at 1.5, 5.5, and 10.75 feet bgs. Arsenic and cadmium were detected at concentrations exceeding combined background. The detected arsenic concentration exceeds screening levels for protection of surface water, groundwater, and human health; however, the cadmium concentrations did not exceed any screening levels. For arsenic and cadmium, the preferred analytical methods are from the SW7000-series and the background values have been derived using these methods. Method SW6010 has been known to produce unreliable results for arsenic and cadmium. Therefore, the slightly elevated arsenic concentration is not believed to represent contamination.

B7.5 Contamination Exposure and Migration

Contamination at this site does not pose a threat to groundwater and no direct exposure routes exist. Because of low contaminant concentrations, potential COCs were not selected.

B7.6 Current and Potential Future Site and Resource Uses

The current use of AOC H-13 remains as the parking lot for Building 910 and 911 (Base Exchange and Commissary). In the future, AOC H-13 will likely be used for commercial/ industrial or community support purposes.

B7.7 Human Health Risk Assessment

Based on this review, only arsenic exceeded the screening level for the protection of human health. However, as discussed in Section B7.4, the slightly elevated arsenic concentration is not believed to represent contamination. No contaminants were identified at AOC H-13 for the HHRA; therefore, a quantitative risk evaluation was not performed (Jacobs, 1998). Based on this review, the site is adequately characterized and is available for unrestricted use. However, the land use is likely to remain industrial due to the site location in the East McClellan District as well as the current land use as a parking lot for the Base Exchange and Commissary.

B7.8 Uncertainties

The sampling and analyses performed during the remedial investigation were sufficient and appropriate for the potential contaminants and release mechanisms at this site. There were no uncertainties identified for this site.

B7.9 Basis for No Action

AOC H-13 was recommended for No Further Investigation in the OUs E-H RICS (Jacobs, 1998). Significant levels of contamination were not detected, therefore additional sampling and analyses were not performed. Therefore, no action is required at this site to protect human health or welfare or the environment.

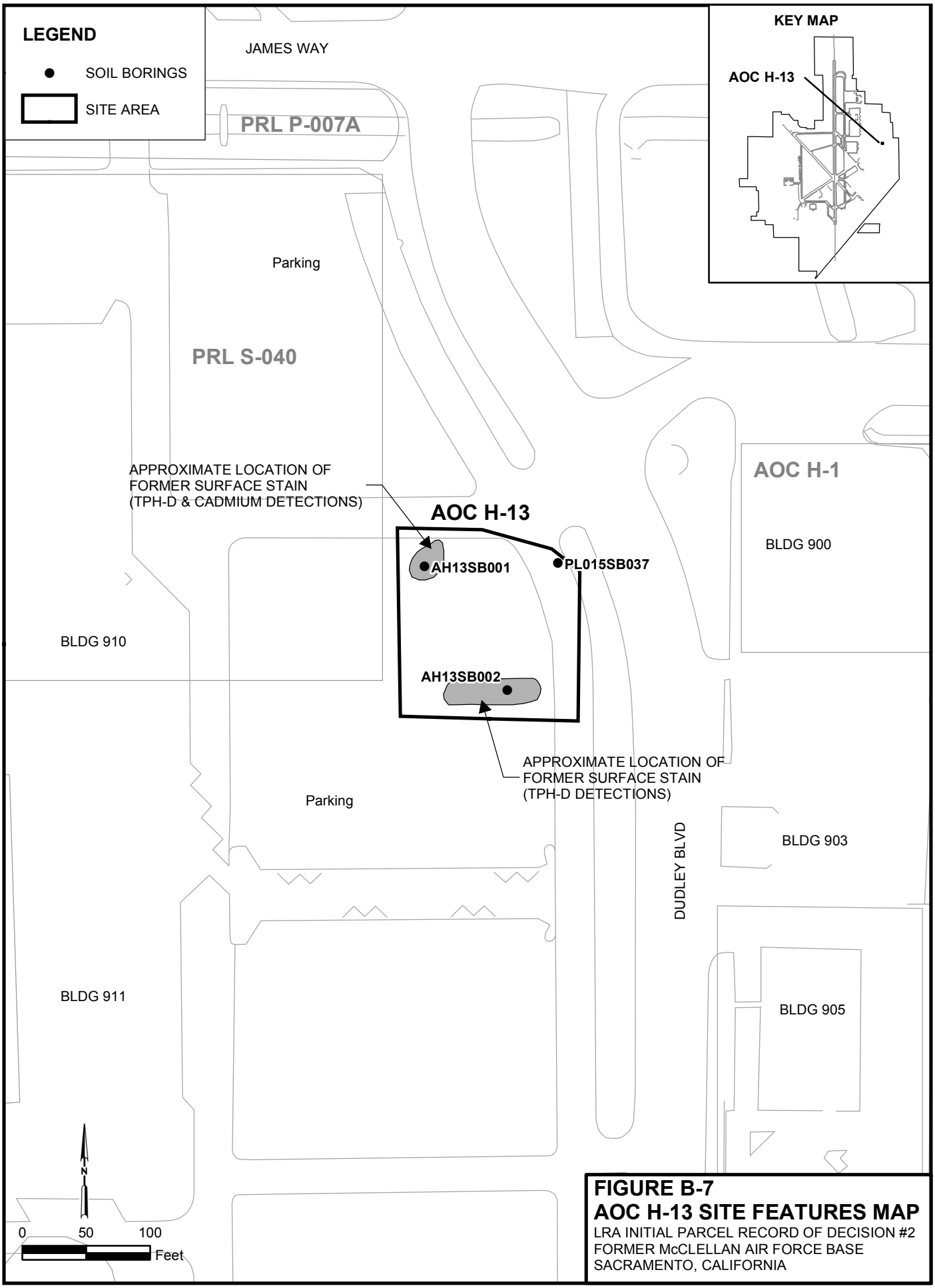

FIGURE B-7
AOC H-13 SITE FEATURES MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

SAC \\GLACIER\PROJ\MCCLELLAN\340972_TO400\MAPFILES\IP2_ROD\LRA_AOC_H-13.MXD LRA_AOC_H-13.PDF 5/9/2008 15:06:30

SECTION B8

AOC H-14

B8.1 Site Overview and Features

AOC H-14 is located in the northern portion of OU H and is part of the East McClellan District. The site is approximately 100 feet by 200 feet and consists of a landscaped area and an asphalt parking lot.

Based on review of aerial photographs, AOC H-14 was used for aircraft parking in the 1940s and 1950s. By 1964, the area was graded and undeveloped. In the 1970s, the area adjacent to AOC H-14 on the west was used as an unpaved parking lot for automobiles. Based on a May 1978 photograph, the area was identified as a dry impoundment by EPA. However, Radian personnel could not identify any berms or barriers in the area of AOC H-14 to verify the site as a dry impoundment. Parked aircraft were observed both within and around the site boundaries. The parking lot appears to be fully paved in a 1981 photograph. In 1986, the location of the potential dry impoundment was covered by an automobile parking lot (Jacobs, 1998).

B8.2 Source of Contamination

The primary contaminants detected at AOC H-14 are TPH-D and DEHP. Low levels of these contaminants were detected at the site; however, no impacts to human health, surface water, or groundwater are predicted. A quantitative HHRA was not conducted for this site, and AOC H-14 was recommended for NFI in the OU E-H RICS (Jacobs, 1998).

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Jacobs. 1998. *Operable Units E-H: Remedial Investigation Characterization Summaries*. Final. October.

  Text: Vol. 1, AOC H-14, pgs. 1-9
  Hits Table: Vol. 1, AOC H-14, Attachment 1, pg. 1
  All Data: Vol. 2, Appendix A, AOCH14, pgs. 8-23

- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May.

B8.3 Sampling Strategy and Type of Contamination

No investigations were conducted prior to the 1997 remedial investigation. RI activities at AOC H-14, completed in September 1997, included drilling one soil boring (AH14SB001) and collecting and analyzing soil gas and soil samples. Another soil boring (AH14SB001R) was drilled and sampled in October 1997 due to a missed holding time by the analytical laboratory. No soil gas samples were collected above 20 feet bgs because the site conceptual model and history of aircraft parking (not servicing) suggest that solvents were not used at

the site. Soil samples were analyzed for SVOCs (SW8270), TPH-D (SW8015D), and mercury (SW7471). Soil gas samples were analyzed for VOCs using method M18MS in the original samples (from boring AH14SB001) and method TO-14 in one duplicate sample (from boring AH14SB001R) (Jacobs 1998). No groundwater samples were collected.

One boring (AH14SB002) was drilled in October 2007 at AOC H-14. The boring was sampled at the request of the DTSC to assess the presence of SSG VOCs noted during previous RI activities. Two soil gas samples were collected, one at 6 feet bgs and one at 15 feet bgs. Both samples were analyzed by Method TO-15. The results from these samples and from the RI are summarized below. For additional information on the soil gas samples collected in October 2007, please see Attachment 1 in this appendix.

B8.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at AOC H-14. All detected contaminants are below the screening levels for protection of groundwater and surface water. Figure B-8 identifies the site location and significant site features.

B8.4.1 VOCs

VOCs were detected at low concentrations below 20 feet bgs. Only acetone, trichloroethene, and non-methane hydrocarbon as hexane were detected at 20 feet bgs by method TO-14. Maximum concentrations of trichloroethene (190 J ppbv) and acetone (17 J ppbv) were detected in boring AH14SB001R at 20.3 feet bgs. No VOCs were detected using Method M18MS.

In the two SSG samples collected from AH14SB002, toluene was the only VOC detected. It was detected at a concentration of 16 ppbv, less than screening levels, at 6 feet bgs. No VOCs were detected in the 15-foot sample.

B8.4.2 SVOCs

DEHP was detected at 0.08 J mg/kg in a sample collected from boring AH14SB001R at 0.5 foot bgs. DEHP concentrations were below all screening levels. DEHP is a common field and laboratory contaminant and is not considered a site contaminant (Jacobs, 1998).

B8.4.3 Metals

Mercury was not detected above background concentrations.

B8.4.4 TPH

Concentrations of TPH-D were reported at 15 mg/kg in a single sample collected at 0.5 foot bgs from boring AH14SB001R. The detection of TPH-D was below the screening level for the protection of surface and groundwater. TPH-G was not detected in any samples.

B8.5 Contamination Exposure and Migration

All detected contaminants are below the screening levels for protection of human health and the environment. No impact to groundwater or surface water is predicted.

B8.6 Current and Potential Future Site and Resource Uses

AOC H-14 is currently a parking lot and landscaped area. In the future, the land use is likely to remain industrial or be used for commercial or community support purposes.

B8.7 Human Health Risk Assessment

None of the constituents detected during the previous investigations exceeded current risk-based screening levels for unrestricted use. No contaminants were identified at AOC H-14 requiring an HHRA; therefore, a quantitative risk evaluation was not performed (Jacobs, 1998). Based on this review, AOC H-14 is available for unrestricted use; however, as part of the East McClellan District, the land use is likely to remain industrial.

B8.8 Uncertainties

The sampling and analyses performed during the remedial investigation were sufficient and appropriate for the potential contaminants and release mechanisms at this site. There were no uncertainties identified for this site.

B8.9 Basis for No Action

The site was recommended for No Further Investigation in the OU E-H RICS (Jacobs, 1998). All detected contaminant concentrations are below the screening levels for protection of groundwater and surface water. None of the constituents detected during previous investigations exceeded current risk-based screening levels for unrestricted or industrial use. Therefore, no action is required at this site to protect human health or welfare or the environment.

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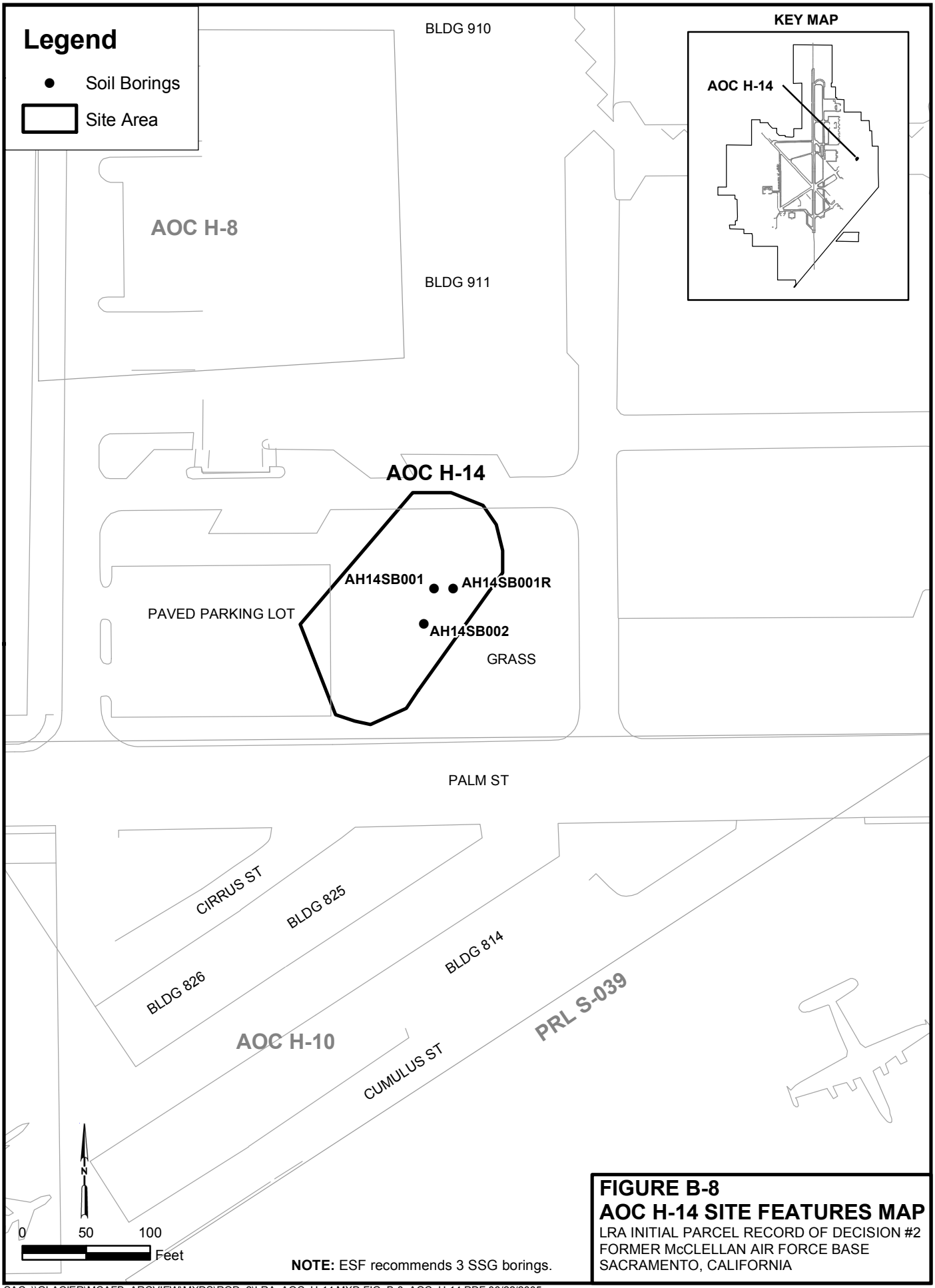


FIGURE B-8
AOC H-14 SITE FEATURES MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

SAC \\GLACIER\MCAFB_ARCVIEW\MXDS\ROD_2\LRA_AOC_H-14.MXD FIG_B-8_AOC_H-14.PDF 06/22/2005

Attachment B8
AOC H-14 Downhole Soil Gas Samples
Technical Memorandum

TECHNICAL MEMORANDUM

TO: **Ken Smarkel, Noblis, AFRPA SVE Remedial Project Manager**

FROM: **Paul Graff, URS McClellan SVE Project Manager**

DATE: **12 November 2007**

RE: **AOC H-14 Downhole Soil Gas Samples**

The purpose of this technical memorandum (tech memo) is to document the collection and analysis of two downhole shallow soil gas samples from boring AH14SB002 at McClellan Installation Restoration Program (IRP) site AOC H-14 during an investigation of adjacent site PRL S-039. The samples were collected at the request of the California Department of Toxic Substances (DTSC) to assess the presence of shallow soil gas VOCs noted during previous remedial investigation (RI) activities.

The attached map shows the location of the AOC H-14 borings and soil gas sample analytical results. Boring AH14SB002 was drilled and sampled on 22 October 2007, while URS was conducting drilling and sampling at nearby site PRL S-039. The boring was drilled to a depth of 15 feet below ground surface (bgs). Soil gas samples were collected by URS at approximate depths of 6 and 15 feet bgs. The samples were collected in 1-liter Summa canisters according to McClellan Standard Operating Procedure (SOP) McAFB-055 for downhole soil gas samples. The samples were analyzed for volatile organic compounds (VOCs), using modified EPA Method TO-15 by, Air Toxics Limited. The laboratory analytical report and URS chain of custody are attached.

Toluene at 16 parts per billion by volume (ppbv) was detected in the 6-foot sample. No other VOCs were detected in either of the samples.

Attachments
AOC H-14 Site Map
AH14SB002 Laboratory Report and Chain of Custody

ATTACHMENTS

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY
THE INSTRUCTIONS FOR FILLING OUT
THIS FORM ARE ON THE BACK

URS

2870 GATEWAY OAKS, SUITE 300
SACRAMENTO, CA 95833
PH (916) 679-2000
FAX (916) 679-2900

0710553

12851

TASK OR SUB TASK (one per form): MCCLN PS039 EXP-OPT

LABORATORY NAME AND ADDRESS: Air Toxics LTD, Rancho Cordova, CA

CONTRACT NAME: Downhole Oil Gas Attenuation Evaluation

CHARGE NUMBER: 18600194.48100

SAMPLE NUMBER	COLLECTION DATE	COLLECTION TIME	SAMPLER'S INITIALS	NUMBER OF UNITS	UNIT QUANTITY	MATRIX CODE	PRESERVATIVE	TYPE OF ANALYSIS (DS 10/23/07 Receipt Vacuum)	QC
01A AH45BD02GS01S	10/22/07	1310	JN	1	1L Canister	GS	None	TO15S 3.0"Hg	
02A AH45BD02GS02NS	10/22/07	1330	JN	1	1L Canister	GS	None	TO15S 2.5"Hg	

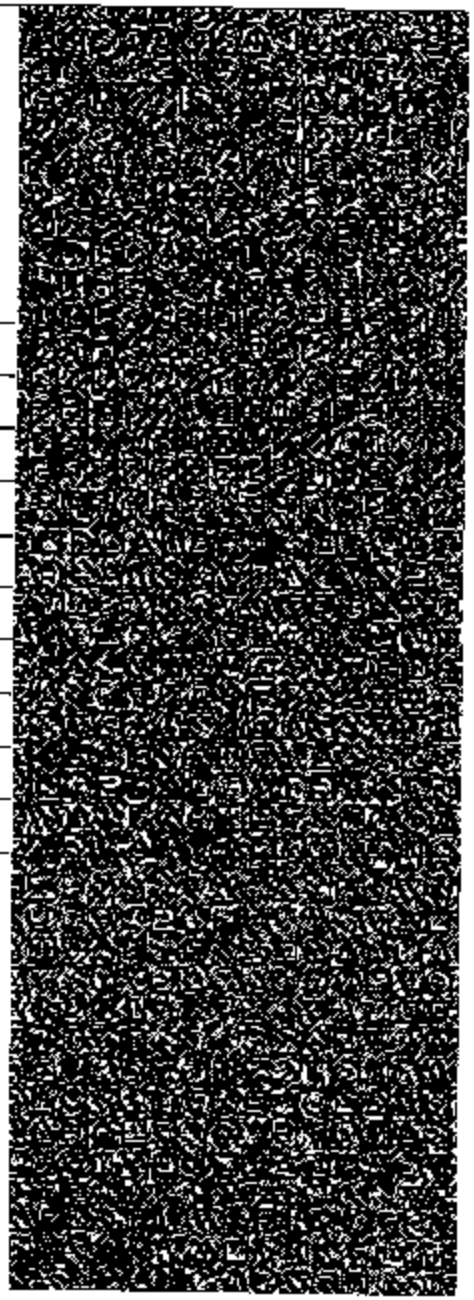
RELEASED BY	DATE	TIME	COMMENTS: * 48Hr Turnaround *
[signature]	10/23/07	11:45	

RECEIVED BY	DATE	TIME	RELINQUISHED BY	DATE	TIME
[signature]	10/23/07	11:45	* 48Hr Turnaround *	/ /	:
	/ /	:		/ /	:
	/ /	:	drop off	/ /	:
	/ /	:	CUSTODY SEAL INTACT? Y N NONE TEMP MA	/ /	:
	/ /	:		/ /	:

DISPOSAL CONFIRMED BY	DATE	TIME	CHAIN-OF-CUSTODY RETURNED BY	DATE	TIME
	/ /	:		/ /	:

WHITE - COORDINATOR - PINK - SAMPLE CONTROL - YELLOW - LABORATORY

DO NOT WRITE IN THIS AREA



[redacted]

5/01-1

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Air Toxics Ltd. Introduces the Electronic Report

Thank you for choosing Air Toxics Ltd. To better serve our customers, we are providing your report by e-mail. This document is provided in Portable Document Format which can be viewed with Acrobat Reader by Adobe.

This electronic report includes the following:

- Work order Summary;
- Laboratory Narrative;
- Results; and
- Chain of Custody (copy).

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(916) 985-1000 .FAX (916) 985-1020
Hours 8:00 A.M to 6:00 P.M. Pacific

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0710553

Work Order Summary

CLIENT:	Ms. Lynn Sandsor URS Corporation 2870 Gateway Oaks Drive Suite 300 Sacramento, CA 95833	**BILL TO:**	Mr. Rob Trojan URS Corporation 2870 Gateway Oaks Drive Suite 300 Sacramento, CA 95833
PHONE:	916-679-2237	**P.O. #**	SC06S3117
FAX:	916-679-2900	**PROJECT #**	18600194.48100 MCCLN PS039 EXP-OPT
DATE RECEIVED:	10/23/2007	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	10/25/2007		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.
01A	AH14SB002GS01NS	Modified TO-15S	3.0 "Hg
02A	AH14SB002GS02NS	Modified TO-15S	2.5 "Hg
03A	Lab Blank	Modified TO-15S	NA
04A	CCV	Modified TO-15S	NA
05A	LCS	Modified TO-15S	NA

CERTIFIED BY: Linda D. Fruman DATE: 10/25/07

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004
NY NELAP - 11291, UT NELAP - 9166389892
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/07, Expiration date: 06/30/08
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

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LABORATORY NARRATIVE
Modified TO-15S
URS Corporation
Workorder# 0710553

Two 1 Liter Summa Canister samples were received on October 23, 2007. The laboratory performed the analysis via Modified Method TO-15S using GC/MS in the full scan mode. The method involves direct injection of up to a 50 mL sample aliquot into a vapor management system. Following dehumidification the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
Daily CCV	+- 30% Difference	</= 30% Difference with two allowed out up to </=40%.; flag and narrate outliers
Sample collection media	Summa canister	ATL recommends use of summa canisters to insure data defensibility, but will report results from Tedlar bags at client request
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction no performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Summary of Detected Compounds
MODIFIED TO-15S GC/MS

Client Sample ID: AH14SB002GS01NS

Lab ID#: 0710553-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Toluene	11	16

Client Sample ID: AH14SB002GS02NS

Lab ID#: 0710553-02A

No Detections Were Found.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: AH14SB002GS01NS

Lab ID#: 0710553-01A

MODIFIED TO-15S GC/MS

File Name:	**c102321**	**Date of Collection: 10/22/07**	
Dil. Factor:	**2.24**	**Date of Analysis: 10/23/07 09:16 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Freon 12	11	Not Detected
Freon 113	11	Not Detected
Chloroform	11	Not Detected
1,1,1-Trichloroethane	11	Not Detected
Carbon Tetrachloride	11	Not Detected
Trichloroethene	11	Not Detected
Tetrachloroethene	11	Not Detected
1,1-Dichloroethene	11	Not Detected
trans-1,2-Dichloroethene	11	Not Detected
cis-1,2-Dichloroethene	11	Not Detected
Benzene	11	Not Detected
Toluene	11	16
Ethyl Benzene	11	Not Detected
m,p-Xylene	11	Not Detected
o-Xylene	11	Not Detected
Vinyl Chloride	11	Not Detected
1,1-Dichloroethane	11	Not Detected
Chlorobenzene	11	Not Detected
Methylene Chloride	11	Not Detected
Freon 11	11	Not Detected
Chloromethane	11	Not Detected
1,2-Dichloroethane	11	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: AH14SB002GS02NS

Lab ID#: 0710553-02A

MODIFIED TO-15S GC/MS

File Name:	**c102322**	**Date of Collection: 10/22/07**	
Dil. Factor:	**2.20**	**Date of Analysis: 10/23/07 09:46 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Freon 12	11	Not Detected
Freon 113	11	Not Detected
Chloroform	11	Not Detected
1,1,1-Trichloroethane	11	Not Detected
Carbon Tetrachloride	11	Not Detected
Trichloroethene	11	Not Detected
Tetrachloroethene	11	Not Detected
1,1-Dichloroethene	11	Not Detected
trans-1,2-Dichloroethene	11	Not Detected
cis-1,2-Dichloroethene	11	Not Detected
Benzene	11	Not Detected
Toluene	11	Not Detected
Ethyl Benzene	11	Not Detected
m,p-Xylene	11	Not Detected
o-Xylene	11	Not Detected
Vinyl Chloride	11	Not Detected
1,1-Dichloroethane	11	Not Detected
Chlorobenzene	11	Not Detected
Methylene Chloride	11	Not Detected
Freon 11	11	Not Detected
Chloromethane	11	Not Detected
1,2-Dichloroethane	11	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: Lab Blank

Lab ID#: 0710553-03A

MODIFIED TO-15S GC/MS

File Name:	**c102305**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/23/07 12:12 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Freon 12	5.0	Not Detected
Freon 113	5.0	Not Detected
Chloroform	5.0	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected
Carbon Tetrachloride	5.0	Not Detected
Trichloroethene	5.0	Not Detected
Tetrachloroethene	5.0	Not Detected
1,1-Dichloroethene	5.0	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected
Benzene	5.0	Not Detected
Toluene	5.0	Not Detected
Ethyl Benzene	5.0	Not Detected
m,p-Xylene	5.0	Not Detected
o-Xylene	5.0	Not Detected
Vinyl Chloride	5.0	Not Detected
1,1-Dichloroethane	5.0	Not Detected
Chlorobenzene	5.0	Not Detected
Methylene Chloride	5.0	Not Detected
Freon 11	5.0	Not Detected
Chloromethane	5.0	Not Detected
1,2-Dichloroethane	5.0	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: CCV

Lab ID#: 0710553-04A

MODIFIED TO-15S GC/MS

File Name:	**c102303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/23/07 10:55 AM**	

Compound	%Recovery
Freon 12	93
Freon 113	100
Chloroform	92
1,1,1-Trichloroethane	91
Carbon Tetrachloride	92
Trichloroethene	96
Tetrachloroethene	98
1,1-Dichloroethene	94
trans-1,2-Dichloroethene	89
cis-1,2-Dichloroethene	87
Benzene	98
Toluene	98
Ethyl Benzene	98
m,p-Xylene	101
o-Xylene	99
Vinyl Chloride	88
1,1-Dichloroethane	90
Chlorobenzene	97
Methylene Chloride	91
Freon 11	98
Chloromethane	90
1,2-Dichloroethane	98

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: LCS

Lab ID#: 0710553-05A

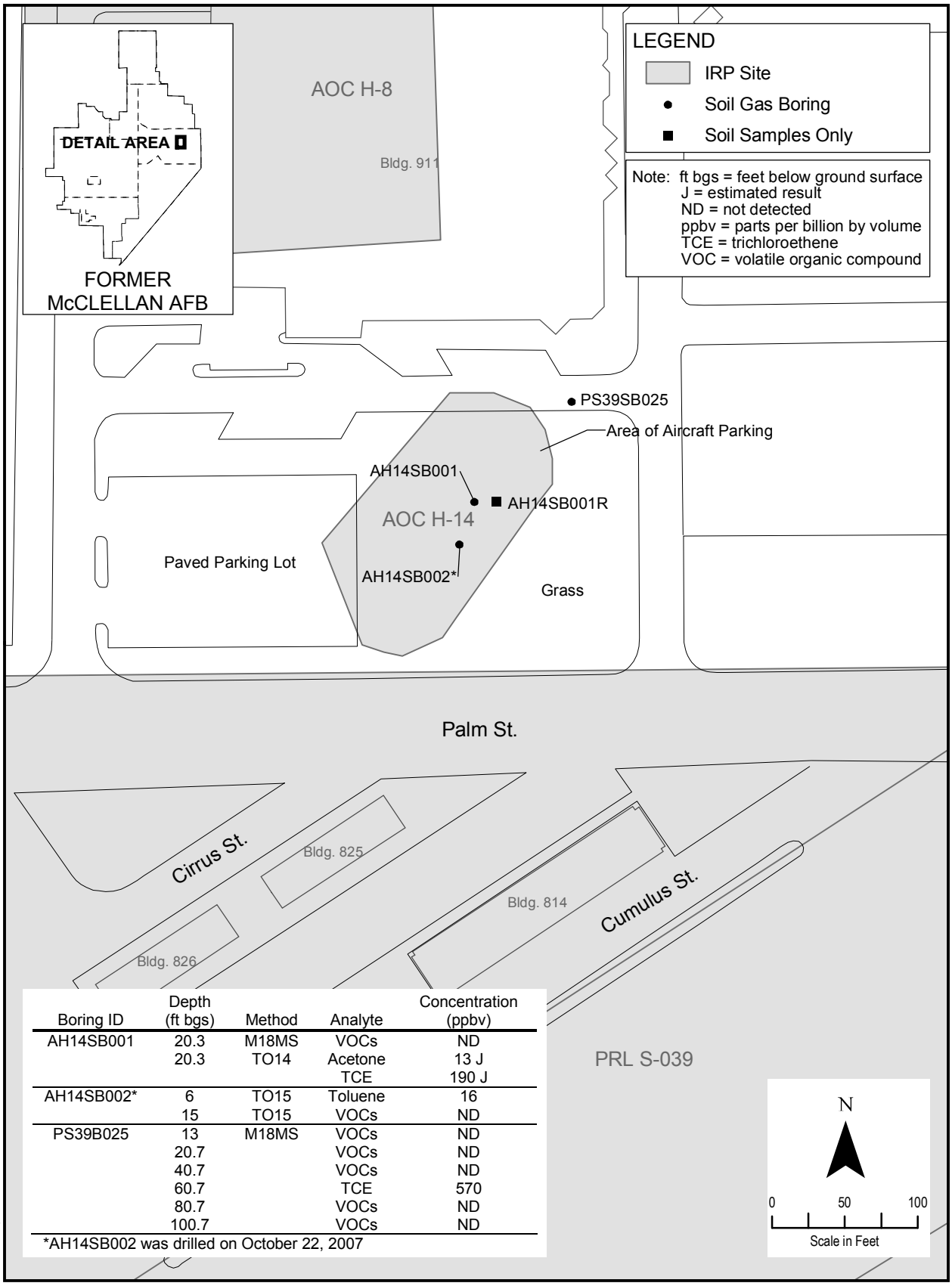
MODIFIED TO-15S GC/MS

File Name:	**c102304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/23/07 11:33 AM**	

Compound	%Recovery
Freon 12	92
Freon 113	102
Chloroform	92
1,1,1-Trichloroethane	93
Carbon Tetrachloride	92
Trichloroethene	96
Tetrachloroethene	98
1,1-Dichloroethene	97
trans-1,2-Dichloroethene	90
cis-1,2-Dichloroethene	88
Benzene	97
Toluene	97
Ethyl Benzene	95
m,p-Xylene	99
o-Xylene	97
Vinyl Chloride	89
1,1-Dichloroethane	92
Chlorobenzene	95
Methylene Chloride	94
Freon 11	97
Chloromethane	90
1,2-Dichloroethane	97

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130



Boring ID	Depth (ft bgs)	Method	Analyte	Concentration (ppbv)
AH14SB001	20.3	M18MS	VOCs	ND
	20.3	TO14	Acetone	13 J
			TCE	190 J
AH14SB002*	6	TO15	Toluene	16
	15	TO15	VOCs	ND
PS39B025	13	M18MS	VOCs	ND
	20.7		VOCs	ND
	40.7		VOCs	ND
	60.7		TCE	570
	80.7		VOCs	ND
	100.7		VOCs	ND

*AH14SB002 was drilled on October 22, 2007

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SECTION B9

CS S-049

B9.1 Site Overview and Features

CS S-049 is located in OU B in the southwest corner of IC 3 within the Core Airfield/ Industrial District. The site was used as a maintenance facility from the late 1970s until the early 1990s. Materials previously handled at the site include pesticides, herbicides, fuels, oils, and solvents. It is not known if the pesticides and herbicides were used for insect and pest control at the site or for entomology operations. In 1990, a maintenance shed was removed from the site. During the removal, visible surface staining and contamination in surface soils was observed prompting McClellan Environmental Management (EM) staff to conduct a site investigation. Thirty soil borings were placed within the area of visible contamination and a variety of contaminants were detected. These data cannot be located. The investigation resulted in the excavation of approximately 190 cubic yards of contaminated surface soils. The exact dimensions of the excavation cavity are unknown. The soils were contaminated with oil and grease, motor and diesel oil, pesticides, and VOCs. The excavated soil was disposed of in a Class I landfill. No confirmation samples were collected after the removal action. Currently, the site is inactive and covered by exposed soil and asphalt.

B9.2 Source of Contamination

The primary contaminants are TPH, pesticides, and VOCs. The site was used as a maintenance facility from the late 1970s until the early 1990s.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Radian. 1991. *Installation Restoration Program. Operable Unit B Remedial Investigation Sampling and Analysis Plan*. Final. November.
- Radian. 1995. *Operable Unit B Remedial Investigation Characterization Study*. Final. December.

  Text: Vol. 1, IC 3, pgs. 1-43
  All Data: Vol. 3, Appendix A, IC 3, pgs. 1-65
  HHRA Data: Vol. 8, Appendix C, IC 3
- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May.
- CH2M HILL. 2007. *Phase 1 LRA Initial Parcel* #2 *Pre-Decision Work Plan*. Final. August.
- CH2M HILL. 2007. Pre-Decision Sampling Results for CS S-049 (located in Appendix D of this document).

B9.3 Sampling Strategy and Type of Contamination

In 1990, a subsurface soil investigation was conducted at the CS S-049, which detected pesticides, oil and grease, TPH-MO, TPH-D, and VOCs. This contamination prompted an excavation of the material, which occurred that same year. Approximately 190 cubic yards of soil were excavated and disposed of in a Class I landfill (Radian, 1991). The soil investigation data prompting the excavation and detailed excavation information (i.e., depth and extent) cannot be located, and confirmation samples were not collected. Therefore, there is uncertainty regarding the magnitude and extent of residual TPH-D, TPH-mo, pesticides, and VOCs surrounding the excavation cavity.

During the RI of November 1991 through August 1992 conducted by Radian, eleven soil borings were advanced to investigate extent of contamination at CS S-049.

In 2007, additional soil samples were collected from CS S-049 during the pre-decision sampling effort. Additional data were needed to fully delineate the volume of soil to be excavated if excavation was necessary. Thirteen soil borings were drilled, and soil samples were analyzed for TPH-D, metals, pesticides/herbicides, SVOCs, and PAHs. The results from this sampling effort and from the RI are summarized below. Additional information regarding the pre-decision sampling effort can be found in Appendix D of this document.

B9.4 Location of Contamination

The following sections describe the contamination at CS S-049. Metals, SVOCs, TPH-D, and VOCs were determined to be present at the site. Figure B-9 identifies the site location and significant site features.

B9.4.1 Metals

Several samples were collected at various depths from each of the eleven RI borings. Two samples from each boring (one from approximately 1 to 3 feet bgs and one from 7 to 16 feet bgs) were analyzed for metals using method SW6010 (arsenic and mercury were analyzed using method SW7060 and SW7470, respectively). Concentrations of beryllium, cadmium, calcium, nickel, selenium, silver, sodium, and vanadium exceeded the "combined" background levels. Except for the cadmium and vanadium, all metals concentrations were below all screening levels. Cadmium was analyzed using Method SW6010, which is known to produce unreliable data for cadmium. No statistical analysis of the data was performed. There is no source of vanadium at the site. Neither cadmium or vanadium are considered significant contamination.

Three metals (lead, arsenic, and copper) were detected at concentrations exceeding screening levels in surface samples collected in 2007 during the pre-decision sampling effort. Lead, at a concentration of 120 mg/kg, and arsenic, at a maximum concentration of 5.6 mg/kg, were detected in surface samples; however, these concentrations are less than the background concentration for surface soils of 137 mg/kg and 5.8 mg/kg, respectively. Copper was detected at 240 mg/kg in a surface sample from CS49SB004, at a concentration exceeding the screening level for the protection of surface water. In deeper soil samples, vanadium was the only metal detected at a concentration exceeding a screening level. It was

detected at 3 feet bgs from CS49SB003 at a concentration greater than the unrestricted use screening level.

B9.4.2 SVOCs

Samples collected from RI boring IC03B008 at approximately 6 and 12 feet bgs were analyzed for SVOCs. A single detection of bis(2-ethylhexyl)phthalate (DEHP) at 6.04 mg/kg was detected at approximately 12 feet, but did not exceed any of the screening levels. DEHP was nondetect at approximately 3 feet, and in all other RI borings.

Benzo(a)pyrene was detected above the unrestricted use screening level at a concentration of 0.035 mg/kg in the field duplicate sample at 0.5 foot bgs from CS49SB002. This sample was analyzed by Method SW8270C; however, benzo(a)pyrene was not detected in the corresponding native sample or in the sample analyzed by Method SW8310 from the same depth interval. Dibenzo(a,h)anthracene was detected above the unrestricted use screening level in samples collected at 0.5 feet bgs from CS49SB002 and CS49SB010. In the sample collected from CS49SB002, dibenzo(a,h)anthracene exceeds the screening level in the field duplicate but not in the corresponding native sample. Other PAHs were detected, but all concentrations were less than screening levels.

DDE, DDT, and dieldrin were detected in four surface soil samples at concentrations exceeding screening levels for the protection of surface water. However, the pesticides were generally only detected above screening levels in either the normal sample or the corresponding field duplicate but not both. These samples were collected from CS49SB001, SC49SB002, CS49SB011, and CS49SB012, drilled and sampled during the pre-decision sampling effort. More details can be found in Appendix D.

B9.4.3 TPH

Samples collected from boring IC03B008 at approximately 12 and 20 feet bgs were analyzed for TPH-D. A single detection of 400 mg/kg was detected at approximately 12 feet in 1991. TPH-D was not detected at approximately 20 feet, and in all other RI borings, with the exception of 16 mg/kg detected at 2.1 feet in boring IC03B001. This single detection of TPH-D exceeds the screening level for protection of groundwater.

TPH-D was not detected at concentrations greater than screening levels in any of the soil samples collected during the pre-decision sampling effort. The maximum detected concentration was 63 mg/kg in a sample collected at 0.5 feet bgs from CS49SB006.

B9.4.4 VOCs

Soil gas samples were also collected at approximately 20 feet bgs from the 11 RI borings and analyzed for VOCs. TCE, PCE, chloroform, and vinyl chloride concentrations were above screening levels for unrestricted use for the 0-to-15-foot-bgs interval (Figure B-9). No further investigation into the SSG contamination was recommended at the time.

B9.5 Contamination Exposure and Migration

Known contamination at the site does not present a threat to human health and surface water. A review of the analytical data indicates that TPH-D slightly exceeds the screening level (100 mg/kg) for protection of groundwater in one sample, therefore adverse impacts

to groundwater are possible but not likely. No other contaminant concentrations reported at the site exceeded screening levels for protection of groundwater with the exception of arsenic in surface soils. However, the arsenic concentrations in the surface samples were less than surface soil background concentrations.

B9.6 Current and Potential Future Site and Resource Uses

The site has been redeveloped as a parking lot supporting ongoing industrial use of Building 690 to the west. In the future, CS S-049 will likely continue to be used for commercial/industrial purposes.

B9.7 Human Health Risk Assessment

The baseline HHRA estimates what risks the site poses if no action were taken. This section of the ROD summarizes the results of the baseline risk assessment for CS S-049. A human health risk assessment was conducted at IC 3 using data collected from six sites (SA 003, CS S-049, PRL L-005E, SA 010, SA 017, and SA 019) during the RI (Radian, 1995). However, no individual risk assessment was presented for this site during the RI. This risk assessment for CS S-049 uses the same risk assessment methodology as described in the OU A RICS Addendum (Jacobs, 2002) for all exposure pathways and includes data collected during the original RI and additional data collected in 2007.

B9.7.1 Risk Characterization

The potential cancer risks for CS S-049 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 5×10^{-6}
- Future adult resident (0-to-10-foot-bgs depth interval): 4×10^{-5}
- Future adult resident (0-to-2-foot-bgs depth interval excluding produce pathway): 1×10^{-6}
- Future adult resident (0-to-10-foot-bgs depth interval excluding produce pathway): 9×10^{-6}
- Outdoor occupational worker: 5×10^{-7}
- Future construction worker: 5×10^{-6}

The main contributors to the cumulative potential cancer risk for the residential scenario for soil 0 to 2 feet bgs are exposure to benzo(a)pyrene and dieldrin through the homegrown produce pathway. The main contributor to the cumulative potential cancer risk for the residential scenario for soil 0 to 10 feet bgs are exposure to arsenic through the homegrown produce pathway. The main contributor to the potential cancer risk for the outdoor occupational scenario is exposure to benzo(a)pyrene through the dermal pathway. The main contributor to the potential cancer risks for the construction worker scenario is chromium through the inhalation pathway.

The potential non-cancer risks for CS S-049 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 2
- Future adult resident (0-to-10-foot-bgs depth interval): 2
- Future adult resident (0-to-2-foot- and 0-to-10-foot-bgs depth intervals excluding produce pathway): < 1

- Future child resident (0-to-2-foot-bgs depth interval): 6
- Future child resident (0-to-10-foot-bgs depth interval): 6
- Future child resident (0-to-2-foot- and 0-to-10-foot-bgs depth intervals excluding produce pathway): 1
- Outdoor occupational worker: < 1
- Future construction worker: < 1

The main contributors to the hazard indices for the residential scenarios are MCPA, MCPP and vanadium through the homegrown produce pathway. Table B9-5 presents the non-cancer hazard indices and the various exposure scenarios and exposure routes at CS S-049.

B9.8 Uncertainties

The sampling and analyses performed during the previous investigations were sufficient and appropriate for the potential contaminants and release mechanisms to soil at this site. There were no uncertainties identified in the characterization of soils at this site. Definitive SSG samples have not been collected.

There are several uncertainties associated with the HHRA. Please see Attachment B9 for more details.

B9.9 Basis for Action

A remedy has been selected in this ROD to address VOCs likely present in SSG.

Based on the results from the RI and the pre-decision sampling effort, sporadic surface contamination and a limited amount of TPH-D are present at CS S-049. Concentrations of contaminants exceed the screening levels for the protection of surface water and human health for unrestricted use at isolated locations. Only arsenic concentrations exceed the screening levels for industrial use; however, the arsenic concentrations were less than the surface soil background concentration.

The updated HHRA indicates that risks are within an acceptable range for industrial use. Based on these results and because the site will be used for industrial use only, institutional controls, including a prohibition of residential use and a deed covenant, will be implemented to eliminate or limit exposure to contaminants. As shown on Figure B-9, the boundary for the prohibition against residential use encompasses an area that includes all sampling locations with detected concentrations that exceed the non-VOC institutional control compliance levels for unrestricted use presented in Section 2.5 (see Table 2-3). The boundary for the deed covenant addressing potential SSG contamination encompasses the site (and adjacent sites SA 010 to the north and SA 019 to the east) and a sufficient buffer surrounding the site to include all site-related locations with detected VOC concentrations that exceed the institutional control compliance levels provided in Section 2.5 (see Table 2-2) for unrestricted use.

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Select Shallow Soil Gas and TPH Contaminant Concentrations

Location	Depth (ft bgs)	1,1-DCE (ppbv)	1,1,1-Trichlorethane (ppbv)	cis-1,2-DCE (ppbv)	Chloroform (ppbv)	PCE (ppbv)	TCE (ppbv)	Vinyl Chloride (ppbv)	TPH-D (mg/Kg)
IC03B001	20	14	11	29	21	290	340	ND	16 (2.1 ft bgs)[B]
IC03B002	21	ND	ND	ND	ND	210[A]	220[A]	ND	-[B]
IC03B003	21	ND	ND	ND	ND	60	140	550	-[B]
IC03B004	21	ND	ND	ND	ND	22	180	ND	-[B]
IC03B005	21	ND	ND	10	ND	38	240	ND	-[B]
IC03B006	21	ND	ND	ND	ND	17	160	ND	-[B]
IC03B007	21	ND	ND	ND	ND	ND	150	ND	-[B]
IC03B008	21	ND	ND	23	ND	14	330	ND	**400** (12 ft bgs)[B]
IC03B009	21	ND	ND	10	ND	15	130	ND	-[B]
IC03B010	21	ND	ND	37	15	90	220	ND	-[B]
IC03B032	22	ND	ND	47	30	280	460	ND	-[B]

Note: Unless noted, VOCs were detected using Method FECD or FPID.
[A] Method TO14
[B] TPH-D samples were collected from each boring at three depths: approximately 2-5, 7-9, 16-25 ft bgs, only detections are shown.
Bold text - exceeds unrestricted use screening levels

Pre-Decision Sample Results

Boring	Analytical Method	Depth (feet bgs)	Contaminant	Concentration (mg/kg)	Exceeds SL for the protection of surface water	Exceeds SL for unrestricted use
CS49SB001	SW8081	0.5	4,4'-DDE	0.034	Yes	
			4,4'-DDT	0.13	Yes	
CS49SB002	SW8081	0.5	4,4'-DDT	0.028	Yes	
			Dieldrin	0.0092	Yes	Yes
	SW8270C		Benzo (a) pyrene	0.035J (FD)		Yes
	SW8310		Dibenzo (a,h) anthracene	0.029J (FD)		Yes
CS49SB003	SW6010B	3	Vanadium	76		Yes
CS49SB004	SW6020	0.5	Copper	240	Yes	
CS49SB010	SW8310	0.5	Dibenzo (a,h) anthracene	0.027J		Yes
CS49SB011	SW8081	0.5	4,4'-DDE	0.034J	Yes	
CS49SB012	SW8081	0.5	Dieldrin	0.012	Yes	Yes

Note:
(FD) = field duplicate sample
SL = screening level

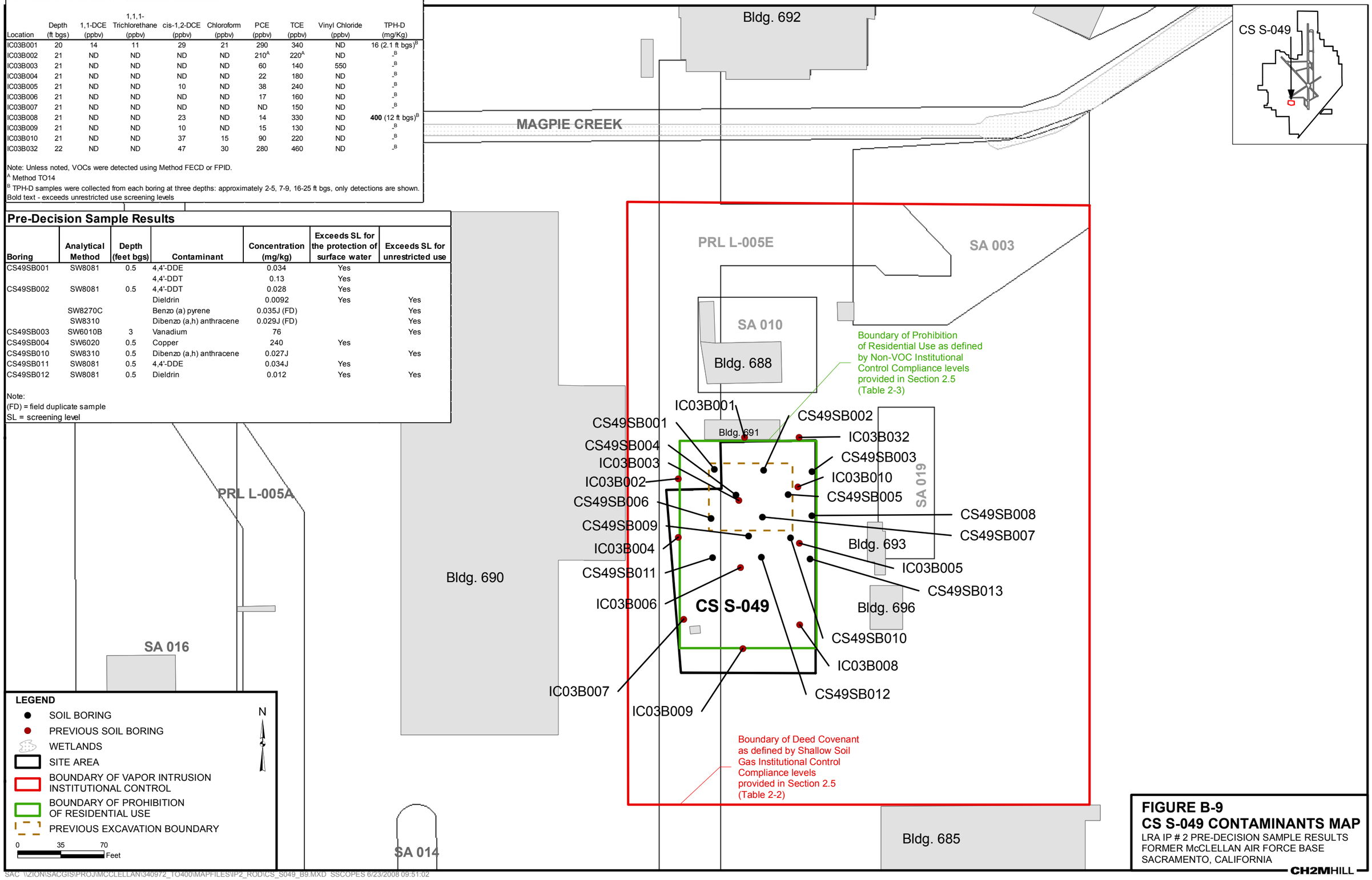

FIGURE B-9
CS S-049 CONTAMINANTS MAP
LRA IP # 2 PRE-DECISION SAMPLE RESULTS
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

CH2MHILL

SAC \\ZION\SACGIS\PROJ\MCCLELLAN\340972_TO400\MAPFILES\IP2_ROD\CS_S049_B9.MXD SSCOPES 6/23/2008 09:51:02

Attachment B9
CS S-049 Human Health Risk Assessment

ATTACHMENT B9

CS S-049 Human Health Risk Assessment

The baseline human health risk assessment estimates what risks the site poses if no action were taken. This section of the ROD summarizes the results of the baseline risk assessment for CS S-049. A human health risk assessment was conducted at IC 3 using data collected from six sites (SA 003, CS S-049, PRL L-005E, SA 010, SA 017, and SA 019) during the RI (Radian, 1995). However, no individual risk assessment was presented for this site during the RI. This risk assessment for CS S-049 uses the same risk assessment methodology as described in the OU A RICS Addendum (Jacobs, 2002) for all exposure pathways and includes data collected during the original RI and additional data collected in 2007.

Identification of Chemicals of Concern

Potential contaminants of concern (COCs) for CS S-049 include metals, TPH, pesticides, and SVOCs. Table B9-1 presents the soil data summary for the COCs (tables are located at the end of this attachment).

Table B9-1 includes the range of potential COC concentrations, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the exposure point concentrations (EPCs), and how the EPCs were derived for the media and exposure area of CS S-049. In general, the lower value of the maximum concentration or the upper 95th percent confidence limit on the mean was used as the EPC for potential COCs detected in more than one sample. In addition, Table B9-1 includes a comparison to site-specific background concentrations for metals. Metals data were compared to depth-specific and lithology-specific background values. A means comparison to background values was also conducted using the Wilcoxon rank sum test to determine if concentrations are significantly different than background. If the maximum detected concentration for metals exceeded the site-specific background concentration and the means comparison showed that concentrations were significantly different than background, the metal was retained as a COC.

Exposure Assessment

A conceptual model was developed that describes the potential exposure pathways associated with soil at CS S-049 (see Figure 2-3 in Section 2.4 of the ROD). Although CS S-049 will likely be used for commercial/industrial purposes in the future; several exposure scenarios were evaluated in the human health risk assessment to provide information for future risk-management decisions.

The following exposure scenarios were quantitatively evaluated in the human health risk assessment:

- Exposure of hypothetical future residents (adults and children) to soil (0 to 2 feet bgs)
- Exposure of outdoor occupational workers (0 to 2 feet bgs)
- Exposure of construction workers to soil (0 to 15 feet bgs)

The exposure routes that were considered in the risk assessment for residents and workers potentially exposed to soil include incidental soil ingestion, inhalation of resuspended particulates , and dermal contact with soil. For the residential scenarios, the ingestion of homegrown produce was also included.

Toxicity Assessment

The toxicity data that were used in the human health risk assessment are summarized on Tables B9-2 and B9-3. Health effects are divided into two categories: cancer and non-cancer effects.

Table B9-2 presents the slope factors used to estimate potential excess lifetime cancer risks associated with exposure to potential COCs in soil at CS S-049. As shown on Table B9-2, the oral slope factor was used to estimate potential risks associated with dermal exposure.

Table B9-3 presents the reference doses (RfDs) used to evaluate the potential for non-cancer health effects. The oral RfDs were used to estimate potential health effects associated with dermal exposure. In addition, when inhalation reference concentrations are not available for some of the COCs, the oral RfDs were used to evaluate potential health effects from the inhalation exposure route.

The hierarchy of sources for toxicity values follows EPA and Air Force guidance (EPA, 2003 and USAF, 2006) and is listed below in order of preference:

1. EPA Integrated Risk Information System (IRIS) – online database (EPA, 2007)
2. EPA's Provisional Peer Reviewed Toxicity Values (as cited in the 2004 EPA Region 9 Preliminary Remediation Goal [PRG] table [EPA, 2004])
3. California Environmental Protection Agency (Cal-EPA) cancer potency factors and reference exposure levels (REL) - online database (Cal-EPA, 2007)
4. Other EPA sources (i.e., Health Effects Assessment Summary Table [HEAST], National Center for Environmental Assessment [NCEA] provisional toxicity values, and route-extrapolated toxicity values as cited in the 2004 EPA Region 9 PRG table [EPA, 2004]).

Risk Characterization

The toxicity values described above were used in the human health risk assessment along with the exposure information to estimate the potential risks from contacting potential COCs in soil. For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a results of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{SF} \qquad (2)$$

Where:

Risk = a unitless probability (e.g., 1×10^{-6}) of an individual's developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(\text{mg/kg-day})^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in a million chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with an RfD derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of the receptor average daily exposure to the route-specific reference dose is called a hazard quotient (HQ). An HQ less than one indicates that the receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index is generated by adding the HQs over the exposure routes. A hazard index less than one indicates that, based on the sum of all HQs from different exposure routes, toxic noncarcinogenic effects are unlikely. A hazard index greater than one indicates that site-related exposure may present a risk to human health.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD} \qquad (2)$$

Where:

CDI = chronic daily intake (milligrams per kilogram per day [mg/kg-day])
RfD = reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term.)

Table B9-4 presents the potential cancer risk estimates for the various exposure scenarios and exposure routes at CS S-049. These risk estimates are based on reasonable maximum exposure and were developed taking into account various conservative assumptions about the frequency and duration of receptors exposure to soil and the toxicity of the potential COCs.

Residential and occupational exposure scenarios were evaluated for CS S-049. The risk results for these scenarios are summarized below and presented in the risk summary tables at the end of this section.

The potential cancer risks for CS S-049 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 5×10^{-6}
- Future adult resident (0-to-10-foot-bgs depth interval): 4×10^{-5}
- Future adult resident (0-to-2-foot-bgs depth interval excluding produce pathway): 1×10^{-6}
- Future adult resident (0-to-10-foot-bgs depth interval excluding produce pathway): 9×10^{-6}
- Outdoor occupational worker: 5×10^{-7}
- Future construction worker: 5×10^{-6}

The main contributors to the cumulative potential cancer risk for the residential scenario for soil 0 to 2 feet bgs are exposure to benzo(a)pyrene and dieldrin through the homegrown produce pathway. The main contributor to the cumulative potential cancer risk for the residential scenario for soil 0 to 10 feet bgs are exposure to arsenic through the homegrown produce pathway. The main contributor to the potential cancer risk for the outdoor occupational scenario is exposure to benzo(a)pyrene through the dermal pathway. The main contributor to the potential cancer risks for the construction worker scenario is chromium through the inhalation pathway.

The potential non-cancer risks for CS S-049 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 2
- Future adult resident (0-to-10-foot bgs depth interval): 2
- Future adult resident (0-to-2-foot- and 0-to-10-foot-bgs depth intervals excluding produce pathway): < 1
- Future child resident (0-to-2-foot-bgs depth interval): 6
- Future child resident (0-to-10-foot-bgs depth interval): 6
- Future child resident (0-to-2-foot- and 0-to-10-foot-bgs depth intervals excluding produce pathway): 1
- Outdoor occupational worker: < 1
- Future construction worker: < 1

The main contributors to the hazard indices for the residential scenarios are MCPA, MCPP and vanadium through the homegrown produce pathway. Table B9-5 presents the non-cancer hazard indices and the various exposure scenarios and exposure routes at CS S-049.

Lead was a COC for the 0-to-10-foot-bgs and 0-to-15-foot-bgs soil depth intervals. The maximum detected concentration of lead in both of these depth intervals (120 mg/kg) does not exceed the residential screening level.

Uncertainties

There are uncertainties associated with the risk estimates for CS S-049. The main uncertainty is that the current reuse plans for this site are indefinite, but do not include residential or other "sensitive" use scenarios (day-cares, schools, hospitals, etc.). Hence, the use of the residential scenario for the site should be considered hypothetical at this time.

There are no SSG for CS S-049 and therefore, there are uncertainties associated with the cumulative risk and hazard estimates. The soil gas data collected at approximately 20 feet bgs indicate that a potential source of VOCs may be present at this site, but the extent of VOCs is not defined.

For several compounds, Cal-EPA presents more conservative toxicity values than the EPA values used in the risk calculations presented in Tables B9-4 and B9-5. The following chemicals have more conservative Cal-EPA cancer slope factors and non cancer reference doses:

- Arsenic – Oral Slope Factor: 9.5 $(mg/kg\text{-}day)^{-1}$
- Beryllium – Inhalation Reference Dose: 2.0E-06 (mg/kg-day)
- Benzo(a)pyrene – Oral Slope Factor: 12 $(mg/kg\text{-}day)^{-1}$
- Cadmium – Inhalation Slope Factor: 15 $(mg/kg\text{-}day)^{-1}$
- Chlordane (gamma) – Oral Slope Factor: 1.3 $(mg/kg\text{-}day)^{-1}$; Inhalation Slope Factor: 1.2 $(mg/kg\text{-}day)^{-1}$
- p,p'-DDT –Inhalation Slope Factor: 0.34 $(mg/kg\text{-}day)^{-1}$

Use of these toxicity values would yield more conservative estimates for cancer risks and hazard indices than are presented in Tables B9-4 and B9-5. For CS S-049, the differences in reference doses have no significant impact on the hazard index results. For the cancer risk estimates, the results are greater using the Cal-EPA slope factors primarily due to the differences in slope factors between Cal-EPA and EPA for arsenic and benzo(a)pyrene. The cancer risk estimates using the more conservative Cal-EPA slope factors are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 6×10^{-6}
- Future adult resident (0-to-10-foot-bgs depth interval): 2×10^{-4}
- Outdoor occupational worker: 6×10^{-7}
- Future construction worker: 6×10^{-6}

The homegrown produce pathway is the main contributor to the risk and HI for the subsurface soil residential scenarios. There is considerable uncertainty associated with the modeling of this pathway and exposure is most likely overestimated.

Several metals were eliminated as COCs based on the background comparison. There is uncertainty associated with the cumulative risk and hazard estimates because of the elimination of metals based on the background comparison. Therefore, estimates of potential cancer risks and non cancer hazards associated with background levels are discussed below. The metals eliminated based on the background comparison are as follows:

- Soil 0-to-2-foot-bgs depth interval: antimony, arsenic, barium, cobalt, iron, lead, manganese, silver, thallium, and zinc.
- Soil 0-to-10-foot-bgs depth interval: aluminum, antimony, barium, cobalt, copper, iron, manganese, molybdenum, silver, thallium, and zinc.
- Soil 0-to-15-foot-bgs depth interval: aluminum, antimony, barium, cobalt, copper, iron, manganese, molybdenum, silver, thallium, and zinc.

For the 0-to-2-foot-bgs depth interval, detected concentrations of antimony, arsenic, barium, cobalt, iron, lead, manganese, thallium, and zinc did not exceed the site-specific background levels. Therefore, these metals were eliminated as COCs. For silver in the 0-to-2-foot-bgs depth interval, there were exceedances of the site-specific background concentration by

detected concentrations; however, the means comparison showed that the CS S-049 concentrations were not significantly different than background. Therefore, silver was also eliminated as a COC. Of these metals eliminated as COCs, only the EPCs for arsenic and iron exceeded residential screening levels indicating that the potential cancer risk for arsenic exceeds 1×10^{-6} and the hazard quotient for iron is greater than 1. For arsenic, the potential cancer risk associated with the EPC for CS S-049 is 4×10^{-5}. The hazard quotient for iron using the EPC is 2. These risk and hazard estimates were calculated using the residential screening levels that include the homegrown produce pathway.

For the 0-to-10-foot-bgs depth interval, detected concentrations of antimony, barium, cobalt, iron, manganese, and molybdenum did not exceed the site-specific background levels. Therefore, these metals were eliminated as COCs. For aluminum, copper, silver, thallium, and zinc, there were exceedances of the site-specific background concentrations by detected concentrations; however, the means comparison showed that the CS S-049 concentrations were not significantly different than background. Therefore, these metals were also eliminated as COCs. Of these metals eliminated as COCs, only the EPC for iron exceeded a residential screening level indicating that the hazard quotient exceeds 1. For iron, the hazard quotient associated with the EPC for CS S-049 is 2. This hazard estimate was calculated using the residential screening level that includes the homegrown produce pathway.

For the 0-to-15-foot-bgs depth interval, detected concentrations of antimony, barium, cobalt, iron, manganese, and molybdenum did not exceed the site-specific background levels. Therefore, these metals were eliminated as COCs. For aluminum, copper, silver, thallium, and zinc, there were exceedances of the site-specific background concentrations by detected concentrations; however, the means comparison showed that the CS S-049 concentrations were not significantly different than background. Therefore, these metals were also eliminated as COCs. Of these metals eliminated as COCs, only the EPC for iron exceeded a residential screening level indicating that the hazard quotient exceeds 1. For iron, the hazard quotient associated with the EPC for CS S-049 is 2. This hazard estimate was calculated using the residential screening level that includes the homegrown produce pathway.

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Table B9-1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
CS S-049

Scenario Timeframe:	Future
Medium	Soil
Exposure Medium	Soil

Exposure Point	Chemical of Concern	Concentration Detected (mg/kg) Min	Concentration Detected (mg/kg) Max	Frequency of Detection	95th UCL Concentration (mg/kg)	Statistical Measure[a]	Exposure Point Concentration[b] (mg/kg)	Background Concentration (mg/kg)	Maximum Detected Concentration > Background?	Background Exceeded by Means Comparison?	COC?
CS S-049 - Soil On-site Direct Contact (0-2 ft bgs)	2,4,5,6-TETRACHLORO-META-XYLENE	4.0E-02	4.4E-02	2/2	NA	Fewer Than Four Samples	4.4E-02	NA	NA	NA	NT
	2,4,6-TRIBROMOPHENOL	3.1E+00	3.9E+00	2/2	NA	Fewer Than Four Samples	3.9E+00	NA	NA	NA	NT
	2,4-DB	1.7E-02	1.7E-02	1/14	1.7E-01	Too Few Unique Detected Values	1.7E-02	NA	NA	NA	Yes
	2,4-DICHLOROPHENYLACETICACID	2.8E-01	3.4E-01	2/2	NA	Fewer Than Four Samples	3.4E-01	NA	NA	NA	NT
	2-FLUOROBIPHENYL	1.9E+00	2.3E+00	2/2	NA	Fewer Than Four Samples	2.3E+00	NA	NA	NA	NT
	2-FLUOROPHENOL	3.4E+00	3.6E+00	2/2	NA	Fewer Than Four Samples	3.6E+00	NA	NA	NA	NT
	2-Methylnaphthalene	4.5E-02	4.5E-02	1/15	2.4E-01	Too Few Unique Detected Values	4.5E-02	NA	NA	NA	Yes
	Acenaphthene	2.2E-02	2.2E-02	1/15	5.5E-02	Too Few Unique Detected Values	2.2E-02	NA	NA	NA	Yes
	Aluminum	7.2E+03	1.8E+04	16/16	1.3E+04	95% Student's-t UCL	1.3E+04	14599	Yes	Yes	Yes
	Antimony	7.0E-02	1.4E-01	3/15	9.3E-02	95% KM (t) UCL	9.3E-02	10	No	NA	No
	Arsenic	1.1E+00	5.6E+00	16/16	3.8E+00	95% Student's-t UCL	3.8E+00	5.8	No	NA	No
	Azinphos-methyl(guthion)	3.1E-02	3.3E-02	2/14	3.2E-02	95% KM (t) UCL	3.2E-02	NA	NA	NA	NT
	Barium	4.9E+01	1.6E+02	16/16	1.1E+02	95% Student's-t UCL	1.1E+02	209	No	NA	No
	Benzo(a)anthracene	1.6E-02	1.6E-02	1/15	5.5E-02	Too Few Unique Detected Values	1.6E-02	NA	NA	NA	Yes
	Benzo(a)pyrene	3.5E-02	3.5E-02	1/15	5.7E-02	Too Few Unique Detected Values	3.5E-02	NA	NA	NA	Yes
	Benzo(b)fluoranthene	4.9E-03	5.8E-02	10/15	2.8E-02	95% KM (t) UCL	2.8E-02	NA	NA	NA	Yes
	Benzo(g,h,i)perylene	5.2E-02	5.2E-02	1/15	5.8E-02	Too Few Unique Detected Values	5.2E-02	NA	NA	NA	Yes
	Beryllium	1.7E-01	1.1E+00	15/16	6.6E-01	95% KM (t) UCL	6.6E-01	0.6	Yes	Yes	Yes
	Cadmium	9.8E-02	1.5E+00	13/14	1.4E+00	97.5% KM (Chebyshev) UCL	1.4E+00	0.5	Yes	NA*	Yes
	Chromium	2.1E+01	5.2E+01	16/16	3.8E+01	95% Student's-t UCL	3.8E+01	42.5	Yes	Yes	Yes
	Chrysene	4.0E-02	5.3E-02	3/15	4.4E-02	95% KM (t) UCL	4.4E-02	NA	NA	NA	Yes
	Cobalt	4.4E+00	1.3E+01	16/16	8.6E+00	95% Student's-t UCL	8.6E+00	15.6	No	NA	No
	Copper	6.0E+00	2.4E+02	16/16	9.5E+01	95% Chebyshev (Mean, Sd) UCL	9.5E+01	23.6	Yes	Yes	Yes
	Dibenzo(a,h)anthracene	3.7E-03	2.9E-02	4/15	1.4E-02	95% KM (t) UCL	1.4E-02	NA	NA	NA	Yes
	Dieldrin	9.2E-03	1.2E-02	2/14	9.9E-03	95% KM (t) UCL	9.9E-03	NA	NA	NA	Yes
	Dinoseb	2.9E-03	3.1E-03	2/14	3.0E-03	95% KM (t) UCL	3.0E-03	NA	NA	NA	Yes
	Fluoranthene	8.6E-02	8.6E-02	1/15	6.6E-02	Too Few Unique Detected Values	6.6E-02	NA	NA	NA	Yes
	Fluorene	8.3E-03	1.5E-02	5/15	1.1E-02	95% KM (t) UCL	1.1E-02	NA	NA	NA	Yes
	Heptachlorepoxide	1.1E-03	2.3E-03	3/14	1.4E-03	95% KM (t) UCL	1.4E-03	NA	NA	NA	Yes
	Indeno(1,2,3-c,d)pyrene	4.3E-03	4.8E-02	4/15	1.7E-02	95% KM (t) UCL	1.7E-02	NA	NA	NA	Yes
	Iron	1.2E+04	2.2E+04	16/16	1.8E+04	95% Student's-t UCL	1.8E+04	23597	No	NA	No
	Lead	3.2E+00	1.2E+02	16/16	1.1E+02	99% Chebyshev (Mean, Sd) UCL	1.1E+02	137	No	NA	No
	MCPA	1.5E+00	1.9E+00	2/14	1.6E+00	95% KM (t) UCL	1.6E+00	NA	NA	NA	Yes
	MCPP	2.1E+00	3.7E+00	6/14	3.0E+00	95% KM (t) UCL	3.0E+00	NA	NA	NA	Yes
	Manganese	1.5E+02	4.4E+02	16/16	2.9E+02	95% Approximate Gamma UCL	2.9E+02	729	No	NA	No
	Nickel	7.0E+00	3.6E+01	16/16	3.0E+01	95% Student's-t UCL	3.0E+01	34.8	Yes	Yes	Yes
	Phenanthrene	8.5E-03	6.8E-02	5/15	2.5E-02	95% KM (t) UCL	2.5E-02	NA	NA	NA	Yes
	Pyrene	8.4E-02	8.4E-02	1/15	1.4E-01	Too Few Unique Detected Values	8.4E-02	NA	NA	NA	Yes
	Selenium	2.3E-01	5.5E-01	13/14	3.8E-01	95% KM (t) UCL	3.8E-01	0.4	Yes	Yes	Yes
	Silver	1.0E-01	5.8E+00	13/16	2.7E+00	95% KM (Chebyshev) UCL	2.7E+00	1	Yes	no	No
	TRIPHENYLPHOSPHATE	3.6E-01	4.3E-01	2/2	NA	Fewer Than Four Samples	4.3E-01	NA	NA	NA	NT
	Thallium	6.2E-02	1.1E-01	13/14	9.0E-02	95% KM (t) UCL	9.0E-02	0.2	No	NA	No
	Vanadium	3.8E+01	7.3E+01	16/16	5.1E+01	95% Approximate Gamma UCL	5.1E+01	61.7	Yes	Yes	Yes
	Zinc	1.1E+01	1.0E+02	16/16	5.8E+01	95% Approximate Gamma UCL	5.8E+01	159	No	NA	No
	alpha-Chlordane	6.2E-04	1.4E-02	5/12	5.4E-03	95% KM (t) UCL	5.4E-03	NA	NA	NA	Yes
	bis(2-ETHYLHEXYL)PHTHALATE	5.3E-02	3.7E-01	6/15	1.5E-01	95% KM (t) UCL	1.5E-01	NA	NA	NA	Yes
	delta-BHC	9.3E-04	9.3E-04	1/14	5.0E-04	Too Few Unique Detected Values	5.0E-04	NA	NA	NA	Yes
	gamma-BHC(Lindane)	2.5E-04	3.1E-04	2/14	2.7E-04	95% KM (t) UCL	2.7E-04	NA	NA	NA	Yes
	gamma-Chlordane	4.0E-04	9.1E-03	6/12	4.0E-03	95% KM (t) UCL	4.0E-03	NA	NA	NA	Yes
	p,p'-DDD	7.9E-03	1.4E-02	2/14	9.4E-03	95% KM (t) UCL	9.4E-03	NA	NA	NA	Yes
	p,p'-DDE	4.9E-04	3.4E-02	6/14	1.3E-02	95% KM (t) UCL	1.3E-02	NA	NA	NA	Yes
	p,p'-DDT	4.0E-03	1.3E-01	5/14	3.3E-02	95% KM (t) UCL	3.3E-02	NA	NA	NA	Yes

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Table B9-1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
CS S-049

Scenario Timeframe:	Future										
Medium	Soil										
Exposure Medium	Soil										
		Concentration Detected (mg/kg)									
Exposure Point	Chemical of Concern	Min	Max	Frequency of Detection	95th UCL Concentration (mg/kg)	Statistical Measure[a]	Exposure Point Concentration[b] (mg/kg)	Background Concentration (mg/kg)	Maximum Detected Concentration > Background?	Background Exceeded by Means Comparison?	COC?
CS S-049 - Soil On-site Direct Contact (0-10 ft bgs)	2,4,5,6-TETRACHLORO-META-XYLENE	4.0E-02	9.7E-02	15/15	8.4E-02	95% Student's-t UCL	8.4E-02	NA	NA	NA	NT
	2,4,6-TRIBROMOPHENOL	1.9E+00	5.6E+00	17/17	3.9E+00	95% Student's-t UCL	3.9E+00	NA	NA	NA	NT
	2,4-DB	1.7E-02	2.3E-02	2/42	1.8E-02	95% KM (t) UCL	1.8E-02	NA	NA	NA	Yes
	2,4-DICHLOROPHENYLACETICACID	2.8E-01	2.0E+00	17/17	1.5E+00	95% Chebyshev (Mean, Sd) UCL	1.5E+00	NA	NA	NA	NT
	2,4-Dinitrophenol	4.6E-01	4.6E-01	1/43	3.8E-01	Too Few Unique Detected Values	3.8E-01	NA	NA	NA	Yes
	2-FLUOROBIPHENYL	1.4E+00	4.0E+00	17/17	2.7E+00	95% Approximate Gamma UCL	2.7E+00	NA	NA	NA	NT
	2-FLUOROPHENOL	1.9E+00	6.1E+00	17/17	4.2E+00	95% Student's-t UCL	4.2E+00	NA	NA	NA	NT
	2-Methylnaphthalene	4.5E-02	4.5E-02	1/43	3.2E-01	Too Few Unique Detected Values	4.5E-02	NA	NA	NA	Yes
	4,4'-DIBROMOOCTAFLUOROBIPHENYL	2.8E-03	2.8E-03	1/1	NA	Fewer Than Four Samples	2.8E-03	NA	NA	NA	NT
	4-Nitrophenol	6.6E-02	6.6E-02	1/43	3.2E-01	Too Few Unique Detected Values	6.6E-02	NA	NA	NA	Yes
	Acenaphthene	2.2E-02	2.2E-02	1/43	8.7E-02	Too Few Unique Detected Values	2.2E-02	NA	NA	NA	Yes
	Aluminum	7.2E+03	2.5E+04	43/43	1.6E+04	95% Student's-t UCL	1.6E+04	23596	Yes	no	No
	Anthracene	7.6E-03	7.6E-03	1/43	8.7E-02	Too Few Unique Detected Values	7.6E-03	NA	NA	NA	Yes
	Antimony	7.0E-02	4.0E+00	4/40	6.6E-01	95% KM (Chebyshev) UCL	6.6E-01	20	No	NA	No
	Arsenic	1.1E+00	5.6E+00	42/43	2.9E+00	95% KM (Chebyshev) UCL	2.9E+00	3.7	Yes	Yes	Yes
	Azinphos-methyl(guthion)	3.1E-02	3.3E-02	2/42	3.1E-02	95% KM (t) UCL	3.1E-02	NA	NA	NA	NT
	Barium	3.8E+01	2.7E+02	43/43	1.4E+02	95% Approximate Gamma UCL	1.4E+02	342	No	NA	No
	Benzo(a)anthracene	6.6E-03	6.9E-02	3/43	1.4E-02	95% KM (t) UCL	1.4E-02	NA	NA	NA	Yes
	Benzo(a)pyrene	3.5E-02	3.5E-02	1/43	8.8E-02	Too Few Unique Detected Values	3.5E-02	NA	NA	NA	Yes
	Benzo(b)fluoranthene	4.9E-03	5.8E-02	11/43	1.7E-02	95% KM (t) UCL	1.7E-02	NA	NA	NA	Yes
	Benzo(g,h,i)perylene	5.1E-03	5.2E-02	2/43	1.8E-02	95% KM (Chebyshev) UCL	1.8E-02	NA	NA	NA	Yes
	Benzo(k)fluoranthene	4.9E-02	4.9E-02	1/43	8.8E-02	Too Few Unique Detected Values	4.9E-02	NA	NA	NA	Yes
	benzoic acid	2.8E-01	2.8E-01	1/43	8.0E-01	Too Few Unique Detected Values	2.8E-01	NA	NA	NA	Yes
	Beryllium	1.7E-01	1.1E+00	42/43	6.5E-01	95% KM (BCA) UCL	6.5E-01	0.6	Yes	Yes	Yes
	Cadmium	2.2E-02	7.4E+00	27/28	3.2E+00	99% KM (Chebyshev) UCL	3.2E+00	0.4	Yes	NA*	Yes
	Chromium	1.9E+01	5.2E+01	43/43	3.4E+01	95% Student's-t UCL	3.4E+01	41.5	Yes	Yes	Yes
	Chrysene	4.0E-02	7.4E-02	4/43	4.5E-02	95% KM (t) UCL	4.5E-02	NA	NA	NA	Yes
	Cobalt	4.2E+00	1.5E+01	43/43	9.0E+00	95% Approximate Gamma UCL	9.0E+00	15	No	NA	No
	Copper	5.6E+00	2.4E+02	43/43	4.5E+01	95% Chebyshev (Mean, Sd) UCL	4.5E+01	26.7	Yes	no	No
	Dibenzo(a,h)anthracene	3.7E-03	2.9E-02	6/43	8.9E-03	95% KM (t) UCL	8.9E-03	NA	NA	NA	Yes
	Dieldrin	9.2E-03	1.2E-02	2/38	9.5E-03	95% KM (t) UCL	9.5E-03	NA	NA	NA	Yes
	Dinoseb	2.9E-03	3.1E-03	2/42	2.9E-03	95% KM (t) UCL	2.9E-03	NA	NA	NA	Yes
	FENSULFOTHION	1.3E-02	1.3E-02	1/42	8.3E-02	Too Few Unique Detected Values	1.3E-02	NA	NA	NA	NT
	Fluoranthene	4.9E-02	8.6E-02	2/43	5.4E-02	95% KM (t) UCL	5.4E-02	NA	NA	NA	Yes
	Fluorene	8.3E-03	1.5E-02	5/43	9.7E-03	95% KM (t) UCL	9.7E-03	NA	NA	NA	Yes
	Heptachlorepoxide	1.1E-03	2.3E-03	3/38	1.2E-03	95% KM (t) UCL	1.2E-03	NA	NA	NA	Yes
	Indeno(1,2,3-c,d)pyrene	4.3E-03	4.8E-02	5/43	1.0E-02	95% KM (t) UCL	1.0E-02	NA	NA	NA	Yes
	Iron	1.1E+04	3.2E+04	43/43	2.1E+04	95% Student's-t UCL	2.1E+04	34759	No	NA	No
	Lead	3.2E+00	1.2E+02	42/43	2.8E+01	95% KM (Chebyshev) UCL	2.8E+01	6.8	Yes	Yes	Yes
	MCPA	1.5E+00	1.9E+00	3/42	1.6E+00	95% KM (t) UCL	1.6E+00	NA	NA	NA	Yes
	MCPP	2.1E+00	3.7E+00	8/42	2.6E+00	95% KM (t) UCL	2.6E+00	NA	NA	NA	Yes
	MIREX	7.9E-02	7.9E-02	1/1	NA	Fewer Than Four Samples	7.9E-02	NA	NA	NA	NT
	Manganese	8.3E+01	6.7E+02	43/43	2.8E+02	95% Approximate Gamma UCL	2.8E+02	1355	No	NA	No
	Molybdenum	1.0E+00	1.0E+00	1/43	3.6E-01	Too Few Unique Detected Values	3.6E-01	4	No	NA	No

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Table B9-1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
CS S-049

Scenario Timeframe:	**Future**										
Medium	**Soil**										
Exposure Medium	**Soil**										
Exposure Point	**Chemical of Concern**	**Concentration Detected (mg/kg) Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration (mg/kg)**	**Statistical Measure[a]**	**Exposure Point Concentration[b] (mg/kg)**	**Background Concentration (mg/kg)**	**Maximum Detected Concentration > Background?**	**Background Exceeded by Means Comparison?**	**COC?**
(Cont…)	Nickel	7.0E+00	5.5E+01	43/43	2.8E+01	95% Student's-t UCL	2.8E+01	52.2	Yes	Yes	Yes
	Phenanthrene	7.4E-03	6.8E-02	6/43	1.6E-02	95% KM (t) UCL	1.6E-02	NA	NA	NA	Yes
	Pyrene	5.0E-02	8.4E-02	2/43	5.4E-02	95% KM (t) UCL	5.4E-02	NA	NA	NA	Yes
	Selenium	1.6E-01	5.5E-01	26/28	3.6E-01	95% KM (t) UCL	3.6E-01	0.5	Yes	Yes	Yes
	Silver	4.6E-02	5.8E+00	27/43	1.2E+00	95% KM (Chebyshev) UCL	1.2E+00	1	Yes	no	No
	TRIPHENYLPHOSPHATE	3.6E-01	4.9E-01	17/17	4.2E-01	95% Student's-t UCL	4.2E-01	NA	NA	NA	NT
	Thallium	6.2E-02	1.2E-01	26/28	9.1E-02	95% KM (t) UCL	9.1E-02	ND	Yes	no	No
CS S-049 -	Vanadium	3.6E+01	8.1E+01	43/43	5.7E+01	95% Student's-t UCL	5.7E+01	75.7	Yes	Yes	Yes
Soil On-site	Zinc	1.1E+01	1.0E+02	43/43	4.3E+01	95% H-UCL	4.3E+01	58.6	Yes	no	No
Direct Contact	alpha-Chlordane	6.2E-04	1.4E-02	5/25	3.0E-03	95% KM (t) UCL	3.0E-03	NA	NA	NA	Yes
(0-10 ft bgs)	bis(2-ETHYLHEXYL)PHTHALATE	5.3E-02	3.7E-01	8/43	1.1E-01	95% KM (t) UCL	1.1E-01	NA	NA	NA	Yes
	delta-BHC	9.3E-04	9.3E-04	1/38	4.1E-04	Too Few Unique Detected Values	4.1E-04	NA	NA	NA	Yes
	gamma-BHC(Lindane)	2.5E-04	3.1E-04	2/38	2.6E-04	95% KM (t) UCL	2.6E-04	NA	NA	NA	Yes
	gamma-Chlordane	4.0E-04	9.1E-03	6/25	2.2E-03	95% KM (t) UCL	2.2E-03	NA	NA	NA	Yes
	p,p'-DDD	7.9E-03	1.4E-02	2/38	8.4E-03	95% KM (t) UCL	8.4E-03	NA	NA	NA	Yes
	p,p'-DDE	4.6E-04	3.4E-02	8/38	5.3E-03	95% KM (t) UCL	5.3E-03	NA	NA	NA	Yes
	p,p'-DDT	9.7E-04	1.3E-01	6/38	1.2E-02	95% KM (t) UCL	1.2E-02	NA	NA	NA	Yes

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Table B9-1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
CS S-049

Scenario Timeframe:	**Future**										
Medium	**Soil**										
Exposure Medium	**Soil**										
		Concentration Detected (mg/kg)									
Exposure Point	**Chemical of Concern**	**Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration (mg/kg)**	**Statistical Measure[a]**	**Exposure Point Concentration[b] (mg/kg)**	**Background Concentration (mg/kg)**	**Maximum Detected Concentration > Background?**	**Background Exceeded by Means Comparison?**	**COC?**
CS S-049 - Soil On-site Direct Contact (0-15 ft bgs)	2,4,5,6-TETRACHLORO-META-XYLENE	4.0E-02	9.7E-02	15/15	8.4E-02	95% Student's-t UCL	8.4E-02	NA	NA	NA	NT
	2,4,6-TRIBROMOPHENOL	1.9E+00	5.6E+00	17/17	3.9E+00	95% Student's-t UCL	3.9E+00	NA	NA	NA	NT
	2,4-DB	1.7E-02	2.3E-02	2/42	1.8E-02	95% KM (t) UCL	1.8E-02	NA	NA	NA	Yes
	2,4-DICHLOROPHENYLACETICACID	2.8E-01	2.0E+00	17/17	1.5E+00	95% Chebyshev (Mean, Sd) UCL	1.5E+00	NA	NA	NA	NT
	2,4-Dinitrophenol	4.6E-01	4.6E-01	1/43	3.8E-01	Too Few Unique Detected Values	3.8E-01	NA	NA	NA	Yes
	2-FLUOROBIPHENYL	1.4E+00	4.0E+00	17/17	2.7E+00	95% Approximate Gamma UCL	2.7E+00	NA	NA	NA	NT
	2-FLUOROPHENOL	1.9E+00	6.1E+00	17/17	4.2E+00	95% Student's-t UCL	4.2E+00	NA	NA	NA	NT
	2-Methylnaphthalene	4.5E-02	4.5E-02	1/43	3.2E-01	Too Few Unique Detected Values	4.5E-02	NA	NA	NA	Yes
	4,4'-DIBROMOOCTAFLUOROBIPHENYL	2.8E-03	2.8E-03	1/1	NA	Fewer Than Four Samples	2.8E-03	NA	NA	NA	NT
	4-Nitrophenol	6.6E-02	6.6E-02	1/43	3.2E-01	Too Few Unique Detected Values	6.6E-02	NA	NA	NA	Yes
	Acenaphthene	2.2E-02	2.2E-02	1/43	8.7E-02	Too Few Unique Detected Values	2.2E-02	NA	NA	NA	Yes
	Aluminum	7.2E+03	2.5E+04	43/43	1.6E+04	95% Student's-t UCL	1.6E+04	23596	Yes	no	No
	Anthracene	7.6E-03	7.6E-03	1/43	8.7E-02	Too Few Unique Detected Values	7.6E-03	NA	NA	NA	Yes
	Antimony	7.0E-02	4.0E+00	4/40	6.6E-01	95% KM (Chebyshev) UCL	6.6E-01	20	No	NA	No
	Arsenic	1.1E+00	5.6E+00	46/47	2.8E+00	95% KM (Chebyshev) UCL	2.8E+00	3.7	Yes	Yes	Yes
	Azinphos-methyl(guthion)	3.1E-02	3.3E-02	2/42	3.1E-02	95% KM (t) UCL	3.1E-02	NA	NA	NA	NT
	Barium	3.8E+01	2.7E+02	43/43	1.4E+02	95% Approximate Gamma UCL	1.4E+02	342	No	NA	No
	Benzo(a)anthracene	6.6E-03	6.9E-02	3/43	1.4E-02	95% KM (t) UCL	1.4E-02	NA	NA	NA	Yes
	Benzo(a)pyrene	3.5E-02	3.5E-02	1/43	8.8E-02	Too Few Unique Detected Values	3.5E-02	NA	NA	NA	Yes
	Benzo(b)fluoranthene	4.9E-03	5.8E-02	11/43	1.7E-02	95% KM (t) UCL	1.7E-02	NA	NA	NA	Yes
	Benzo(g,h,i)perylene	5.1E-03	5.2E-02	2/43	1.8E-02	95% KM (Chebyshev) UCL	1.8E-02	NA	NA	NA	Yes
	Benzo(k)fluoranthene	4.9E-02	4.9E-02	1/43	8.8E-02	Too Few Unique Detected Values	4.9E-02	NA	NA	NA	Yes
	benzoic acid	2.8E-01	2.8E-01	1/43	8.0E-01	Too Few Unique Detected Values	2.8E-01	NA	NA	NA	Yes
	Beryllium	1.7E-01	1.1E+00	42/43	6.5E-01	95% KM (BCA) UCL	6.5E-01	0.6	Yes	Yes	Yes
	Cadmium	2.2E-02	7.4E+00	27/29	3.1E+00	99% KM (Chebyshev) UCL	3.1E+00	0.4	Yes	NA*	Yes
	Chromium	1.9E+01	5.2E+01	43/43	3.4E+01	95% Student's-t UCL	3.4E+01	41.5	Yes	Yes	Yes
	Chrysene	4.0E-02	7.4E-02	4/43	4.5E-02	95% KM (t) UCL	4.5E-02	NA	NA	NA	Yes
	Cobalt	4.2E+00	1.5E+01	43/43	9.0E+00	95% Approximate Gamma UCL	9.0E+00	15	No	NA	No
	Copper	5.6E+00	2.4E+02	43/43	4.5E+01	95% Chebyshev (Mean, Sd) UCL	4.5E+01	23.6	Yes	no	No
	Dibenzo(a,h)anthracene	3.7E-03	2.9E-02	6/43	8.9E-03	95% KM (t) UCL	8.9E-03	NA	NA	NA	Yes
	Dieldrin	9.2E-03	1.2E-02	2/38	9.5E-03	95% KM (t) UCL	9.5E-03	NA	NA	NA	Yes
	Dinoseb	2.9E-03	3.1E-03	2/42	2.9E-03	95% KM (t) UCL	2.9E-03	NA	NA	NA	Yes
	FENSULFOTHION	1.3E-02	1.3E-02	1/42	8.3E-02	Too Few Unique Detected Values	1.3E-02	NA	NA	NA	NT
	Fluoranthene	4.9E-02	8.6E-02	2/43	5.4E-02	95% KM (t) UCL	5.4E-02	NA	NA	NA	Yes
	Fluorene	8.3E-03	1.5E-02	5/43	9.7E-03	95% KM (t) UCL	9.7E-03	NA	NA	NA	Yes
	Heptachlorepoxide	1.1E-03	2.3E-03	3/38	1.2E-03	95% KM (t) UCL	1.2E-03	NA	NA	NA	Yes
	Indeno(1,2,3-c,d)pyrene	4.3E-03	4.8E-02	5/43	1.0E-02	95% KM (t) UCL	1.0E-02	NA	NA	NA	Yes
	Iron	1.1E+04	3.2E+04	43/43	2.1E+04	95% Student's-t UCL	2.1E+04	34759	No	NA	No
	Lead	3.2E+00	1.2E+02	42/43	2.8E+01	95% KM (Chebyshev) UCL	2.8E+01	6.8	Yes	Yes	Yes
	MCPA	1.5E+00	1.9E+00	3/42	1.6E+00	95% KM (t) UCL	1.6E+00	NA	NA	NA	Yes
	MCPP	2.1E+00	3.7E+00	8/42	2.6E+00	95% KM (t) UCL	2.6E+00	NA	NA	NA	Yes
	MIREX	7.9E-02	7.9E-02	1/1	NA	Fewer Than Four Samples	7.9E-02	NA	NA	NA	NT
	Manganese	8.3E+01	6.7E+02	43/43	2.8E+02	95% Approximate Gamma UCL	2.8E+02	1355	No	NA	No
	Molybdenum	1.0E+00	1.0E+00	1/43	3.6E-01	Too Few Unique Detected Values	3.6E-01	4	No	NA	No

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Table B9-1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
CS S-049

Scenario Timeframe:	**Future**										
Medium	**Soil**										
Exposure Medium	**Soil**										
Exposure Point	**Chemical of Concern**	**Concentration Detected (mg/kg) Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration (mg/kg)**	**Statistical Measure[a]**	**Exposure Point Concentration[b] (mg/kg)**	**Background Concentration (mg/kg)**	**Maximum Detected Concentration > Background?**	**Background Exceeded by Means Comparison?**	**COC?**
(Cont…)	Nickel	7.0E+00	5.5E+01	43/43	2.8E+01	95% Student's-t UCL	2.8E+01	52.2	Yes	Yes	Yes
	Phenanthrene	7.4E-03	6.8E-02	6/43	1.6E-02	95% KM (t) UCL	1.6E-02	NA	NA	NA	Yes
	Pyrene	5.0E-02	8.4E-02	2/43	5.4E-02	95% KM (t) UCL	5.4E-02	NA	NA	NA	Yes
	Selenium	1.6E-01	5.5E-01	26/29	3.6E-01	95% KM (t) UCL	3.6E-01	0.5	Yes	Yes	Yes
	Silver	4.6E-02	5.8E+00	27/43	1.2E+00	95% KM (Chebyshev) UCL	1.2E+00	1	Yes	no	No
	TRIPHENYLPHOSPHATE	3.6E-01	4.9E-01	17/17	4.2E-01	95% Student's-t UCL	4.2E-01	NA	NA	NA	NT
	Thallium	6.2E-02	1.2E-01	26/29	9.1E-02	95% KM (t) UCL	9.1E-02	ND	Yes	no	No
CS S-049 -	Vanadium	3.6E+01	8.1E+01	43/43	5.7E+01	95% Student's-t UCL	5.7E+01	75.7	Yes	Yes	Yes
Soil On-site	Zinc	1.1E+01	1.0E+02	43/43	4.3E+01	95% H-UCL	4.3E+01	58.6	Yes	no	No
Direct Contact	alpha-Chlordane	6.2E-04	1.4E-02	5/25	3.0E-03	95% KM (t) UCL	3.0E-03	NA	NA	NA	Yes
(0-15 ft bgs)	bis(2-ETHYLHEXYL)PHTHALATE	5.3E-02	3.7E-01	8/43	1.1E-01	95% KM (t) UCL	1.1E-01	NA	NA	NA	Yes
	delta-BHC	9.3E-04	9.3E-04	1/38	4.1E-04	Too Few Unique Detected Values	4.1E-04	NA	NA	NA	Yes
	gamma-BHC(Lindane)	2.5E-04	3.1E-04	2/38	2.6E-04	95% KM (t) UCL	2.6E-04	NA	NA	NA	Yes
	gamma-Chlordane	4.0E-04	9.1E-03	6/25	2.2E-03	95% KM (t) UCL	2.2E-03	NA	NA	NA	Yes
	p,p'-DDD	7.9E-03	1.4E-02	2/38	8.4E-03	95% KM (t) UCL	8.4E-03	NA	NA	NA	Yes
	p,p'-DDE	4.6E-04	3.4E-02	8/38	5.3E-03	95% KM (t) UCL	5.3E-03	NA	NA	NA	Yes
	p,p'-DDT	9.7E-04	1.3E-01	6/38	1.2E-02	95% KM (t) UCL	1.2E-02	NA	NA	NA	Yes

[a] The statistical measure indicates the basis for the exposure point concentration.
[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.
NT = Chemical is a COC, however no toxicity values are available to evaluate risk and/or hazard.
NA = Not applicable.
* The full background data set for cadmium was not available, therefore a means comparison could not be performed.
95th UCL = 95 percent upper confidence limit on the mean.

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Table B9-2
Cancer Toxicity Data Summary
CS S-049

Pathway: Ingestion, Dermal						
Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence[a]	Source	Date
Arsenic	1.5E+00	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Benzo(a)anthracene	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Benzo(a)pyrene	7.3E+00	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Benzo(b)fluoranthene	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Benzo(k)fluoranthene	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Beryllium				B1	IRIS	2007
Cadmium				B1	IRIS	2007
Chromium				D	IRIS	2007
Chrysene	1.2E-01	1.2E-01	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Dibenzo(a,h)anthracene	4.1E+00	4.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Dieldrin	1.6E+01	1.6E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Heptachlorepoxide	9.1E+00	9.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Indeno(1,2,3-c,d)pyrene	1.2E+00	1.2E+00	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Nickel				A (Inhalation)	IRIS	2007
alpha-Chlordane	1.3E+00	1.3E+00	$(mg/kg\text{-}day)^{-1}$		Cal-EPA	2007
bis(2-ethylhexyl)phthalate	1.4E-02	1.4E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
gamma-BHC(Lindane)	1.1E+00	1.1E+00	$(mg/kg\text{-}day)^{-1}$		Cal-EPA	2007
gamma-Chlordane	3.5E-01	3.5E-01	$(mg/kg\text{-}day)^{-1}$		IRIS	2007
p,p'-DDD	2.4E-01	2.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
p,p'-DDE	3.4E-01	3.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
p,p'-DDT	3.4E-01	3.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007

Pathway: Inhalation					
Chemical of Concern	Inhalation Cancer Slope Factor	Slope Factor Units	Weight of Evidence[a]	Source	Date
Arsenic	1.5E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	2007
Benzo(a)anthracene	3.9E-01	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Benzo(a)pyrene	3.9E+00	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Benzo(b)fluoranthene	3.9E-01	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Benzo(k)fluoranthene	3.9E-01	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Beryllium	8.4E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	2007
Cadmium	6.3E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	2007
Chromium	4.2E+01	$(mg/kg\text{-}day)^{-1}$	D	IRIS	2007
Chrysene	3.9E-02	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Dibenzo(a,h)anthracene	4.1E+00	$(mg/kg\text{-}day)^{-2}$	B2	Cal-EPA	2007
Dieldrin	1.6E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Heptachlorepoxide	9.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007
Indeno(1,2,3-c,d)pyrene	3.9E-01	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
Nickel	9.1E-01	$(mg/kg\text{-}day)^{-1}$	A (Inhalation)	Cal-EPA	2007
alpha-Chlordane	1.2E+00	$(mg/kg\text{-}day)^{-1}$		Cal-EPA	2007
bis(2-ethylhexyl)phthalate	8.4E-03	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
gamma-BHC(Lindane)	1.1E+00	$(mg/kg\text{-}day)^{-1}$		Cal-EPA	2007
gamma-Chlordane	3.5E-01	$(mg/kg\text{-}day)^{-1}$		IRIS	2007
p,p'-DDD	2.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
p,p'-DDE	3.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	Cal-EPA	2007
p,p'-DDT	3.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	2007

[a]Weight of Evidence Classification

A - human carcinogen
B1 and B2 - probable human carcinogen
C - possible human carcinogen
D - not classifiable as a human carcinogen
E - evidence of noncarcinogenicity for humans
Reference = USEPA 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December.

Cal-EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System

Table B9-3
Non-Cancer Toxicity Data Summary
CS S-049

Pathway: Ingestion, Dermal									
Chemical of Concern	Chronic/ subchronic	Oral RfD	Oral RfD Units	Dermal RfD	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
2,4-DB	Chronic	8.0E-03	(mg/kg-day)	8.0E-03	(mg/kg-day)	Internal hemorrhage, mortality		IRIS	2007
2,4-Dinitrophenol	Chronic	2.0E-03	(mg/kg-day)	2.0E-03	(mg/kg-day)	Cataract formation		IRIS	2007
2-Methylnaphthalene	Chronic	4.0E-03	(mg/kg-day)	4.0E-03	(mg/kg-day)		1000	IRIS	2007
4-Nitrophenol	Chronic								
Acenaphthene	Chronic	6.0E-02	(mg/kg-day)	6.0E-02	(mg/kg-day)	Hepatotoxicity	3000	IRIS	2007
Aluminum	Chronic	1.0E+00	(mg/kg-day)	1.0E+00	(mg/kg-day)		100	PPRTV	2004
Anthracene	Chronic	3.0E-01	(mg/kg-day)	3.0E-01	(mg/kg-day)		3000	IRIS	2007
Arsenic	Chronic	3.0E-04	(mg/kg-day)	3.0E-04	(mg/kg-day)	Vascular	3	IRIS	2007
Benzo(a)anthracene	Chronic	3.0E-02	(mg/kg-day)	3.0E-02	(mg/kg-day)		3000	SURROGATE	
Benzo(a)pyrene	Chronic	3.0E-02	(mg/kg-day)	3.0E-02	(mg/kg-day)		3000	SURROGATE	
Benzo(b)fluoranthene	Chronic	3.0E-02	(mg/kg-day)	3.0E-02	(mg/kg-day)		3000	SURROGATE	
Benzo(g,h,i)perylene	Chronic	3.0E-02	(mg/kg-day)	3.0E-02	(mg/kg-day)		3000	SURROGATE	
Benzo(k)fluoranthene	Chronic	3.0E-02	(mg/kg-day)	3.0E-02	(mg/kg-day)		3000	SURROGATE	
Benzoic acid	Chronic	4.0E+00	(mg/kg-day)	4.0E+00	(mg/kg-day)			IRIS	2007
Beryllium	Chronic	2.0E-03	(mg/kg-day)	2.0E-03	(mg/kg-day)	Small intestine; Lungs		IRIS	2007
Cadmium	Chronic	1.0E-03	(mg/kg-day)	1.0E-03	(mg/kg-day)	Significant proteinuria; Lung, trachea, bronchus cancer deaths	10	IRIS	2007
Chromium	Chronic	1.5E+00	(mg/kg-day)	1.5E+00	(mg/kg-day)			IRIS	2007
Chrysene	Chronic	3.0E-02	(mg/kg-day)	3.0E-02	(mg/kg-day)		3000	SURROGATE	
Copper	Chronic	4.0E-02	(mg/kg-day)	4.0E-02	(mg/kg-day)		--	HEAST	1997
Dibenzo(a,h)anthracene	Chronic	3.0E-02	(mg/kg-day)	3.0E-02	(mg/kg-day)		3000	SURROGATE	
Dieldrin	Chronic	5.0E-05	(mg/kg-day)	5.0E-05	(mg/kg-day)	Liver lesions; Liver carcinoma		IRIS	2007
Dinoseb	Chronic	1.0E-03	(mg/kg-day)	1.0E-03	(mg/kg-day)	Decreased fetal weight		IRIS	2007
Fluoranthene	Chronic	4.0E-02	(mg/kg-day)	4.0E-02	(mg/kg-day)	Nephropathy, increased liver weights, hematological alterations, and clinical effects	3000	IRIS	2007
Fluorene	Chronic	4.0E-02	(mg/kg-day)	4.0E-02	(mg/kg-day)	Blood-forming system	3000	IRIS	2007
Heptachlorepoxide	Chronic	1.3E-05	(mg/kg-day)	1.3E-05	(mg/kg-day)	Increased liver-to-body weight ratio in both males and females; Hepatocellular carcinomas		IRIS	2007
Indeno(1,2,3-c,d)pyrene	Chronic	3.0E-02	(mg/kg-day)	3.0E-02	(mg/kg-day)		3000	SURROGATE	
Iron	Chronic	3.0E-01	(mg/kg-day)	3.0E-01	(mg/kg-day)			NCEA	2004
Lead	Chronic		(mg/kg-day)		(mg/kg-day)		--		
MCPA	Chronic	5.0E-04	(mg/kg-day)	5.0E-04	(mg/kg-day)	Kidney and liver toxicity	300	IRIS	2007
MCPP	Chronic	1.0E-03	(mg/kg-day)	1.0E-03	(mg/kg-day)	Increased absolute and relative kidney weights	3000	IRIS	2007
Nickel	Chronic	2.0E-02	(mg/kg-day)	2.0E-02	(mg/kg-day)	Decreased weight	300	IRIS	2007
Phenanthrene	Chronic	3.0E-02	(mg/kg-day)	3.0E-02	(mg/kg-day)		3000	SURROGATE	
Pyrene	Chronic	3.0E-02	(mg/kg-day)	3.0E-02	(mg/kg-day)	Kidney	3000	IRIS	2007
Selenium	Chronic	5.0E-03	(mg/kg-day)	5.0E-03	(mg/kg-day)	Clinical selenosis	3	IRIS	2007
Vanadium	Chronic	1.0E-03	(mg/kg-day)	1.0E-03	(mg/kg-day)	Liver and kidney	100	NCEA	2004
alpha-Chlordane	Chronic	5.0E-04	(mg/kg-day)	5.0E-04	(mg/kg-day)			IRIS	2007
bis(2-ethylhexyl)phthalate	Chronic	2.0E-02	(mg/kg-day)	2.0E-02	(mg/kg-day)	Liver	1000	IRIS	2007
delta-BHC	Chronic	3.0E-04	(mg/kg-day)	3.0E-04	(mg/kg-day)			IRIS	2007
gamma-BHC(Lindane)	Chronic	3.0E-04	(mg/kg-day)	3.0E-04	(mg/kg-day)			IRIS	2007
gamma-Chlordane	Chronic	5.0E-04	(mg/kg-day)	5.0E-04	(mg/kg-day)			IRIS	2007
p,p'-DDD	Chronic	5.0E-04	(mg/kg-day)	5.0E-04	(mg/kg-day)		100	SURROGATE	
p,p'-DDE	Chronic	5.0E-04	(mg/kg-day)	5.0E-04	(mg/kg-day)		100	SURROGATE	
p,p'-DDT	Chronic	5.0E-04	(mg/kg-day)	5.0E-04	(mg/kg-day)	Liver	100	IRIS	2007

Table B9-3
Non-Cancer Toxicity Data Summary
CS S-049

Pathway: Inhalation								
Chemical of Concern	Chronic/ subchronic	Inhalation RfD	Inhalation RfD Units		Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
2,4-DB	Chronic	8.0E-03	mg/kg-day		Internal hemorrhage, mortality		ROUTE	
2,4-Dinitrophenol	Chronic	2.0E-03	mg/kg-day		Cataract formation		ROUTE	
2-Methylnaphthalene	Chronic	8.6E-04	mg/kg-day			1000	IRIS	2007
4-Nitrophenol	Chronic							
Acenaphthene	Chronic	6.0E-02	mg/kg-day		Hepatotoxicity	3000	ROUTE	
Aluminum	Chronic	1.4E-03	mg/kg-day			100	PPRTV	2004
Anthracene	Chronic	3.0E-01	mg/kg-day			3000	ROUTE	
Arsenic	Chronic	8.6E-06	mg/kg-day		Vascular	3	Cal-EPA	2007
Benzo(a)anthracene	Chronic	3.0E-02	mg/kg-day			3000	ROUTE	
Benzo(a)pyrene	Chronic	3.0E-02	mg/kg-day			3000	ROUTE	
Benzo(b)fluoranthene	Chronic	3.0E-02	mg/kg-day			3000	ROUTE	
Benzo(g,h,i)perylene	Chronic	3.0E-02	mg/kg-day			3000	ROUTE	
Benzo(k)fluoranthene	Chronic	3.0E-02	mg/kg-day			3000	ROUTE	
Benzoic acid	Chronic	4.0E+00	mg/kg-day				ROUTE	
Beryllium	Chronic	5.7E-06	mg/kg-day		Small intestine; Lungs		IRIS	2007
Cadmium	Chronic	5.7E-06	mg/kg-day		Significant proteinuria; Lung, trachea, bronchus cancer deaths	10	Cal-EPA	2007
Chromium	Chronic	1.5E+00	mg/kg-day				ROUTE	
Chrysene	Chronic	3.0E-02	mg/kg-day			3000	ROUTE	
Copper	Chronic	4.0E-02	mg/kg-day			--	HEAST	1997
Dibenzo(a,h)anthracene	Chronic	3.0E-02	mg/kg-day			3000	ROUTE	
Dieldrin	Chronic	5.0E-05	mg/kg-day		Liver lesions; Liver carcinoma		ROUTE	
Dinoseb	Chronic	1.0E-03	mg/kg-day		Decreased fetal weight		ROUTE	
Fluoranthene	Chronic	4.0E-02	mg/kg-day		Nephropathy, increased liver weights, hematological alterations, and clinical effects	3000	ROUTE	
Fluorene	Chronic	4.0E-02	mg/kg-day		Blood-forming system	3000	ROUTE	
Heptachlorepoxide	Chronic	1.3E-05	mg/kg-day		Increased liver-to-body weight ratio in both males and females; Hepatocellular carcinomas		ROUTE	
Indeno(1,2,3-c,d)pyrene	Chronic	3.0E-02	mg/kg-day			3000	ROUTE	
Iron	Chronic		mg/kg-day					
Lead	Chronic		mg/kg-day			--		
MCPA	Chronic	5.0E-04	mg/kg-day		Kidney and liver toxicity	300	ROUTE	
MCPP	Chronic	1.0E-03	mg/kg-day		Increased absolute and relative kidney weights	3000	ROUTE	
Nickel	Chronic	1.4E-05	mg/kg-day		Decreased weight	300	Cal-EPA	2007
Phenanthrene	Chronic	3.0E-02	mg/kg-day			3000	ROUTE	
Pyrene	Chronic	3.0E-02	mg/kg-day		Kidney	3000	ROUTE	
Selenium	Chronic	5.7E-03	mg/kg-day		Clinical selenosis	3	Cal-EPA	2007
Vanadium	Chronic	1.0E-03	mg/kg-day		Liver and kidney	100	NCEA	2004
alpha-Chlordane	Chronic	2.0E-04	mg/kg-day				IRIS	2007
bis(2-ethylhexyl)phthalate	Chronic	2.0E-02	mg/kg-day		Liver	1000	ROUTE	
delta-BHC	Chronic	3.0E-04	mg/kg-day				ROUTE	
gamma-BHC(Lindane)	Chronic	3.0E-04	mg/kg-day				ROUTE	
gamma-Chlordane	Chronic	2.0E-04	mg/kg-day				IRIS	2007
p,p'-DDD	Chronic	5.0E-04	mg/kg-day			100	ROUTE	
p,p'-DDE	Chronic	5.0E-04	mg/kg-day			100	ROUTE	
p,p'-DDT	Chronic	5.0E-04	mg/kg-day		Liver	100	ROUTE	

Notes:
Blank cells indicate information is not available or not applicable.
Cal-EPA = California Environmental Protection Agency
HEAST = Health Effects Assessment Summary Table
IRIS = Integrated Risk Information System
NCEA = National Center for Environmental Assessment, USEPA
PPRTV = Provisional Peer Reviewed Toxicity Value
ROUTE = route-to-route extrapolated value (e.g., oral RfD used for inhalation RfD)
SURROGATE =
RfDs for pyrene used for Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene, and phenanthrene.
RfDs for p,p'-DDT used for p,p'-DDE and p,p'-DDD.

Table B9-4
Risk Characterization Summary - Carcinogens
CS S-049

Scenario Timeframe:	**Future**									
Receptor Population:	**Resident**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	CS S-049 - Soil On-site Direct Contact (0-2 ft bgs)	Benzo(a)anthracene	1.6E-02	mg/kg	3.E-08	6.E-14	1.E-08	1.E-07	2.E-07
			Benzo(a)pyrene	3.5E-02	mg/kg	4.E-07	1.E-12	2.E-07	1.E-06	2.E-06
			Benzo(b)fluoranthene	2.8E-02	mg/kg	5.E-08	1.E-13	3.E-08	2.E-07	3.E-07
			Beryllium	6.6E-01	mg/kg	--	5.E-11	--	--	5.E-11
			Cadmium	1.4E+00	mg/kg	--	8.E-11	--	--	8.E-11
			Chromium	3.8E+01	mg/kg	--	1.E-08	--	--	1.E-08
			Chrysene	4.4E-02	mg/kg	8.E-09	9.E-11	4.E-09	4.E-08	5.E-08
			Dibenzo(a,h)anthracene	1.4E-02	mg/kg	9.E-08	5.E-13	4.E-08	2.E-07	4.E-07
			Dieldrin	9.9E-03	mg/kg	2.E-07	1.E-12	4.E-08	1.E-06	2.E-06
			Heptachlorepoxide	1.4E-03	mg/kg	2.E-08	1.E-13	3.E-09	2.E-07	2.E-07
			Indeno(1,2,3-c,d)pyrene	1.7E-02	mg/kg	3.E-08	6.E-14	2.E-08	9.E-08	1.E-07
			Nickel	3.0E+01	mg/kg	--	3.E-10	--	--	3.E-10
			alpha-Chlordane	5.4E-03	mg/kg	1.E-08	6.E-14	2.E-09	3.E-08	5.E-08
			bis(2-ethylhexyl)phthalate	1.5E-01	mg/kg	3.E-09	1.E-14	1.E-09	8.E-09	1.E-08
			gamma-BHC(Lindane)	2.7E-04	mg/kg	5.E-10	3.E-15	7.E-11	2.E-08	2.E-08
			gamma-Chlordane	4.0E-03	mg/kg	2.E-09	1.E-14	4.E-10	7.E-09	9.E-09
			p,p'-DDD	9.4E-03	mg/kg	4.E-09	2.E-14	6.E-10	1.E-08	2.E-08
			p,p'-DDE	1.3E-02	mg/kg	7.E-09	4.E-14	1.E-09	2.E-08	3.E-08
			p,p'-DDT	3.3E-02	mg/kg	2.E-08	1.E-13	3.E-09	5.E-08	7.E-08
			TOTAL			**9.E-07**	**2.E-08**	**3.E-07**	**4.E-06**	**5.E-06**
		CS S-049 - Soil On-site Direct Contact (0-10 ft bgs)	Arsenic	2.9E+00	mg/kg	7.E-06	4.E-10	7.E-07	2.E-05	3.E-05
			Benzo(a)anthracene	1.4E-02	mg/kg	3.E-08	5.E-14	1.E-08	1.E-07	2.E-07
			Benzo(a)pyrene	3.5E-02	mg/kg	4.E-07	1.E-12	2.E-07	1.E-06	2.E-06
			Benzo(b)fluoranthene	1.7E-02	mg/kg	3.E-08	6.E-14	2.E-08	1.E-07	2.E-07
			Benzo(k)fluoranthene	4.9E-02	mg/kg	9.E-08	2.E-13	4.E-08	3.E-07	5.E-07
			Beryllium	6.5E-01	mg/kg	--	5.E-11	--	--	5.E-11
			Cadmium	3.2E+00	mg/kg	--	2.E-10	--	--	2.E-10
			Chromium	3.4E+01	mg/kg	--	1.E-08	--	--	1.E-08
			Chrysene	4.5E-02	mg/kg	8.E-09	1.E-10	4.E-09	4.E-08	5.E-08
			Dibenzo(a,h)anthracene	8.9E-03	mg/kg	6.E-08	3.E-13	3.E-08	2.E-07	2.E-07
			Dieldrin	9.5E-03	mg/kg	2.E-07	1.E-12	4.E-08	1.E-06	2.E-06
			Heptachlorepoxide	1.2E-03	mg/kg	2.E-08	1.E-13	3.E-09	1.E-07	2.E-07
			Indeno(1,2,3-c,d)pyrene	1.0E-02	mg/kg	2.E-08	4.E-14	9.E-09	6.E-08	8.E-08
			Nickel	2.8E+01	mg/kg	--	2.E-10	--	--	2.E-10
			alpha-Chlordane	3.0E-03	mg/kg	6.E-09	3.E-14	1.E-09	2.E-08	3.E-08
			bis(2-ethylhexyl)phthalate	1.1E-01	mg/kg	2.E-09	9.E-15	8.E-10	6.E-09	9.E-09
			gamma-BHC(Lindane)	2.6E-04	mg/kg	4.E-10	3.E-15	7.E-11	2.E-08	2.E-08
			gamma-Chlordane	2.2E-03	mg/kg	1.E-09	7.E-15	2.E-10	4.E-09	5.E-09
			p,p'-DDD	8.4E-03	mg/kg	3.E-09	2.E-14	5.E-10	1.E-08	2.E-08
			p,p'-DDE	5.3E-03	mg/kg	3.E-09	2.E-14	5.E-10	7.E-09	1.E-08
			p,p'-DDT	1.2E-02	mg/kg	6.E-09	4.E-14	1.E-09	2.E-08	3.E-08
			TOTAL			**8.E-06**	**1.E-08**	**1.E-06**	**3.E-05**	**4.E-05**

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Table B9-4
Risk Characterization Summary - Carcinogens
CS S-049

Scenario Timeframe:	**Future**									
Receptor Population:	**Outdoor Occupational**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	CS S-049 - Soil On-site Direct Contact (0-2 ft bgs)	Benzo(a)anthracene	1.6E-02	mg/kg	7.E-09	3.E-14	1.E-08	--	2.E-08
			Benzo(a)pyrene	3.5E-02	mg/kg	9.E-08	6.E-13	2.E-07	--	2.E-07
			Benzo(b)fluoranthene	2.8E-02	mg/kg	1.E-08	5.E-14	2.E-08	--	3.E-08
			Beryllium	6.6E-01	mg/kg	--	2.E-11	--	--	2.E-11
			Cadmium	1.4E+00	mg/kg	--	4.E-11	--	--	4.E-11
			Chromium	3.8E+01	mg/kg	--	7.E-09	--	--	7.E-09
			Chrysene	4.4E-02	mg/kg	2.E-09	4.E-11	3.E-09	--	5.E-09
			Dibenzo(a,h)anthracene	1.4E-02	mg/kg	2.E-08	2.E-13	3.E-08	--	5.E-08
			Dieldrin	9.9E-03	mg/kg	6.E-08	7.E-13	3.E-08	--	9.E-08
			Heptachlorepoxide	1.4E-03	mg/kg	4.E-09	6.E-14	3.E-09	--	7.E-09
			Indeno(1,2,3-c,d)pyrene	1.7E-02	mg/kg	7.E-09	3.E-14	1.E-08	--	2.E-08
			Nickel	3.0E+01	mg/kg	--	1.E-10	--	--	1.E-10
			alpha-Chlordane	5.4E-03	mg/kg	2.E-09	3.E-14	1.E-09	--	4.E-09
			bis(2-ethylhexyl)phthalate	1.5E-01	mg/kg	7.E-10	6.E-15	8.E-10	--	2.E-09
			gamma-BHC(Lindane)	2.7E-04	mg/kg	1.E-10	1.E-15	6.E-11	--	2.E-10
			gamma-Chlordane	4.0E-03	mg/kg	5.E-10	6.E-15	3.E-10	--	8.E-10
			p,p'-DDD	9.4E-03	mg/kg	8.E-10	1.E-14	4.E-10	--	1.E-09
			p,p'-DDE	1.3E-02	mg/kg	2.E-09	2.E-14	9.E-10	--	2.E-09
			p,p'-DDT	3.3E-02	mg/kg	4.E-09	5.E-14	2.E-09	--	6.E-09
			TOTAL			**2.E-07**	**7.E-09**	**3.E-07**	**--**	**5.E-07**

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Table B9-4
Risk Characterization Summary - Carcinogens
CS S-049

Scenario Timeframe:	**Future**									
Receptor Population:	**Contruction Worker**									
Receptor Age:	**Adult**									
						Carcinogenic Risk				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	CS S-049 - Soil On-site Direct Contact (0-15 ft bgs)	Arsenic	2.8E+00	mg/kg	2.E-07	1.E-07	8.E-08	--	4.E-07
			Benzo(a)anthracene	1.4E-02	mg/kg	8.E-10	2.E-11	2.E-09	--	2.E-09
			Benzo(a)pyrene	3.5E-02	mg/kg	1.E-08	4.E-10	2.E-08	--	4.E-08
			Benzo(b)fluoranthene	1.7E-02	mg/kg	1.E-09	2.E-11	2.E-09	--	3.E-09
			Benzo(k)fluoranthene	4.9E-02	mg/kg	3.E-09	5.E-11	6.E-09	--	8.E-09
			Beryllium	6.5E-01	mg/kg	--	2.E-08	--	--	2.E-08
			Cadmium	3.1E+00	mg/kg	--	5.E-08	--	--	5.E-08
			Chromium	3.4E+01	mg/kg	--	4.E-06	--	--	4.E-06
			Chrysene	4.5E-02	mg/kg	2.E-10	7.E-12	5.E-10	--	8.E-10
			Dibenzo(a,h)anthracene	8.9E-03	mg/kg	2.E-09	1.E-10	3.E-09	--	5.E-09
			Dieldrin	9.5E-03	mg/kg	7.E-09	4.E-10	5.E-09	--	1.E-08
			Heptachlorepoxide	1.2E-03	mg/kg	5.E-10	3.E-11	4.E-10	--	9.E-10
			Indeno(1,2,3-c,d)pyrene	1.0E-02	mg/kg	6.E-10	1.E-11	1.E-09	--	2.E-09
			Nickel	2.8E+01	mg/kg	--	7.E-08	--	--	7.E-08
			alpha-Chlordane	3.0E-03	mg/kg	2.E-10	1.E-11	1.E-10	--	3.E-10
			bis(2-ethylhexyl)phthalate	1.1E-01	mg/kg	7.E-11	3.E-12	1.E-10	--	2.E-10
			gamma-BHC(Lindane)	2.6E-04	mg/kg	1.E-11	8.E-13	9.E-12	--	2.E-11
			gamma-Chlordane	2.2E-03	mg/kg	3.E-11	2.E-12	2.E-11	--	6.E-11
			p,p'-DDD	8.4E-03	mg/kg	9.E-11	6.E-12	6.E-11	--	2.E-10
			p,p'-DDE	5.3E-03	mg/kg	8.E-11	5.E-12	6.E-11	--	1.E-10
			p,p'-DDT	1.2E-02	mg/kg	2.E-10	1.E-11	1.E-10	--	3.E-10
			TOTAL			**2.E-07**	**4.E-06**	**1.E-07**	--	**5.E-06**

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Table B9-5
Risk Characterization Summary - Non-Carcinogens
CS S-049

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	CS S-049 - Soil On-site Direct Contact (0-2 ft bgs)	2,4-DB	1.7E-02	mg/kg	Internal hemorrhage, mortality	3.E-06	4.E-11	1.E-06	3.E-04	3.E-04
			2-Methylnaphthalene	4.5E-02	mg/kg		2.E-05	3.E-04	9.E-06	7.E-04	1.E-03
			Acenaphthene	2.2E-02	mg/kg	Hepatotoxicity	5.E-07	6.E-07	3.E-07	2.E-05	3.E-05
			Aluminum	1.3E+04	mg/kg		2.E-02	2.E-04	7.E-04	7.E-02	9.E-02
			Benzo(a)anthracene	1.6E-02	mg/kg		7.E-07	9.E-12	4.E-07	7.E-06	8.E-06
			Benzo(a)pyrene	3.5E-02	mg/kg		2.E-06	2.E-11	1.E-06	1.E-05	1.E-05
			Benzo(b)fluoranthene	2.8E-02	mg/kg		1.E-06	2.E-11	8.E-07	9.E-06	1.E-05
			Benzo(g,h,i)perylene	5.2E-02	mg/kg		2.E-06	3.E-11	1.E-06	1.E-05	2.E-05
			Beryllium	6.6E-01	mg/kg	Small intestine; Lungs	5.E-04	2.E-06	2.E-05	2.E-03	2.E-03
			Cadmium	1.4E+00	mg/kg	Significant proteinuria; Lung, trachea, bronchus cancer deaths	2.E-03	4.E-06	7.E-06	7.E-02	8.E-02
			Chromium	3.8E+01	mg/kg		3.E-05	4.E-10	1.E-06	1.E-04	2.E-04
			Chrysene	4.4E-02	mg/kg		2.E-06	1.E-07	1.E-06	2.E-05	2.E-05
			Copper	9.5E+01	mg/kg		3.E-03	4.E-08	1.E-04	1.E-02	2.E-02
			Dibenzo(a,h)anthracene	1.4E-02	mg/kg		6.E-07	8.E-12	4.E-07	3.E-06	4.E-06
			Dieldrin	9.9E-03	mg/kg	Liver lesions; Liver carcinoma	3.E-04	3.E-09	5.E-05	3.E-03	3.E-03
			Dinoseb	3.0E-03	mg/kg	Decreased fetal weight	4.E-06	5.E-11	2.E-06	3.E-04	4.E-04
			Fluoranthene	6.6E-02	mg/kg	Nephropathy, increased liver weights, hematological alterations, and clinical effects	2.E-06	3.E-11	1.E-06	4.E-05	4.E-05
			Fluorene	1.1E-02	mg/kg	Blood-forming system	4.E-07	2.E-07	2.E-07	1.E-05	2.E-05
			Heptachlorepoxide	1.4E-03	mg/kg	Increased liver-to-body weight ratio in both males and females; Hepatocellular carcinomas	1.E-04	2.E-09	3.E-05	2.E-03	3.E-03
			Indeno(1,2,3-c,d)pyrene	1.7E-02	mg/kg		8.E-07	9.E-12	5.E-07	4.E-06	5.E-06
			MCPA	1.6E+00	mg/kg	Kidney and liver toxicity	4.E-03	6.E-08	2.E-03	6.E-01	6.E-01
			MCPP	3.0E+00	mg/kg	Increased absolute and relative kidney weights	4.E-03	5.E-08	2.E-03	6.E-01	6.E-01
			Nickel	3.0E+01	mg/kg	Decreased weight	2.E-03	4.E-05	8.E-05	2.E-02	2.E-02
			Phenanthrene	2.5E-02	mg/kg		1.E-06	1.E-11	7.E-07	3.E-05	3.E-05
			Pyrene	8.4E-02	mg/kg	Kidney	4.E-06	2.E-07	2.E-06	7.E-05	8.E-05
			Selenium	3.8E-01	mg/kg	Clinical selenosis	1.E-04	1.E-09	4.E-06	9.E-04	1.E-03
			Vanadium	5.1E+01	mg/kg	Liver and kidney	7.E-02	9.E-07	3.E-03	3.E-01	4.E-01
			alpha-Chlordane	5.4E-03	mg/kg		1.E-05	5.E-10	3.E-06	9.E-05	1.E-04
			bis(2-ethylhexyl)phthalate	1.5E-01	mg/kg	Liver	1.E-05	1.E-10	4.E-06	5.E-05	6.E-05
			delta-BHC	5.0E-04	mg/kg		2.E-06	3.E-11	5.E-07	1.E-04	1.E-04
			gamma-BHC(Lindane)	2.7E-04	mg/kg		1.E-06	2.E-11	2.E-07	8.E-05	9.E-05
			gamma-Chlordane	4.0E-03	mg/kg		1.E-05	3.E-10	2.E-06	7.E-05	8.E-05
			p,p'-DDD	9.4E-03	mg/kg		3.E-05	3.E-10	5.E-06	2.E-04	2.E-04
			p,p'-DDE	1.3E-02	mg/kg		4.E-05	5.E-10	7.E-06	2.E-04	2.E-04
			p,p'-DDT	3.3E-02	mg/kg	Liver	9.E-05	1.E-09	2.E-05	5.E-04	6.E-04
			TOTAL				**1.E-01**	**5.E-04**	**7.E-03**	**2.E+00**	**2.E+00**

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Table B9-5
Risk Characterization Summary - Non-Carcinogens
CS S-049

(Cont…)			2,4-DB	1.8E-02	mg/kg	Internal hemorrhage, mortality	3.E-06	4.E-11	1.E-06	3.E-04	3.E-04
			2,4-Dinitrophenol	3.8E-01	mg/kg	Cataract formation	3.E-04	3.E-09	1.E-04	3.E-01	3.E-01
			2-Methylnaphthalene	4.5E-02	mg/kg		2.E-05	3.E-04	9.E-06	7.E-04	1.E-03
			4-Nitrophenol	6.6E-02	mg/kg		--	--	--	--	--
			Acenaphthene	2.2E-02	mg/kg	Hepatotoxicity	5.E-07	6.E-07	3.E-07	2.E-05	3.E-05
			Anthracene	7.6E-03	mg/kg		3.E-08	1.E-08	2.E-08	1.E-06	1.E-06
			Arsenic	2.9E+00	mg/kg	Vascular	1.E-02	6.E-06	2.E-03	9.E-02	1.E-01
			Benzo(a)anthracene	1.4E-02	mg/kg		6.E-07	8.E-12	4.E-07	6.E-06	7.E-06
			Benzo(a)pyrene	3.5E-02	mg/kg		2.E-06	2.E-11	1.E-06	1.E-05	1.E-05
			Benzo(b)fluoranthene	1.7E-02	mg/kg		8.E-07	1.E-11	5.E-07	5.E-06	7.E-06
			Benzo(g,h,i)perylene	1.8E-02	mg/kg		8.E-07	1.E-11	5.E-07	5.E-06	6.E-06
			Benzo(k)fluoranthene	4.9E-02	mg/kg		2.E-06	3.E-11	1.E-06	2.E-05	2.E-05
			Benzoic acid	2.8E-01	mg/kg		1.E-07	1.E-12	4.E-08	7.E-05	7.E-05
			Beryllium	6.5E-01	mg/kg	Small intestine; Lungs	4.E-04	2.E-06	2.E-05	2.E-03	2.E-03
			Cadmium	3.2E+00	mg/kg	Significant proteinuria; Lung, trachea, bronchus cancer deaths	4.E-03	1.E-05	2.E-05	2.E-01	2.E-01
			Chromium	3.4E+01	mg/kg		3.E-05	4.E-10	1.E-06	1.E-04	2.E-04
			Chrysene	4.5E-02	mg/kg		2.E-06	2.E-07	1.E-06	2.E-05	2.E-05
			Dibenzo(a,h)anthracene	8.9E-03	mg/kg		4.E-07	5.E-12	2.E-07	2.E-06	3.E-06
			Dieldrin	9.5E-03	mg/kg	Liver lesions; Liver carcinoma	3.E-04	3.E-09	5.E-05	3.E-03	3.E-03
			Dinoseb	2.9E-03	mg/kg	Decreased fetal weight	4.E-06	5.E-11	2.E-06	3.E-04	3.E-04
Soil	Soil	CS S-049 - Soil On-site Direct Contact (0-10 ft bgs)	Fluoranthene	5.4E-02	mg/kg	Nephropathy, increased liver weights, hematological alterations, and clinical effects	2.E-06	2.E-11	1.E-06	3.E-05	3.E-05
			Fluorene	9.7E-03	mg/kg	Blood-forming system	3.E-07	2.E-07	2.E-07	1.E-05	1.E-05
			Heptachlorepoxide	1.2E-03	mg/kg	Increased liver-to-body weight ratio in both males and females; Hepatocellular carcinomas	1.E-04	2.E-09	3.E-05	2.E-03	2.E-03
			Indeno(1,2,3-c,d)pyrene	1.0E-02	mg/kg		5.E-07	6.E-12	3.E-07	3.E-06	3.E-06
			Lead	2.8E+01	mg/kg		--	--	--	--	--
			MCPA	1.6E+00	mg/kg	Kidney and liver toxicity	4.E-03	5.E-08	2.E-03	5.E-01	5.E-01
			MCPP	2.6E+00	mg/kg	Increased absolute and relative kidney weights	4.E-03	5.E-08	1.E-03	5.E-01	5.E-01
			Nickel	2.8E+01	mg/kg	Decreased weight	2.E-03	3.E-05	8.E-05	2.E-02	2.E-02
			Phenanthrene	1.6E-02	mg/kg		7.E-07	9.E-12	4.E-07	2.E-05	2.E-05
			Pyrene	5.4E-02	mg/kg	Kidney	2.E-06	1.E-07	1.E-06	4.E-05	5.E-05
			Selenium	3.6E-01	mg/kg	Clinical selenosis	1.E-04	1.E-09	4.E-06	8.E-04	9.E-04
			Vanadium	5.7E+01	mg/kg	Liver and kidney	8.E-02	1.E-06	3.E-03	3.E-01	4.E-01
			alpha-Chlordane	3.0E-03	mg/kg		8.E-06	3.E-10	2.E-06	5.E-05	6.E-05
			bis(2-ethylhexyl)phthalate	1.1E-01	mg/kg	Liver	8.E-06	1.E-10	3.E-06	4.E-05	5.E-05
			delta-BHC	4.1E-04	mg/kg		2.E-06	2.E-11	4.E-07	8.E-05	8.E-05
			gamma-BHC(Lindane)	2.6E-04	mg/kg		1.E-06	1.E-11	2.E-07	8.E-05	8.E-05
			gamma-Chlordane	2.2E-03	mg/kg		6.E-06	2.E-10	1.E-06	4.E-05	4.E-05
			p,p'-DDD	8.4E-03	mg/kg		2.E-05	3.E-10	5.E-06	2.E-04	2.E-04
			p,p'-DDE	5.3E-03	mg/kg		1.E-05	2.E-10	3.E-06	8.E-05	9.E-05
			p,p'-DDT	1.2E-02	mg/kg	Liver	3.E-05	4.E-10	6.E-06	2.E-04	2.E-04
			TOTAL				**1.E-01**	**4.E-04**	**8.E-03**	**2.E+00**	**2.E+00**

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Table B9-5
Risk Characterization Summary - Non-Carcinogens
CS S-049

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Child**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	CS S-049 - Soil On-site Direct Contact (0-2 ft bgs)	2,4-DB	1.7E-02	mg/kg	Internal hemorrhage, mortality	3.E-05	8.E-11	8.E-06	7.E-04	7.E-04
			2-Methylnaphthalene	4.5E-02	mg/kg		1.E-04	8.E-04	6.E-05	2.E-03	3.E-03
			Acenaphthene	2.2E-02	mg/kg	Hepatotoxicity	5.E-06	1.E-06	2.E-06	7.E-05	8.E-05
			Aluminum	1.3E+04	mg/kg		2.E-01	4.E-04	5.E-03	2.E-01	4.E-01
			Benzo(a)anthracene	1.6E-02	mg/kg		7.E-06	2.E-11	3.E-06	2.E-05	3.E-05
			Benzo(a)pyrene	3.5E-02	mg/kg		1.E-05	5.E-11	6.E-06	3.E-05	5.E-05
			Benzo(b)fluoranthene	2.8E-02	mg/kg		1.E-05	4.E-11	5.E-06	2.E-05	4.E-05
			Benzo(g,h,i)perylene	5.2E-02	mg/kg		2.E-05	7.E-11	1.E-05	4.E-05	7.E-05
			Beryllium	6.6E-01	mg/kg	Small intestine; Lungs	4.E-03	5.E-06	1.E-04	5.E-03	9.E-03
			Cadmium	1.4E+00	mg/kg	Significant proteinuria; Lung, trachea, bronchus cancer deaths	2.E-02	1.E-05	5.E-05	2.E-01	2.E-01
			Chromium	3.8E+01	mg/kg		3.E-04	1.E-09	9.E-06	4.E-04	7.E-04
			Chrysene	4.4E-02	mg/kg		2.E-05	3.E-07	8.E-06	5.E-05	8.E-05
			Copper	9.5E+01	mg/kg		3.E-02	9.E-08	9.E-04	4.E-02	7.E-02
			Dibenzo(a,h)anthracene	1.4E-02	mg/kg		6.E-06	2.E-11	3.E-06	9.E-06	2.E-05
			Dieldrin	9.9E-03	mg/kg	Liver lesions; Liver carcinoma	3.E-03	8.E-09	4.E-04	8.E-03	1.E-02
			Dinoseb	3.0E-03	mg/kg	Decreased fetal weight	4.E-05	1.E-10	1.E-05	9.E-04	1.E-03
			Fluoranthene	6.6E-02	mg/kg	Nephropathy, increased liver weights, hematological alterations, and clinical effects	2.E-05	7.E-11	9.E-06	1.E-04	1.E-04
			Fluorene	1.1E-02	mg/kg	Blood-forming system	4.E-06	5.E-07	2.E-06	4.E-05	5.E-05
			Heptachlorepoxide	1.4E-03	mg/kg	Increased liver-to-body weight ratio in both males and females; Hepatocellular carcinomas	1.E-03	4.E-09	2.E-04	6.E-03	8.E-03
			Indeno(1,2,3-c,d)pyrene	1.7E-02	mg/kg		7.E-06	2.E-11	3.E-06	1.E-05	2.E-05
			MCPA	1.6E+00	mg/kg	Kidney and liver toxicity	4.E-02	1.E-07	1.E-02	2.E+00	2.E+00
			MCPP	3.0E+00	mg/kg	Increased absolute and relative kidney weights	4.E-02	1.E-07	1.E-02	2.E+00	2.E+00
			Nickel	3.0E+01	mg/kg	Decreased weight	2.E-02	8.E-05	6.E-04	5.E-02	7.E-02
			Phenanthrene	2.5E-02	mg/kg		1.E-05	3.E-11	5.E-06	8.E-05	9.E-05
			Pyrene	8.4E-02	mg/kg	Kidney	4.E-05	5.E-07	2.E-05	2.E-04	2.E-04
			Selenium	3.8E-01	mg/kg	Clinical selenosis	1.E-03	3.E-09	3.E-05	2.E-03	3.E-03
			Vanadium	5.1E+01	mg/kg	Liver and kidney	7.E-01	2.E-06	2.E-02	8.E-01	1.E+00
			alpha-Chlordane	5.4E-03	mg/kg		1.E-04	1.E-09	2.E-05	3.E-04	4.E-04
			bis(2-ethylhexyl)phthalate	1.5E-01	mg/kg	Liver	1.E-04	3.E-10	3.E-05	1.E-04	3.E-04
			delta-BHC	5.0E-04	mg/kg		2.E-05	7.E-11	3.E-06	3.E-04	3.E-04
			gamma-BHC(Lindane)	2.7E-04	mg/kg		1.E-05	4.E-11	2.E-06	2.E-04	2.E-04
			gamma-Chlordane	4.0E-03	mg/kg		1.E-04	8.E-10	1.E-05	2.E-04	3.E-04
			p,p'-DDD	9.4E-03	mg/kg		2.E-04	8.E-10	3.E-05	6.E-04	9.E-04
			p,p'-DDE	1.3E-02	mg/kg		3.E-04	1.E-09	5.E-05	5.E-04	9.E-04
			p,p'-DDT	3.3E-02	mg/kg	Liver	8.E-04	3.E-09	1.E-04	1.E-03	2.E-03
			TOTAL				**1.E+00**	**1.E-03**	**5.E-02**	**4.E+00**	**6.E+00**

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Table B9-5
Risk Characterization Summary - Non-Carcinogens
CS S-049

(Cont…)			2,4-DB	1.8E-02	mg/kg	Internal hemorrhage, mortality	3.E-05	9.E-11	8.E-06	7.E-04	8.E-04
			2,4-Dinitrophenol	3.8E-01	mg/kg	Cataract formation	2.E-03	8.E-09	7.E-04	7.E-01	7.E-01
			2-Methylnaphthalene	4.5E-02	mg/kg		1.E-04	8.E-04	6.E-05	2.E-03	3.E-03
			4-Nitrophenol	6.6E-02	mg/kg		--	--	--	--	--
			Acenaphthene	2.2E-02	mg/kg	Hepatotoxicity	5.E-06	1.E-06	2.E-06	7.E-05	8.E-05
			Anthracene	7.6E-03	mg/kg		3.E-07	2.E-08	1.E-07	3.E-06	3.E-06
			Arsenic	2.9E+00	mg/kg	Vascular	1.E-01	1.E-05	1.E-02	2.E-01	4.E-01
			Benzo(a)anthracene	1.4E-02	mg/kg		6.E-06	2.E-11	3.E-06	2.E-05	2.E-05
			Benzo(a)pyrene	3.5E-02	mg/kg		1.E-05	5.E-11	6.E-06	3.E-05	5.E-05
			Benzo(b)fluoranthene	1.7E-02	mg/kg		7.E-06	2.E-11	3.E-06	1.E-05	3.E-05
			Benzo(g,h,i)perylene	1.8E-02	mg/kg		8.E-06	2.E-11	3.E-06	1.E-05	2.E-05
			Benzo(k)fluoranthene	4.9E-02	mg/kg		2.E-05	7.E-11	9.E-06	4.E-05	7.E-05
			Benzoic acid	2.8E-01	mg/kg		9.E-07	3.E-12	3.E-07	2.E-04	2.E-04
			Beryllium	6.5E-01	mg/kg	Small intestine; Lungs	4.E-03	5.E-06	1.E-04	5.E-03	9.E-03
			Cadmium	3.2E+00	mg/kg	Significant proteinuria; Lung, trachea, bronchus cancer deaths	4.E-02	2.E-05	1.E-04	5.E-01	5.E-01
			Chromium	3.4E+01	mg/kg		3.E-04	9.E-10	8.E-06	4.E-04	7.E-04
			Chrysene	4.5E-02	mg/kg		2.E-05	4.E-07	8.E-06	5.E-05	8.E-05
			Dibenzo(a,h)anthracene	8.9E-03	mg/kg		4.E-06	1.E-11	2.E-06	6.E-06	1.E-05
			Dieldrin	9.5E-03	mg/kg	Liver lesions; Liver carcinoma	2.E-03	8.E-09	4.E-04	8.E-03	1.E-02
			Dinoseb	2.9E-03	mg/kg	Decreased fetal weight	4.E-05	1.E-10	1.E-05	9.E-04	1.E-03
Soil	Soil	CS S-049 - Soil On-site Direct Contact (0-10 ft bgs)	Fluoranthene	5.4E-02	mg/kg	Nephropathy, increased liver weights, hematological alterations, and clinical effects	2.E-05	5.E-11	7.E-06	9.E-05	1.E-04
			Fluorene	9.7E-03	mg/kg	Blood-forming system	3.E-06	4.E-07	1.E-06	4.E-05	4.E-05
			Heptachlorepoxide	1.2E-03	mg/kg	Increased liver-to-body weight ratio in both males and females; Hepatocellular carcinomas	1.E-03	4.E-09	2.E-04	6.E-03	7.E-03
			Indeno(1,2,3-c,d)pyrene	1.0E-02	mg/kg		4.E-06	1.E-11	2.E-06	7.E-06	1.E-05
			Lead	2.8E+01	mg/kg		--	--	--	--	--
			MCPA	1.6E+00	mg/kg	Kidney and liver toxicity	4.E-02	1.E-07	1.E-02	1.E+00	2.E+00
			MCPP	2.6E+00	mg/kg	Increased absolute and relative kidney weights	3.E-02	1.E-07	1.E-02	1.E+00	2.E+00
			Nickel	2.8E+01	mg/kg	Decreased weight	2.E-02	8.E-05	5.E-04	5.E-02	6.E-02
			Phenanthrene	1.6E-02	mg/kg		7.E-06	2.E-11	3.E-06	5.E-05	6.E-05
			Pyrene	5.4E-02	mg/kg	Kidney	2.E-05	3.E-07	1.E-05	1.E-04	2.E-04
			Selenium	3.6E-01	mg/kg	Clinical selenosis	9.E-04	3.E-09	3.E-05	2.E-03	3.E-03
			Vanadium	5.7E+01	mg/kg	Liver and kidney	7.E-01	2.E-06	2.E-02	9.E-01	2.E+00
			alpha-Chlordane	3.0E-03	mg/kg		8.E-05	6.E-10	1.E-05	1.E-04	2.E-04
			bis(2-ethylhexyl)phthalate	1.1E-01	mg/kg	Liver	7.E-05	2.E-10	2.E-05	1.E-04	2.E-04
			delta-BHC	4.1E-04	mg/kg		2.E-05	6.E-11	3.E-06	2.E-04	2.E-04
			gamma-BHC(Lindane)	2.6E-04	mg/kg		1.E-05	3.E-11	2.E-06	2.E-04	2.E-04
			gamma-Chlordane	2.2E-03	mg/kg		5.E-05	4.E-10	8.E-06	1.E-04	2.E-04
			p,p'-DDD	8.4E-03	mg/kg		2.E-04	7.E-10	3.E-05	5.E-04	8.E-04
			p,p'-DDE	5.3E-03	mg/kg		1.E-04	4.E-10	2.E-05	2.E-04	4.E-04
			p,p'-DDT	1.2E-02	mg/kg	Liver	3.E-04	9.E-10	4.E-05	5.E-04	9.E-04
			TOTAL				**1.E+00**	**9.E-04**	**6.E-02**	**5.E+00**	**6.E+00**

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Table B9-5
Risk Characterization Summary - Non-Carcinogens
CS S-049

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Occupational**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	CS S-049 - Soil On-site Direct Contact (0-2 ft bgs)	2,4-DB	1.7E-02	mg/kg	Internal hemorrhage, mortality	2.E-06	3.E-11	2.E-06	--	4.E-06
			2-Methylnaphthalene	4.5E-02	mg/kg		1.E-05	2.E-04	2.E-05	--	3.E-04
			Acenaphthene	2.2E-02	mg/kg	Hepatotoxicity	4.E-07	4.E-07	6.E-07	--	1.E-06
			Aluminum	1.3E+04	mg/kg		1.E-02	1.E-04	1.E-03	--	1.E-02
			Benzo(a)anthracene	1.6E-02	mg/kg		5.E-07	7.E-12	9.E-07	--	1.E-06
			Benzo(a)pyrene	3.5E-02	mg/kg		1.E-06	1.E-11	2.E-06	--	3.E-06
			Benzo(b)fluoranthene	2.8E-02	mg/kg		9.E-07	1.E-11	2.E-06	--	2.E-06
			Benzo(g,h,i)perylene	5.2E-02	mg/kg		2.E-06	2.E-11	3.E-06	--	5.E-06
			Beryllium	6.6E-01	mg/kg	Small intestine; Lungs	3.E-04	1.E-06	4.E-05	--	4.E-04
			Cadmium	1.4E+00	mg/kg	Significant proteinuria; Lung, trachea, bronchus cancer deaths	1.E-03	3.E-06	2.E-05	--	1.E-03
			Chromium	3.8E+01	mg/kg		2.E-05	3.E-10	3.E-06	--	3.E-05
			Chrysene	4.4E-02	mg/kg		1.E-06	1.E-07	2.E-06	--	4.E-06
			Copper	9.5E+01	mg/kg		2.E-03	3.E-08	3.E-04	--	3.E-03
			Dibenzo(a,h)anthracene	1.4E-02	mg/kg		5.E-07	6.E-12	8.E-07	--	1.E-06
			Dieldrin	9.9E-03	mg/kg	Liver lesions; Liver carcinoma	2.E-04	2.E-09	1.E-04	--	3.E-04
			Dinoseb	3.0E-03	mg/kg	Decreased fetal weight	3.E-06	4.E-11	3.E-06	--	6.E-06
			Fluoranthene	6.6E-02	mg/kg	Nephropathy, increased liver weights, hematological alterations, and clinical effects	2.E-06	2.E-11	3.E-06	--	4.E-06
			Fluorene	1.1E-02	mg/kg	Blood-forming system	3.E-07	2.E-07	5.E-07	--	9.E-07
			Heptachlorepoxide	1.4E-03	mg/kg	Increased liver-to-body weight ratio in both males and females; Hepatocellular carcinomas	1.E-04	1.E-09	6.E-05	--	2.E-04
			Indeno(1,2,3-c,d)pyrene	1.7E-02	mg/kg		5.E-07	7.E-12	9.E-07	--	1.E-06
			MCPA	1.6E+00	mg/kg	Kidney and liver toxicity	3.E-03	4.E-08	4.E-03	--	7.E-03
			MCPP	3.0E+00	mg/kg	Increased absolute and relative kidney weights	3.E-03	4.E-08	3.E-03	--	6.E-03
			Nickel	3.0E+01	mg/kg	Decreased weight	1.E-03	3.E-05	2.E-04	--	2.E-03
			Phenanthrene	2.5E-02	mg/kg		8.E-07	1.E-11	1.E-06	--	2.E-06
			Pyrene	8.4E-02	mg/kg	Kidney	3.E-06	1.E-07	5.E-06	--	8.E-06
			Selenium	3.8E-01	mg/kg	Clinical selenosis	7.E-05	8.E-10	8.E-06	--	8.E-05
			Vanadium	5.1E+01	mg/kg	Liver and kidney	5.E-02	6.E-07	6.E-03	--	6.E-02
			alpha-Chlordane	5.4E-03	mg/kg		1.E-05	3.E-10	6.E-06	--	2.E-05
			bis(2-ethylhexyl)phthalate	1.5E-01	mg/kg	Liver	7.E-06	9.E-11	8.E-06	--	2.E-05
			delta-BHC	5.0E-04	mg/kg		2.E-06	2.E-11	9.E-07	--	3.E-06
			gamma-BHC(Lindane)	2.7E-04	mg/kg		9.E-07	1.E-11	5.E-07	--	1.E-06
			gamma-Chlordane	4.0E-03	mg/kg		8.E-06	2.E-10	4.E-06	--	1.E-05
			p,p'-DDD	9.4E-03	mg/kg		2.E-05	2.E-10	1.E-05	--	3.E-05
			p,p'-DDE	1.3E-02	mg/kg		3.E-05	3.E-10	1.E-05	--	4.E-05
			p,p'-DDT	3.3E-02	mg/kg	Liver	6.E-05	8.E-10	4.E-05	--	1.E-04
			TOTAL				**7.E-02**	**4.E-04**	**1.E-02**	--	**9.E-02**

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Table B9-5
Risk Characterization Summary - Non-Carcinogens
CS S-049

Scenario Timeframe:	**Future**										
Receptor Population:	**Contruction Worker**										
Receptor Age:	**Adult**										
							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	CS S-049 - Soil On-site Direct Contact (0-15 ft bgs)	2,4-DB	1.8E-02	mg/kg	Internal hemorrhage, mortality	7.E-06	4.E-07	1.E-05	--	2.E-05
			2,4-Dinitrophenol	3.8E-01	mg/kg	Cataract formation	6.E-04	4.E-05	8.E-04	--	1.E-03
			2-Methylnaphthalene	4.5E-02	mg/kg		4.E-05	2.E-04	8.E-05	--	4.E-04
			4-Nitrophenol	6.6E-02	mg/kg		--	--	--	--	--
			Acenaphthene	2.2E-02	mg/kg	Hepatotoxicity	1.E-06	5.E-07	2.E-06	--	4.E-06
			Anthracene	7.6E-03	mg/kg		8.E-08	1.E-08	2.E-07	--	3.E-07
			Arsenic	2.8E+00	mg/kg	Vascular	3.E-02	6.E-02	1.E-02	--	1.E-01
			Benzo(a)anthracene	1.4E-02	mg/kg		2.E-06	9.E-08	3.E-06	--	5.E-06
			Benzo(a)pyrene	3.5E-02	mg/kg		4.E-06	2.E-07	8.E-06	--	1.E-05
			Benzo(b)fluoranthene	1.7E-02	mg/kg		2.E-06	1.E-07	4.E-06	--	6.E-06
			Benzo(g,h,i)perylene	1.8E-02	mg/kg		2.E-06	1.E-07	4.E-06	--	6.E-06
			Benzo(k)fluoranthene	4.9E-02	mg/kg		5.E-06	3.E-07	1.E-05	--	2.E-05
			Benzoic acid	2.8E-01	mg/kg		2.E-07	1.E-08	3.E-07	--	6.E-07
			Beryllium	6.5E-01	mg/kg	Small intestine; Lungs	1.E-03	2.E-02	1.E-04	--	2.E-02
			Cadmium	3.1E+00	mg/kg	Significant proteinuria; Lung, trachea, bronchus cancer deaths	1.E-02	1.E-01	1.E-04	--	1.E-01
			Chromium	3.4E+01	mg/kg		7.E-05	4.E-06	1.E-05	--	9.E-05
			Chrysene	4.5E-02	mg/kg		5.E-06	4.E-07	1.E-05	--	2.E-05
			Dibenzo(a,h)anthracene	8.9E-03	mg/kg		1.E-06	6.E-08	2.E-06	--	3.E-06
			Dieldrin	9.5E-03	mg/kg	Liver lesions; Liver carcinoma	6.E-04	4.E-05	4.E-04	--	1.E-03
			Dinoseb	2.9E-03	mg/kg	Decreased fetal weight	9.E-06	6.E-07	1.E-05	--	2.E-05
			Fluoranthene	5.4E-02	mg/kg	Nephropathy, increased liver weights, hematological alterations, and clinical effects	4.E-06	3.E-07	9.E-06	--	1.E-05
			Fluorene	9.7E-03	mg/kg	Blood-forming system	8.E-07	2.E-07	2.E-06	--	3.E-06
			Heptachlorepoxide	1.2E-03	mg/kg	Increased liver-to-body weight ratio in both males and females; Hepatocellular carcinomas	3.E-04	2.E-05	2.E-04	--	5.E-04
			Indeno(1,2,3-c,d)pyrene	1.0E-02	mg/kg		1.E-06	7.E-08	2.E-06	--	4.E-06
			Lead	2.8E+01	mg/kg		--	--	--	--	--
			MCPA	1.6E+00	mg/kg	Kidney and liver toxicity	1.E-02	6.E-04	1.E-02	--	2.E-02
			MCPP	2.6E+00	mg/kg	Increased absolute and relative kidney weights	9.E-03	5.E-04	1.E-02	--	2.E-02
			Nickel	2.8E+01	mg/kg	Decreased weight	4.E-03	4.E-01	6.E-04	--	4.E-01
			Phenanthrene	1.6E-02	mg/kg		2.E-06	1.E-07	4.E-06	--	5.E-06
			Pyrene	5.4E-02	mg/kg	Kidney	6.E-06	4.E-07	1.E-05	--	2.E-05
			Selenium	3.6E-01	mg/kg	Clinical selenosis	2.E-04	1.E-05	3.E-05	--	3.E-04
			Vanadium	5.7E+01	mg/kg	Liver and kidney	2.E-01	1.E-02	3.E-02	--	2.E-01
			alpha-Chlordane	3.0E-03	mg/kg		2.E-05	3.E-06	1.E-05	--	4.E-05
			bis(2-ethylhexyl)phthalate	1.1E-01	mg/kg	Liver	2.E-05	1.E-06	2.E-05	--	4.E-05
			delta-BHC	4.1E-04	mg/kg		4.E-06	3.E-07	3.E-06	--	8.E-06
			gamma-BHC(Lindane)	2.6E-04	mg/kg		3.E-06	2.E-07	2.E-06	--	5.E-06
			gamma-Chlordane	2.2E-03	mg/kg		1.E-05	2.E-06	1.E-05	--	3.E-05
			p,p'-DDD	8.4E-03	mg/kg		5.E-05	3.E-06	4.E-05	--	1.E-04
			p,p'-DDE	5.3E-03	mg/kg		3.E-05	2.E-06	2.E-05	--	6.E-05
			p,p'-DDT	1.2E-02	mg/kg	Liver	8.E-05	5.E-06	5.E-05	--	1.E-04
			TOTAL				**2.E-01**	**6.E-01**	**7.E-02**	--	**9.E-01**

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SECTION B10

PRL S-047

B10.1 Site Overview and Features

PRL S-047 is located in the northeastern portion of OU H within a former residential area. The site consists of a portion of Building 943 (boiler room), an adjacent automobile parking area, a former boiler drainage trench (located beneath the automobile parking area), and a storage area. The boiler was used as a backup heating source for Building 943. The waste stream from the boiler and surface runoff from the area surrounding Building 943 was discharged into the boiler drainage trench. It is unclear if the trench was lined. The location of a fuel tank that supplied petroleum-based fuel for the boiler is unknown. There is no record of an underground storage tank (UST) at the site. Aerial photographs from 1953 through 1991 revealed some surface soil discoloration in the area, but no aboveground storage tank (AST) was observed (Aerial Photographic Analysis of McClellan Air Force Base, EPA Region 9, 1993).

At the time of the RICS (Jacobs, 2000a), Building 943 was used as an administration building for Base food services. A portion of the building also housed a military uniform shop and linen exchange. Historically, the building was used as a dining facility until it was converted to the administration building around 1976.

B10.2 Source of Contamination

The primary contaminants at PRL S-047 are SVOCs, VOCs, metals, and TPH in soil. The waste stream from the boiler and surface runoff from the area surrounding Building 943 was discharged into the boiler drainage trench.

Potential areas of contamination include the former boiler room, the former boiler drainage trench, and an outdoor materials storage area. Petroleum-based fuels were used in the boiler. The materials handled at the storage area are unknown.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Radian. 1995. *Operable Units E - H Preliminary Assessment Report*. Draft
- Jacobs. 2000a. *Operable Units E-H: Remedial Investigation Characterization Summaries 2*. Final. June.

  Text: Vol. 2, PRL S-47, pgs. 1-14
  Hits Table: Vol. 2, PRL S-47, Attachment 1, pgs. 1-2
  All Data: Vol. 4, Appendix A, PRLS47, pgs. 10, 12-2
- Aerial Photographic Analysis of McClellan Air Force Base, Sacramento, CA, July 1993. EPA Region 9.
- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study #2*. Final. May.

B10.3 Sampling Strategy and Type of Contamination

McClellan Environmental Management (EM) conducted several investigations focusing on the boiler room and boiler drainage trench during the late 1980s. During these investigations, four soil excavations were performed. Samples from the four excavations were analyzed for VOCs, SVOCs, AVOCs, and metals. The remedial investigation performed in September 1997 and December and October 1998 was designed to fully characterize the site. Samples collected during this investigation were analyzed for TPH, VOCs, and SVOCs. Metals were not identified as COCs in the RICS so no metals analyses were performed during the RI.

B10.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at PRL S-047. VOCs, SVOC, and mercury were determined to be present at the site. Figure B-10 identifies the site location and significant site features.

Several remedial investigations in the late 1980s and early 1990s reported the presence of fuel-related compounds and metals in the soil surrounding the boiler room and the boiler room drainage trench. A review of historical records suggest that soil excavation events removed approximately 300 cubic yards of soil from PRL S-047, but the exact location and volume of soil removed is unknown due to limited documentation (Jacobs, 2000). The excavation information available during this review is described below. According to historical records, a total of four soil excavation events have been conducted at PRL S-047:

- The first soil excavation event occurred on December 23, 1987 near the east end of Building 943 (boiler room). The exact volume of soil removed and the perimeter of this excavation effort were not available. EM collected two soil samples between 1 and 7 feet bgs from a 20-by-30-foot area. Five aromatic VOCs and SVOCs were detected. A maximum benzene concentration of 3 ∝g/kg was reported.

- The second excavation occurred on January 5, 1988 from the trench adjacent to Building 943. The exact volume of soil removed and the perimeter of this excavation effort were not available. Ten soil samples were collected by EM at 10 locations from a 150-foot section of the trench. Five VOCs and SVOCs were detected. A benzene concentration of 13 ∝g/kg was reported. Arsenic, mercury, selenium, and thallium concentrations reported from a single sample exceeded the combined background levels. Arsenic and thallium concentrations also exceeded risk-based screening levels; however, method SW6010 used for the metals analysis is known to produce unreliable results for these metals. The detected mercury concentration exceeded the screening level for protection of surface water, however this sample was collected from between 1 and 7 feet bgs (sampling records do not specify an exact depth); deeper than the applicable range (0 to 1 foot bgs) for surface water protection screening levels.

- A third excavation event occurred on January 11, 1988. EM collected eight composite soil samples from both the boiler room and the trench area along Building 943 to perform bioassay tests. The test results indicated that the composite soil samples did not meet the

acute aquatic toxicity test criteria for classification of material as hazardous. The exact volume of soil removed and the perimeter of this excavation effort were not available.

- Finally, in December 1990 a fourth excavation event is documented. CH2M HILL conducted a Soil Waste Streams Record Review for McClellan and determined twelve soil samples were collected from Building 943, but the exact sample locations, depths, methods used for analysis, and year was unavailable. The volume of soil removed and the perimeter of this excavation effort were not available. Thirteen aromatic VOCs and SVOCs, were detected. Maximum concentration of di(2-ethylhexyl)phthalate was 2,700 ∝g/kg (Radian, 1995).

As documented in the RICS (Jacobs, 2000a), eleven soil borings (PS47SB001 through PS47SB011) were drilled and sampled for TPH, VOCs, and SVOCs during September 1997 and October and December 1998. Metals were not identified as COCs in the RICS, and therefore, no metals analyses were performed. The soil borings were well-placed to adequately represent areas of potential contamination. Borings PS47SB001 through PS47SB005, PS47SB010, and PS47SB011 were located along the trench adjacent to Building 943. Boring PS47SB008 was located in the former surface storage area. Borings PS47SB001 and PS47SB009 were located in the boiler room area.

SSG samples were collected at approximately 10 feet bgs from borings PS47SB009 through PS47SB011 and at approximately 20 feet bgs in borings PS47SB001 through PS47SB004. All soil gas samples were analyzed for VOCs using analytical method M18MS. Duplicate samples from PS47SB001 and PS47SB004 were analyzed for VOCs using analytical method TO-14. Hexane was the only VOC detected in the SSG samples. It was detected in only one sample at a concentration of 1,500 ppbv (at 9.7 feet bgs from PS47SB009), which is below the SSG screening level for unrestricted use. Low levels of VOCs were detected in the soil gas samples collected from PS47SB001 through PS47SB004. The maximum VOC concentration was 4,200 ppbv of Freon 11 at 20 feet bgs from PS47SB004

Borings PS47SB005 through PS47SB008 were drilled to approximately 5 feet bgs. Samples were analyzed for TPH-D, TPH-G, and SVOCs using analytical method M8015D, M8015V, and SW8270B, respectively. TPH-G and TPH-D were not reported above detection limits in any soil samples collected at PRL S-047. However, duplicate samples were analyzed using a DI-WET test. The results reported TPH-D in the leachate from soil borings PS47SB002 and PS47SB006 (92 J µg/l at 2 feet bgs and 120 J µg/l at 1 feet bgs, respectively). All soil borings were analyzed for SVOCs at PRL S-047. Trace levels of DEHP and DEPH were reported, but were below screening levels. No other SVOCs were detected (Jacobs, 2000a).

B10.5 Contamination Exposure and Migration

No surface soil samples were collected at depths less than 1 foot bgs with which to compare to surface water screening values. Arsenic and thallium were found to exceed the screening levels for protection of groundwater, although, the method used to quantify the arsenic and thallium concentrations (SW6010) is known to produce unreliable results for these compounds. In addition, the reported concentrations are only slightly greater than the protection of groundwater screening levels, therefore impacts to groundwater are not anticipated.

B10.6 Current and Potential Future Site and Resource Uses

PRL S-047 is the heating and cooling plant for the former dormitories, which are currently in use. The site is located within the Community Support Subdistrict with allowable uses such as commercial, residential, and recreational.

B10.7 Human Health Risk Assessment

The potential COC identified at PRL S-047 for the HHRA was n-hexane (VOC), detected in shallow soil in the southeastern corner of the site. n-Hexane is not considered carcinogenic; thus, only non-carcinogenic hazard was evaluated in the risk assessment. Residential and occupational exposure scenarios were evaluated for PRL S-047. The non-cancer hazard indices for the future adult and child residential scenario are less than 1 for both soil intervals (0 to 2 and 0 to 10 feet bgs, respectively). In addition, the hazard indices are also less than 1 for the outdoor and indoor occupational worker and future construction worker scenarios. The potential for adverse non-cancer health effects for the adult resident and worker scenarios is unlikely at PRL S-047. DEPH and DEHP were detected at low levels in subsurface soils; however, they were determined not to be representative of site contamination, and therefore were not considered in the HHRA. DEPH and DEHP detections were also below the screening levels for protection of human health.

B10.8 Uncertainties

The sampling and analyses performed during the remedial investigation were sufficient and appropriate for the potential contaminants and release mechanisms at this site. There were no uncertainties identified for this site.

There are uncertainties associated with the risk estimates for PRL S-047. The main uncertainty is that the current reuse plans for this site are indefinite, but do not include residential or other "sensitive" use scenarios (day-cares, schools, hospitals, etc.). Although there are dormitories surrounding the site, the site itself is planned for commercial or community support purposes. Hence, the use of the residential scenario for the site should be considered hypothetical at this time.

B10.9 Basis for No Action

The low levels of contaminants present at PRL S-047 do not present a threat to human health or the environment. Therefore, no action is necessary at this site to protect human health or welfare or the environment.

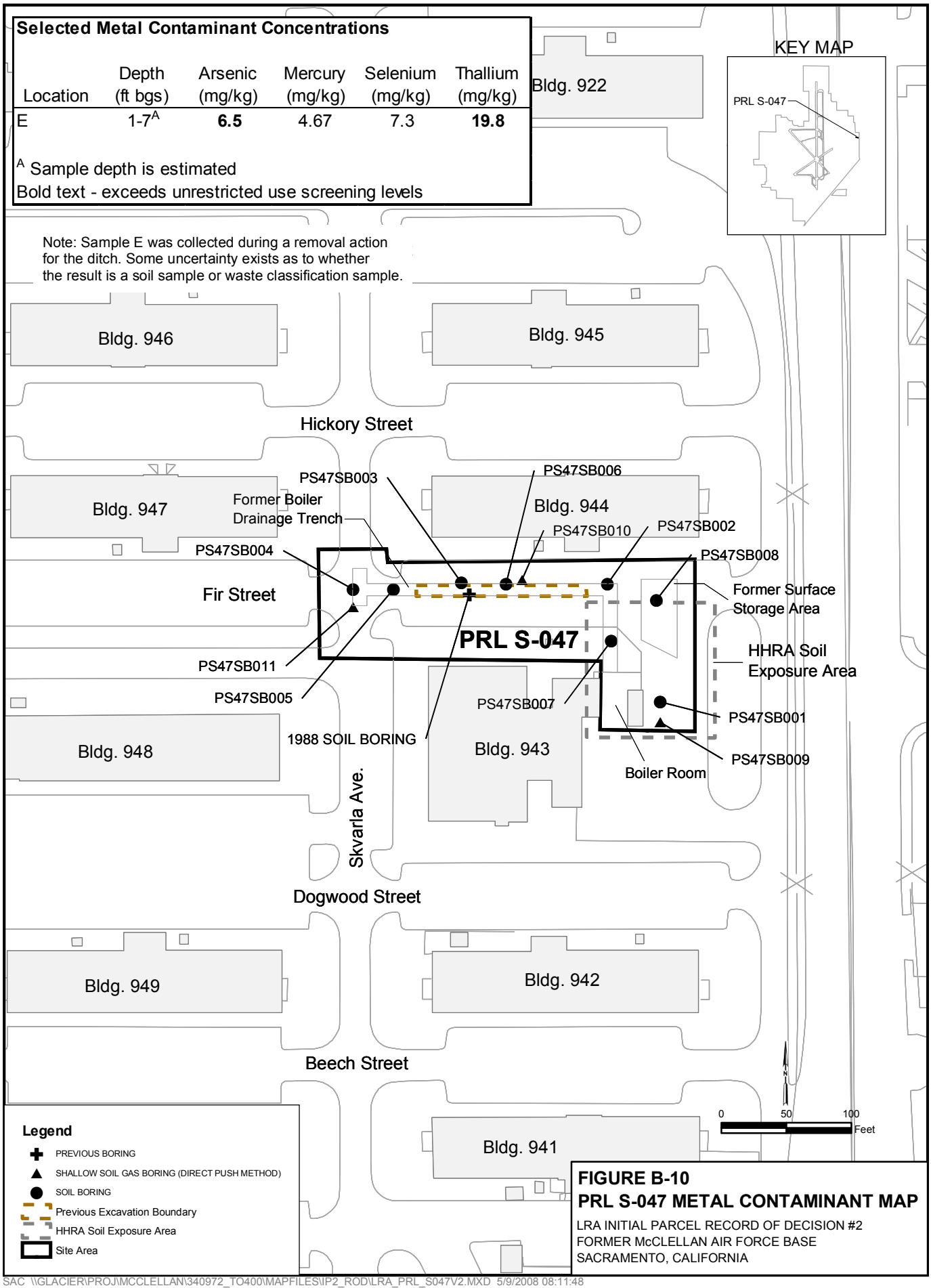

FIGURE B-10
PRL S-047 METAL CONTAMINANT MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

SAC \\GLACIER\PROJ\MCCLELLAN\340972_TO400\MAPFILES\IP2_ROD\LRA_PRL_S047V2.MXD 5/9/2008 08:11:48

Attachment B10
PRL S-047 Human Health Risk Assessment

ATTACHMENT B10

PRL S-047

The baseline human health risk assessment estimates what risks the site poses if no action were taken. This section of the ROD summarizes the results of the updated baseline risk assessment for PRL S-047. This risk assessment was originally presented in the OU E-H RICS2 (Jacobs, 2000). This update uses the same risk assessment methodology as OU E-H for all exposure pathways except those involving indoor air. For indoor air pathways (i.e., inhalation exposure route for residential and indoor occupational scenarios), the SSG screening levels that are presented in Appendix C of this ROD and the SSG exposure point concentrations (see Table B10-1a) were used as the basis for inhalation cancer risk and non-cancer hazard calculations. In addition, for chemicals that have had toxicity value updates since the OU E-H RICS2 was published, the most recent toxicity criteria have been used.

Identification of Chemicals of Concern

The potential contaminant of concern (COC) for PRL S-047 is n-hexane. Tables B10-1a and B10-1b present the air and soil gas data summaries, respectively, for the COC (tables are located at the end of this attachment).

Table B10-1b includes the range of the potential COC concentration, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the exposure point concentration (EPC), and how the EPC was derived for the media and exposure area of PRL S-047. In general, the lower value of the maximum concentration or the upper 95th percent confidence limit on the mean was used as the EPC for potential COCs detected in more than one sample.

Exposure Assessment

A conceptual model was developed that describes the potential exposure pathways associated with air and soil gas at PRL S-047 (see Figure 2-3 in Section 2.4 of the ROD). Although PRL S-047 will likely be used for commercial/industrial or community support purposes in the future; several exposure scenarios were evaluated in the human health risk assessment to provide information for future risk-management decisions.

The following exposure scenarios were quantitatively evaluated in the human health risk assessment:

- Exposure of hypothetical future residents (adults and children) to soil (0 to 2 feet bgs)
- Exposure of hypothetical future residents (adults and children) to soil (0 to 10 feet bgs)
- Exposure of outdoor workers to soil (0 to 2 feet bgs)
- Exposure of indoor workers to VOCs in indoor air
- Exposure of construction workers to soil (0 to 15 feet bgs)

The exposure routes that were considered in the risk assessment for residents and workers potentially exposed to soil include incidental soil ingestion, inhalation of VOCs (indoor air for residents and ambient air for outdoor workers and construction workers) and resuspended particulates, and dermal contact with soil. For the indoor worker, potential risk associated with inhalation of VOCs in indoor air was evaluated.

Toxicity Assessment

The toxicity data that were used in the human health risk assessment are summarized on Tables B10-2. Health effects are divided into two categories: cancer and non-cancer effects. However, n-hexane is a noncarcinogen, and only non-cancer effects were evaluated.

Table B10-2 presents the reference doses (RfDs) used to evaluate the potential for non-cancer health effects. The oral RfDs were used to estimate potential health effects associated with dermal exposure. In addition, when inhalation reference concentrations are not available for some of the COCs, the oral RfDs were used to evaluate potential health effects from the inhalation exposure route.

The hierarchy of sources for toxicity values follows EPA and Air Force guidance (EPA, 2003 and USAF, 2006) and is listed below in order of preference:

1. EPA Integrated Risk Information System (IRIS) – online database (EPA, 2007)
2. EPA's Provisional Peer Reviewed Toxicity Values (as cited in the 2004 EPA Region 9 Preliminary Remediation Goal [PRG] table [EPA, 2004])
3. California Environmental Protection Agency (Cal-EPA) cancer potency factors and reference exposure levels (REL) - online database (Cal-EPA, 2007)
4. Other EPA sources (i.e., Health Effects Assessment Summary Table [HEAST], National Center for Environmental Assessment [NCEA] provisional toxicity values, and route-extrapolated toxicity values as cited in the 2004 EPA Region 9 PRG table [EPA, 2004]).

Toxicity criteria for several contaminants have changed since the human health risk assessment was first presented. The risk estimates have been updated with the most current toxicity factors.

The following non-cancer toxicity reference dose was updated:

- n-Hexane – Oral: 0.06 to 11 mg/kg-day; Inhalation: 0.057 to 0.2 mg/kg-day

Risk Characterization

The toxicity value described above was used in the human health risk assessment along with the exposure information to estimate the potential risks from contacting the potential COC in soil. In general, for carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a results of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{SF} \quad (3)$$

Where:

Risk = a unitless probability (e.g., 1×10^{-6}) of an individual's developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in a million chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}. There were no carcinogenic contaminants of concern at PRL S-047.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with an RfD derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of the receptor average daily exposure to the route-specific reference dose is called a hazard quotient (HQ). An HQ less than one indicates that the receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index is generated by adding the HQs over the exposure routes. A hazard index less than one indicates that, based on the sum of all HQs from different exposure routes, toxic noncarcinogenic effects are unlikely. A hazard index greater than one indicates that site-related exposure may present a risk to human health.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD} \qquad (2)$$

Where:

CDI = chronic daily intake (milligrams per kilogram per day [mg/kg-day])
RfD = reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term.)

Residential and occupational exposure scenarios were evaluated for PRL S-047. The non-cancer hazard indices for the future adult and child residential scenario are less than 1 for both soil intervals (0 to 2 and 0 to 10 feet bgs). In addition, the hazard indices are also less than 1 for the outdoor and indoor occupational worker and future construction worker scenarios. The potential for adverse non-cancer health effects for the adult resident and worker scenarios is unlikely at PRL S-047. Table B10-3 presents the non-cancer hazard indexes and the various exposure scenarios and exposure routes at PRL S-047.

Uncertainties

There are uncertainties associated with the risk estimates for PRL S-047. The main uncertainty is that the current reuse plans for this site are indefinite, but do not include residential or other "sensitive" use scenarios (day-cares, schools, hospitals, etc.). Although there are dormitories surrounding the site, the site itself is planned for commercial or community support purposes. Hence, the use of the residential scenario for the site should be considered hypothetical at this time.

References

California Environmental Protection Agency (Cal-EPA). 2007. Office of Environmental Health Hazard Assessment (OEHHA). Cal-EPA – OEHHA Toxicity Criteria Database.

Jacobs. 2000a. *Operable Units E-H: Remedial Investigation Characterization Summaries 2*. Final. June.

Text: Vol. 2, PRL S-47, pgs. 1-14
Hits Table: Vol. 2, PRL S-47, Attachment 1, pgs. 1-2
All Data: Vol. 4, Appendix A, PRLS47, pgs. 10, 12-2

U.S. Air Force (USAF). 2006. "Toxicity Values for Use in Risk Assessments and Establishing Risk-Based Cleanup Levels." Memorandum from Gregory R. Ottoman, Major, USAF. July 14.

U.S. Environmental Protection Agency (EPA). 2007. Integrated Risk Information System (IRIS). On-line data base.

U.S. Environmental Protection Agency (EPA). 2004. Region 9 Preliminary Remediation Goal (PRG) table. October.

U.S. Environmental Protection Agency (EPA). 2003. "Human Health Toxicity Values in Superfund Risk Assessments." OSWER Directive 9285.7-53. December 5.

Table B10-1a
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
PRL S-047

Scenario Timeframe:	**Future**					
Medium	**Air**					
Exposure Medium	**Air**					
			Construction Worker Air Exposure		**Occupational Worker Air Exposure**	
				Exposure Point Concentration		**Exposure Point Concentration**
Exposure Point	**Chemical of Concern**	**Exposure Point Concentration in Soil[a] (mg/kg)**	**1-Year Flux Rate (g/m^2-s)**	**Construction Worker Outdoor Air[b] (mg/m^3)**	**30-Year Flux Rate (g/m^2-s)**	**Occupational Indoor Air[b] (mg/m^3)**
PRL S-047 - VOCs in Air	n-Hexane	1.0E-03	2.06E-10	8.0E-07	6.15E-12	9.0E-07

[a] Exposure point concentrations for this VOC in soil are estimated from measured shallow soil gas concentrations.

[b] Emissions from soil and resulting air concentrations were estimated from models using the exposure point concentration estimated for soil.

[c] The units for the 30-year flux were noted as g/cm^2-s per the RI, which is different then the units for the 1-year flux rate (g/m2-s). Assume the units to be m^2 not cm^2.

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Table B10-1b
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
PRL S-047

Scenario Timeframe:	**Future**							
Medium	**Soil Gas**							
Exposure Medium	**Soil Gas**							
		Concentration Detected (ppbv)						
Exposure Point	**Chemical of Concern**	**Min**	**Max**	**Frequency of Detection**	**95th UCL Concentration (ppbv)**	**Statistical Measure[a,d]**	**Exposure Point Concentration[b] (ppbv)**	**Exposure Point Concentration in Soil[c] (mg/kg)**
PRL S-047 - Soil Gas	n-Hexane	1500	1500	1/1	1500	Max Detect	1500	0.001

[a] The statistical measure indicates the basis for the exposure point concentration.
[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.
[c] Exposure point concentrations for this VOC in soil are estimated from measured shallow soil gas concentrations.
[d] Due to the limited data set, a statistical analysis could not be conducted to determine the 95th UCL concentration.

95th UCL = 95 percent upper confidence limit on the mean.

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Table B10-2
Non-Cancer Toxicity Data Summary
PRL S-047

Pathway: Ingestion, Dermal										
Chemical of Concern	Chronic/ subchronic	Oral RfD	Oral RfD Units	Oral RfD Units	Dermal RfD	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
n-Hexane	Chronic	11	mg/kg-day	mg/kg-day	11	mg/kg-day	Nervous system	10000	PPRTV	2004

Pathway: Inhalation								
Chemical of Concern	Chronic/ subchronic	Inhalation RfD		Inhalation RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
n-Hexane	Chronic	0.2		mg/kg-day	Nervous system	10000	IRIS	2007

Notes:
Toxicity values used were accurate as of the date of report submittal and are not necessarily the most current values.
Blank cells indicate information is not available or not applicable.

IRIS = Integrated Risk Information System
mg/kg-day = milligrams per kilogram per day
PPRTV = EPA's Provisional Peer Reviewed Toxicity Values
RfD = reference dose

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Table B10-3
Risk Characterization Summary - Non-Carcinogens
PRL S-047

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Adult**

							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-047- Soil On-site Direct Contact (0-2 ft bgs)	n-Hexane	1.0E-03	mg/kg	Nervous System	1.6E-09	7.5E-02	4.9E-10	--	7.5E-02
			TOTAL				**1.6E-09**	**7.5E-02**	**4.9E-10**	**--**	**8.E-02**
		PRL S-047 - Soil On-site Direct Contact (0-10 ft bgs)	n-Hexane	1.0E-03	mg/kg	Nervous System	1.6E-09	7.5E-02	4.9E-10	--	7.5E-02
			TOTAL				**1.6E-09**	**7.5E-02**	**4.9E-10**	**--**	**8.E-02**

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Child**

							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-047 - Soil On-site Direct Contact (0-2 ft bgs)	n-Hexane	1.0E-03	mg/kg	Nervous System	1.5E-09	7.5E-02	4.3E-10	--	7.5E-02
			TOTAL				**1.5E-09**	**7.5E-02**	**4.3E-10**	**--**	**8.E-02**
		PRL S-047 - Soil On-site Direct Contact (0-10 ft bgs)	n-Hexane	1.3E+00	mg/kg	Nervous System	1.5E-09	7.5E-02	4.3E-10	--	7.5E-02
			TOTAL				**1.5E-09**	**7.5E-02**	**4.3E-10**	**--**	**8.E-02**

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Table B10-3
Risk Characterization Summary - Non-Carcinogens
PRL S-047

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Occupational**
Receptor Age:	**Adult**

							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-047 - Soil On-site Direct Contact (0-2 ft bgs)	n-Hexane	1.0E-03	mg/kg	Nervous System	5.5E-11	2.0E-08	1.3E-10	--	2.0E-08
			TOTAL				**5.5E-11**	**2.0E-08**	**1.3E-10**	**--**	**2.E-08**

Scenario Timeframe:	**Future**
Receptor Population:	**Indoor Occupational**
Receptor Age:	**Adult**

							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
	soil	PRL S-047 - Soil On-site Direct Contact (0-2 ft bgs)	n-Hexane	1500	ppbv	Nervous System	--	5.2E-03	--	--	5.2E-03
			TOTAL				**--**	**5.2E-03**	**--**	**--**	**5.E-03**

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

							Non-Carcinogenic Hazard Quotient				
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	PRL S-047 - Soil On-site Direct Contact (0-15 ft bgs)	n-Hexane	1.0E-03	mg/kg	Nervous System	5.4E-10	7.7E-07	5.1E-10	--	7.7E-07
			TOTAL				**5.4E-10**	**7.7E-07**	**5.1E-10**	**--**	**8.E-07**

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SECTION B11

SA 010

B11.1 Site overview and Features

SA 010 is located in OU B in the northeast corner of IC 3 within the proposed Core Airfield/ Industrial District. The site is the location of Building 688 and Building 689. Entomology activities have occurred at the buildings since the early 1980s during which time herbicides, pesticides, and various solvents were stored in Building 688. A sump connected to the east side of Building 688 collected wastewater from the building and the adjacent washrack. The cylindrical concrete sump is six feet in diameter and six feet deep. The bottom of the sump is sealed to a 7-inch thick concrete slab with a narrow strip of mortar that is not considered impervious. Wastewater was periodically pumped from the sump for disposal at the IWTP. Additionally, it is unclear if Building 688 was connected to the base IWL at PRL L-005E. The site and surrounding areas are covered with asphalt.

B11.2 Source of Contamination

The potential sources of contamination are the sump, drain lines, and materials handled at the site including pesticides, herbicides, and various solvents. The primary contaminants for this ROD are metals and VOCs.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Radian. 1995. Operable Unit B Remedial Investigation Characterization Summaries. Final. December.

  Text: Vol. 1, IC 3, pgs. 1-43
  All Data: Vol. 3, Appendix A, IC 3, pgs. 1-65
  HHRA Data: Vol. 8, Appendix C, IC 3

- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May.

B11.3 Sampling Strategy and Type of Contamination

Two field investigations were performed in the early 1990s to evaluate soil and soil gas contamination at SA 010. In 1991, eight soil gas probes were drilled during a shallow gas investigation. Samples were analyzed for VOCs, and VOCs were detected in all samples. In November 1991 and May 1992, four remedial investigation soil borings were advanced. Samples were analyzed for VOCs and metals from borings IC03B020, IC03B029, IC03B030, and IC03B031. No surface soil samples were collected during the remedial investigation at SA 010.

B11.4 Location of Contamination

The following section describes the lateral and vertical extent of contamination at SA 010. Metals and VOCs were the primary contaminants. Figure B-11 identifies the site location and significant site features.

B11.4.1 Metals

All metals were analyzed using method SW6010, except for arsenic (SW7060) and mercury (SW7470). Concentrations of arsenic, cadmium, and vanadium exceeded the combined background levels. The maximum cadmium and vanadium concentrations were detected in borings IC03B029 at approximately 7.5 feet bgs and IC03B031 at approximately 6 feet bgs, respectively. The maximum concentration for vanadium exceeded screening levels for protection of human health. The maximum arsenic concentration (9.6 mg/kg) was detected in boring IC03B020 at 10 feet bgs, and exceeded screening levels for human health and the environment. This sample collected at 10 feet bgs was one of two samples collected from boring IC03B020. In the second sample, collected at 15.8 feet bgs, arsenic was detected at a concentration of 3.1 mg/kg. The elevated arsenic, cadmium, and vanadium concentration at 10 feet bgs could be naturally-occurring, or could be the result of site activities, and therefore represents an uncertainty for the site.

Vanadium was detected at concentrations ranging from 31 to 87 mg/kg. The maximum concentration of vanadium is only slightly greater than the “combined” background level (75.7 mg/kg). There is no known source of vanadium at the site. The levels of vanadium at SA 010 appear to be representative of naturally occurring variations in background levels rather than indicative of site-related contamination.

B11.4.2 VOCs

The screening level soil gas investigation performed in 1991 reported HVOCs in all of the 8 SSG probes drilled and two unspeciated compounds were found at concentrations exceeding 2,300 ppbv. VOCs were detected in the four soil borings at approximately 21 feet bgs at concentrations above the unrestricted use screening level for the 0-to-15-foot-bgs interval. However, no VOCs were detected in the SSG sample collected at 5.5 feet bgs from IC03B020. There were no detections of SVOCs in any of the samples collected.

B11.5 Contamination Exposure and Migration

Routes for human exposure include contact with skin, ingestion, and inhalation for contaminated soils and SSG in SA 010. VOCs present a potential threat to human health, but there are uncertainties due to the undefined SSG. Surface soil samples were not collected with which to evaluate protection of surface water. The shallowest samples were collected at 1.5 feet bgs. The presence or absence of pesticide contamination in surface soil is an uncertainty at the site. Review of the analytical data from the subsurface samples indicates that no detected contaminants, with the exception of arsenic, exceeded the screening levels for the protection of groundwater. Collection of additional samples around soil boring IC03B020 is recommended to define the extent of potential arsenic contamination.

B11.6 Current and Potential Future Site and Resource Uses

The site is currently being used by a private pest control firm. In the future, SA 010 will likely be used for commercial/industrial purposes.

B11.7 Human Health Risk Assessment

A human health risk assessment was conducted for the entire IC 3 using data from the RI. The estimated total lifetime excess cancer risk for the residential receptor (0 to 10 feet) was 1E-04. The HI for the residential receptor is 4. The risk at IC 3 was driven entirely by detections at SA 003.

As a part of this analysis, detections of metals at SA 010 were compared to screening levels for unrestricted use to determine risk to human health. Arsenic detections exceed the screening levels for unrestricted and industrial uses. However, the range of background concentrations for arsenic, including the combined background concentration, also exceed the screening levels for unrestricted and industrial uses.

Risk estimates at SA 010 were calculated for arsenic, cadmium, and vanadium in soil and are shown in the risk summary tables for SA 010 (attached). The estimated carcinogenic risk calculated for arsenic exceeds 1E-06 in both the unrestricted and industrial use scenarios at 6E-04 and 7E-06, respectively. Total non-carcinogenic risks for metals in soil exceed 1 for the unrestricted use scenario but are less than 1 for the industrial use scenario.

B11.8 Uncertainties

There are uncertainties associated with the risk estimates for SA 010.

- The potential SSG contamination is uncertain.
- The extent of arsenic contamination is based on one boring, IC03B020.
- Vanadium was detected at concentrations that appear greater than the "combined" background concentration at selected locations. The maximum concentration of vanadium is only slightly greater than the "combined" background level. There is no known source of vanadium at the site. The levels of vanadium at SA 010 appear to be representative of naturally occurring variations in background levels rather than indicative of site-related contamination. Therefore, the risk associated with vanadium at this site may be representative of background.

B11.9 Basis for Action

A remedy has been selected in this ROD to address the threat to human health from potential VOCs in SSG. The response action is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. A deed covenant will be implemented to address potential VOCs in SSG. As shown on Figure B-11, the boundary for the institutional control encompasses SA 010, CS S-049, and SA 019 and a sufficient buffer surrounding the sites to include all site-related

locations with detected VOC concentrations that exceed the institutional control compliance levels provided in Section 2.5 (see Table 2-2) for unrestricted use.

Selected Soil Gas Contaminant Concentrations

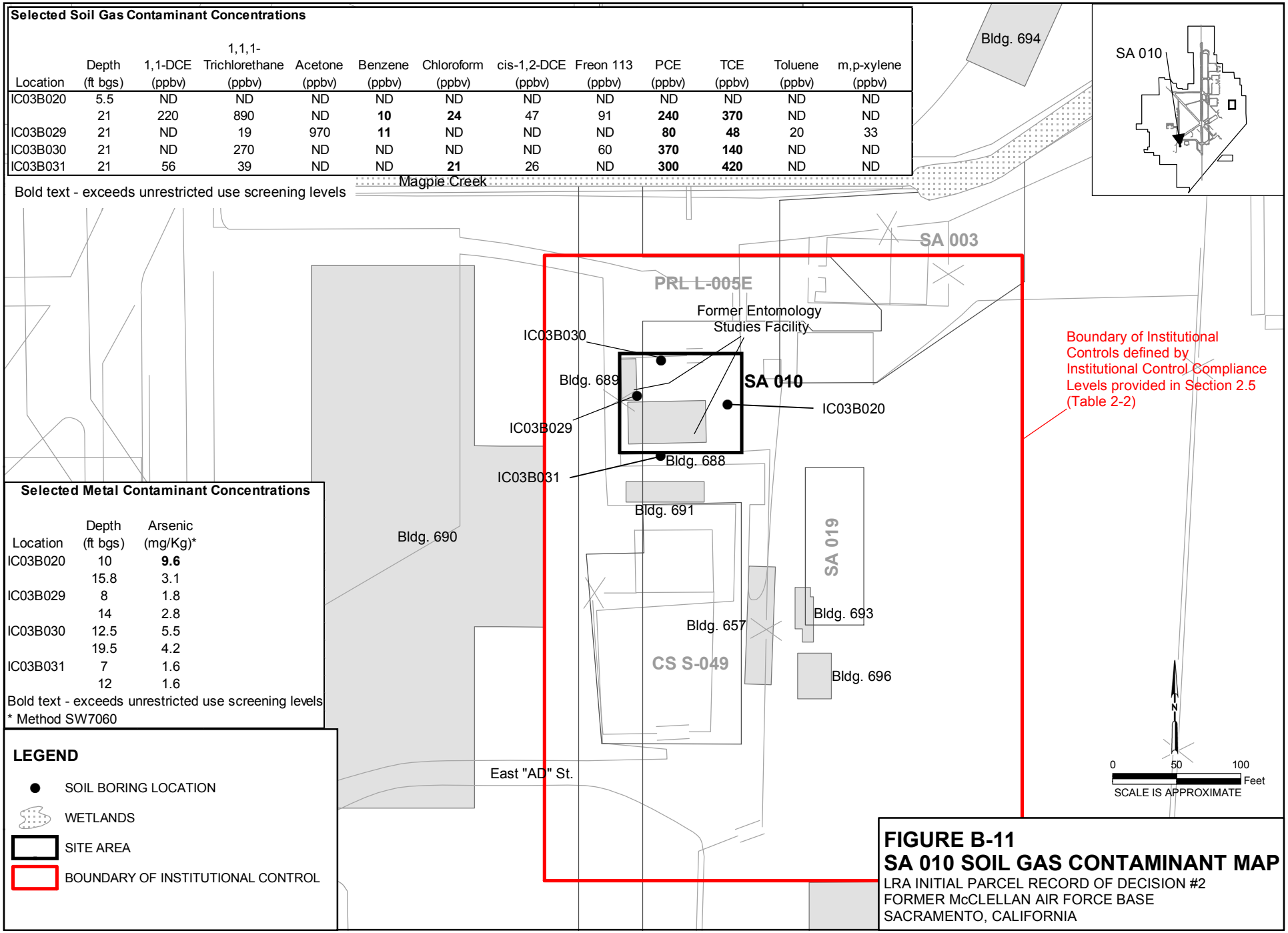
Location	Depth (ft bgs)	1,1-DCE (ppbv)	1,1,1-Trichlorethane (ppbv)	Acetone (ppbv)	Benzene (ppbv)	Chloroform (ppbv)	cis-1,2-DCE (ppbv)	Freon 113 (ppbv)	PCE (ppbv)	TCE (ppbv)	Toluene (ppbv)	m,p-xylene (ppbv)
IC03B020	5.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	21	220	890	ND	**10**	**24**	47	91	**240**	**370**	ND	ND
IC03B029	21	ND	19	970	**11**	ND	ND	ND	**80**	**48**	20	33
IC03B030	21	ND	270	ND	ND	ND	ND	60	**370**	**140**	ND	ND
IC03B031	21	56	39	ND	ND	**21**	26	ND	**300**	**420**	ND	ND

Bold text - exceeds unrestricted use screening levels

Selected Metal Contaminant Concentrations

Location	Depth (ft bgs)	Arsenic (mg/Kg)*
IC03B020	10	**9.6**
	15.8	3.1
IC03B029	8	1.8
	14	2.8
IC03B030	12.5	5.5
	19.5	4.2
IC03B031	7	1.6
	12	1.6

Bold text - exceeds unrestricted use screening levels
* Method SW7060



LEGEND

- SOIL BORING LOCATION
- WETLANDS
- SITE AREA
- BOUNDARY OF INSTITUTIONAL CONTROL

FIGURE B-11
SA 010 SOIL GAS CONTAMINANT MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

SAC \\ZION\SACGIS\PROJ\MCCLELLAN\340972_TO400\MAPFILES\IP2_ROD\LRA_SA_010_FINAL.MXD LRA_SA_010_FINAL.PDF 6/17/2008 12:07:25

Attachment B11
SA 010 Risk Summary Tables

SA-010 ATTACHMENT B11

Risk Summary Table for SA-010, Unrestricted Use Scenario

Initial Parcel #2 Feasibility Study, Former McClellan Air Force Base, California

Analyte	Frequency of Detection	Units	Minimum Detected Concentration	Maximum Detected Concentration	EPC[a]	EPC basis[a]	AFRPA Preliminary Cleanup Goals (PCGs)		Estimated Risk Based on AFRPA PCGs	
							Cancer Target Risk = 1.0 x 10^{-6}	Non-Cancer Target HI =1	Carcinogenic Risk	Non-carcinogenic risk
Soil (0 to 10 ft bgs)										
Arsenic	3/3	mg/kg	1.6	9.6	9.6	Max Concentration	0.093	7.6	1.0E-04	1.3E+00
Cadmium	1/3	mg/kg	0.59	0.59	0.59	Max Concentration	17,000	6.2	3.5E-11	9.5E-02
Vanadium	3/3	mg/kg	31	87	87	Max Concentration	NA	35		2.5E+00
Soil Gas (0 to 15 ft bgs)										
--[b]	--	ppbv	--	--	--	--	--	--	--	--
Total									**1.E-04**	**4.E+00**

[a] A human health risk assessment has not been performed specifically for SA 010. Therefore, maximum concentrations have been used for exposure point concentrations.

[b] Magnitude and extent of shallow soil gas contamination is uncertain.

Note:

NA = Not Available-no PCG has been established for this compound

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SA-010 ATTACHMENT B11

Risk Summary Table for SA-010, Industrial Scenario

Initial Parcel #2 Feasibility Study, Former McClellan Air Force Base, California

Analyte	Frequency of Detection	Units	Minimum Detected Concentration	Maximum Detected Concentration	EPC[a]	EPC basis[a]	AFRPA Preliminary Cleanup Goals (PCGs)		Estimated Risk Based on AFRPA PCGs	
							Cancer Target Risk = 1.0 x 10^{-6}	Non-Cancer Target HI =1	Carcinogenic Risk	Non-carcinogenic risk
Soil (0 to 10 ft bgs)										
Arsenic	3/3	mg/kg	1.6	9.6	9.6	Max Concentration	1.4	230	6.8E-06	4.2E-02
Cadmium	1/3	mg/kg	0.59	0.59	0.59	Max Concentration	36,000	1,000	1.6E-11	5.9E-04
Vanadium	3/3	mg/kg	31	87	87	Max Concentration	NA	920		9.5E-02
Soil Gas (0 to 15 ft bgs)										
--[b]	--	ppbv	--	--	--	--	--	--	--	--
Total									**7.E-06**	**1.E-01**

[a] A human health risk assessment has not been performed specifically for SA 010. Therefore, maximum concentrations have been used for exposure point concentrations.

[b] Magnitude and extent of shallow soil gas contamination is uncertain.

Note:

NA = Not Available-no PCG has been established for this compound

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SECTION B12

SA 015

B12.1 Site Overview and Features

SA 015 is located in the northwestern portion of OU B west of IC 2 within the proposed Core Aviation/Industrial District. It includes the northern section of paved Storage Lot 10 (about 2.5 acres total), which was paved in 1955. From 1955 to 1965 the paved lot was used for aircraft parking and storage of paints and solvents. SA 015 has been used predominantly for aircraft parking and as a storage yard supporting aircraft maintenance activities, including warehousing spare parts for battle damage repair and hazardous materials. A fire occurred at this storage lot in 1970, and there was initial concern that the integrity of the asphalt could have been compromised, allowing a release of contaminants to the soil beneath the storage lot. The study area boundaries of SA 015 within Storage Lot 10 were established based on possible contamination associated with a fire in 1970. After the fire, chemicals were not stored on Storage Lot 10. The site is bounded on the west by Patrol Road. Access to SA 015 is off of Patrol Road west of Storage Lot 10. The site is currently completely paved. Surface features include two extraction wells, an unlined drainage ditch, and an asphalt-covered storage area. Surface water from the paved storage lot flows north to an unlined drainage area. The area runs east-west and has a shallow slope to the west.

B12.2 Source of Contamination

The potential sources of contamination at SA 015 are spills in Storage Lot 10 and the unlined drainage ditch. Metals, TPH, and VOCs have been identified as potential contaminants. Following is a list of documents, in chronological order, that were used to prepare this summary:

- Radian. 1995. *Operable Unit B Remedial Investigation Characterization Summaries*. Final. December.

  Text: Vol. 2, SA 15, pgs. 1-24
  All Data: Vol. 4, Appendix A, SA 15, pgs. 1-8

- CH2M HILL. 2003. *LRA Initial Parcel Feasibility Study #1* (7 sites). Final. August.

- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May.

B12.3 Sampling Strategy and Type of Contamination

Several field investigations were performed in the early 1990s to evaluate soil and soil gas contamination at SA 015. In 1991, a preliminary assessment of the site was conducted. Historical information about site operations and the 1970 fire at SA 015 were compiled. Also in 1991, a near-surface soil gas investigation was performed, where four soil gas samples were collected. Halogenated VOCs were detected.

A remedial investigation was conducted from April 1992 to September 2003 to determine the lateral and vertical extent of the soil and soil gas contamination. Samples from 11 soil borings (SA15B001 through SA15B006, SA15B0007 through SA15B0009, SA15S0001, and SA15S0002) were collected and analyzed for metals, VOCs, SVOCs, and TPH. The remedial investigation focused on the northern and northwestern perimeter of the storage lot that may have received runoff containing any released chemicals during the storage lot's service life. The sampling was conducted in the exposed soils on the north side of the site and near the drainage feature on the west side of the site. No soil samples were collected from beneath the asphalt, but soil gas samples were collected from two borings (SA15B008 and SA15B007) drilled near the center of the site. Surface scrapes and soil borings samples reported metals contamination above "combined" background levels, as well as a single detection of TPH-D. Soil gas samples collected at 20 feet bgs reported elevated VOC concentrations.

B12.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at SA 015. Metals, TPH, and VOCs are the primary contaminants at the site. Figure B-12 identifies the site location and significant site features.

B12.4.1 Metals

Soil samples collected from borings SA15B001 through SA15B006 (two samples collected from each boring between 1 and 13 feet bgs) and from borings SA15S001 and SA15S002 (one sample collected from each boring between 1.5 and 1.75 feet bgs) were analyzed for metals using method SW6010. Several metals were detected above their combined background levels, including cadmium, chromium, copper, selenium, silver, sodium, thallium, and zinc. The concentration of thallium also exceeded screening levels for unrestricted use. However, the elevated detection was measured using analytical method SW6010 which is known to produce unreliable results for thallium.

B12.4.2 TPH

TPH-D was reported at 22 mg/kg from a shallow soil sample (< 2 feet bgs) collected in boring SA15B001. No detectable TPH-D was measured from a sample collected at approximately 8 feet bgs in the same boring. The TPH-D concentration detected at SA 015 did not exceed the 100 mg/kg screening level for the protection of groundwater and surface water. TPH-D was not detected in any other boring at SA 015.

B12.4.3 VOCs

Soil gas samples, collected at approximately 20 feet bgs from borings SA15B001 through SA15B009, were analyzed for VOCs. Several chlorinated and petroleum-related VOCs were detected. Vinyl chloride, TCE, and PCE were detected at concentrations exceeding the unrestricted use PCG for the 0-to-15-foot interval, indicating that a shallow VOC source may be present at the site. The extent of VOCs in SSG is uncertain due to the lack of definitive soil gas data from 0 to 15 feet bgs.

B12.5 Contamination Exposure and Migration

Potential future exposure of residents or workers is possible if soils are brought to the surface by excavation, drilling, or construction. Migration is not expected because there are no known significant levels of non-VOC contaminants present at the site that present a threat to surface water or groundwater quality. VOCs may present a threat to human health, but the magnitude and content of the SSG contamination is undefined.

All contaminant detections are less than the screening levels for the protection of groundwater, and therefore no impacts to groundwater are predicted.

B12.6 Current and Potential Future Site and Resource Uses

The site is currently vacant. It is completely paved, with an asphalt-covered storage area. In the future, SA 015 will likely be used for commercial/industrial purposes.

B12.7 Human Health Risk Assessment

A human health risk assessment was completed for the site using the data collected through 1993 (Radian, OU B RICS, Volume 8, 1995), however an exposure area was not explicitly defined. Risks were calculated for the hypothetical residential, current occupational, and construction worker scenarios. However, the protocols used for the risk assessment are not consistent with those used currently for sites at McClellan. The risks were highest for the residential scenario, but were still less than 1×10^{-6}. TCE in groundwater was the primary contributor to risk. Since there are no non-VOC COCs in soil at this site and elevated VOC COCs are likely in shallow soil gas, the historical risk assessment from the OU B RICS for SA 015 was not used as a basis for selection of a remedy.

An ecological risk assessment was performed for SA 015. Surface contamination at SA 015 was identified as a potential source of contamination to nearby vernal pools. A scoping level/Tier 1 evaluation of ecological risk was performed, and the risks were found to be negligible (CH2M HILL, IP #1 FS, Appendix F, 2003). Based on this analysis, no further ecological investigation was recommended.

Comparison of detected analytes to current screening levels indicates that only one detection of thallium is in excess of the screening level for unrestricted use. However, as discussed above, the analytical method used (SW6010) is known to produce unreliable results for thallium.

A risk summary table has not been prepared for this site because there are no contaminant concentrations greater than screening levels (with the exception of thallium as discussed).

B12.8 Uncertainties

There are uncertainties in the site characterization related to potential contaminants in SSG.

B12.9 Basis for Action

A remedy has been selected in this ROD to address the threat to human health from potential VOCs in SSG. The response action is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. A deed covenant will be implemented to address the potential VOCs in SSG. As shown on Figure B-12, the boundary for the institutional control encompasses SA 015 and all site-related locations with detected VOC concentrations that exceed the institutional control compliance levels provided in Section 2.5 (see Table 2-2) for unrestricted use. The highest reported concentrations were from a sample at 21 feet bgs from boring SA15SB003 in the north central portion of the site. VOCs were not detected in samples collected east and southeast of SA 15SB003. The institutional control boundary was extended further to the north because of the elevated detection of VOCs at 21 feet bgs in a sample from boring SA15SB007 located north of SA 015. Results from samples collected along the western boundary of the site were lower and are included within the boundary of the institutional control along Patrol Road.

Selected Soil Gas Contaminant Concentrations

Location	Depth (ft bgs)	Vinyl Chloride (ppbv)	TCE (ppbv)	PCE (ppbv)	cis-1,2-DCE (ppbv)
SA15B001	21	**100**	**520**	**36**	35
SA15B002	21	**48**	**71**	ND	22
SA15B003	21	**240**	**2,500**	**38**	750
SA15B004	21	ND	ND	ND	ND
SA15B005	21	**68**	**31**	ND	12
SA15B006	21	**77**	**890**	ND	230
SA15B007	21	ND	**170**	**190**	210
SA15B008	21	ND	ND	ND	ND
SA15B009	21	ND	**650**	**23**	93

Bold text - exceeds unrestricted use screening level

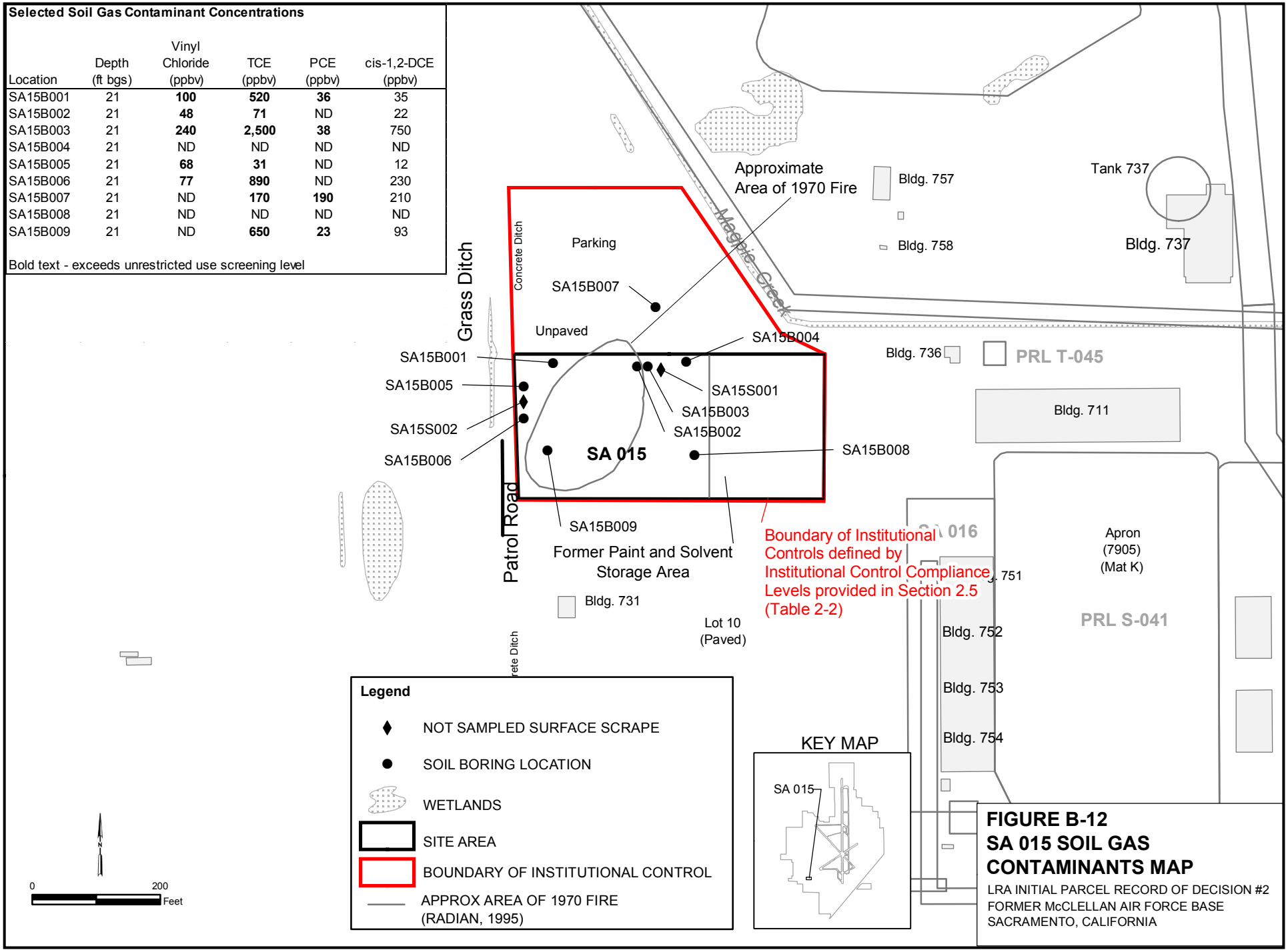

FIGURE B-12
SA 015 SOIL GAS CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

SAC \\ZION\SACGIS\PROJ\MCCLELLAN\340972_TO400\MAPFILES\IP2_ROD\LRA_SA_015_FINAL.MXD LRA_SA_015_FINAL.PDF 6/17/2008 12:10:21

SECTION B13

SA 019

B13.1 Site Overview and Features

SA 019 is located in OU B in the center of IC 3 within the proposed Core Airfield/Industrial District. The site was the location of a paint spray booth (Temporary Building 690 is referred to as Building 190 in several documents created after the November 1991 OU B SAP). According to the preliminary assessment (PA), the spray booth was operational from 1951 to 1974 and subsequently removed from the site. Detailed information regarding the historical operations of Temporary Building 690 is unavailable. Suggested materials handled at the site were acetone, solvents, and paints. Aerial photographs from the 1960s show an area of discoloration to the south of Temporary Building 690 near Building 693. Currently, the site is inactive and covered by asphalt.

B13.2 Source of Contamination

The potential source of contamination is the handling of acetone, solvents, and paints at SA 019. The primary contaminants are metals and VOCs.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Radian. 1991a. *Installation Restoration Program, McClellan Air Force Base, California: Operable Unit B Soil Gas Data Summary Report*. February.
- Radian. 1991b. *Installation Restoration Program, McClellan Air Force Base, California: Operable Unit B Preliminary Assessment Summary Report*. Final. October.
- Radian. 1995. *Operable Unit B Remedial Investigation Characterization Summaries*. Final. December.

  Text: Vol. 1, IC 3, pgs. 1-43
  All Data: Vol. 3, Appendix A, IC 3, pgs. 1-65
  HHRA Data: Vol. 8, Appendix C, IC 3
- CH2M HILL, 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May.

  Text: Vol. 2, Appendix C, SA 019, pgs. 14-1 to 14-4.

B13.3 Sampling Strategy and Type of Contamination

Two field investigations were performed in the early 1990s to evaluate soil and soil gas contamination at SA 019. Samples were analyzed for metals, VOCs, SVOCs, and TPH.

In 1991, a preliminary assessment was conducted to summarize the historical operations and past investigations at IC 3. In the same year, ten SSG probes were drilled to investigate

SSG contamination. In November 1991, five additional borings (IC03B025 through IC03B028 and IC03B038) were advanced to investigate the extent of soil and soil gas contamination at SA 019. Eighty-six soil and ten soil gas samples were collected from the upper 21 feet of soil. Low levels of metals and VOCs were detected.

B13.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at SA 019. Metals and VOCs were the primary contaminants. No TPH or SVOCs were detected in any samples. Figure B-13 identifies the site location and significant site features.

B13.4.1 Metals

During the RI, method SW6010 was used to analyze for metals. Single detections of sodium and vanadium exceeded "combined" background levels in IC03B025 at 11 feet bgs and IC03B026 at 8 feet bgs, respectively. However, there is no source of vanadium at the site and sodium is considered an essential nutrient. Therefore, neither metal is indicative of significant contamination.

B13.4.2 VOCs

Low levels of chlorinated VOCs were detected from samples collected at 21 feet bgs. Chloroform, PCE, and TCE were detected at concentrations above the unrestricted use screening level for the 0-to-15-foot-bgs interval The maximum concentration of cis-1,2-dichloroethene was detected in IC03B025 (98 ppbv). The maximum concentrations of chloroform, tetrachloroethene, and trichloroethene were detected in IC03B026 (26, 96, and 420 ppbv, respectively). It is uncertain if the detection of VOCs at 21 feet bgs represents a source of SSG contamination. The lack of soil gas data in the upper 15 feet creates some uncertainty.

B13.5 Contamination Exposure and Migration

Migration is not expected because there are no significant levels of non-VOC contaminants present at the site. In addition, the low levels of non-VOC contaminants at the site do not present a threat to surface water or groundwater quality. VOCs may present a threat to human health, but there are uncertainties due to the undefined SSG between 0 to 15 feet bgs.

B13.6 Current and Potential Future Site Resource Uses

Currently, the site is inactive and covered by asphalt. In the future, SA 019 will likely be used for commercial/industrial purposes.

B13.7 Human Health Risk Assessment

A human health risk assessment was conducted for the entire IC 3 using data from the RI. The estimated total lifetime excess cancer risk for the residential receptor (0 to 10 feet) was

1E-07. The HI for the residential receptor was 2. The risk at IC 3 was driven entirely by detections at SA 003.

As a part of this analysis, detections of metals at SA 019 were compared to screening levels for unrestricted use to determine risk to human health. As discussed in Section 13.4, detected contaminant concentrations of vanadium exceed screening levels for protection of human health. However, the levels of vanadium at SA 019 appear to be representative of naturally occurring variations in background levels rather than indicative of site-related contamination.

B13.8 Uncertainties

It is uncertain if the detection of VOCs at 21 feet bgs represents a source of SSG contamination. The lack of soil gas data in the upper 15 feet creates some uncertainty.

B13.9 Basis for Action

VOCs in SSG present a potential threat to human health. The response action is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. A deed covenant will be implemented to address the potential VOC contamination in SSG. As shown on Figure B-13, the boundary for the institutional control encompasses SA 010, CS S-049, and SA 019 and a sufficient buffer surrounding the sites to include all site-related locations with detected VOC concentrations that exceed the institutional control compliance levels provided in Section 2.5 (see Table 2-2) for unrestricted use.

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Selected Soil Gas Contaminant Concentrations

Location	Depth (ft bgs)	Chloroform (ppbv)	cis-1,2-DCE (ppbv)	PCE (ppbv)	TCE (ppbv)
IC03B025	21.5	**16**	98	**14**	**105**
IC03B026	21.0	**26**	87	**96**	**420**
IC03B027	21.0	ND	52	**65**	**310**
IC03B028	21.0	**14**	30	**60**	**360**
IC03B038	21.0	ND	37	**22**	**140**

Bold text - exceeds unrestricted use screening level

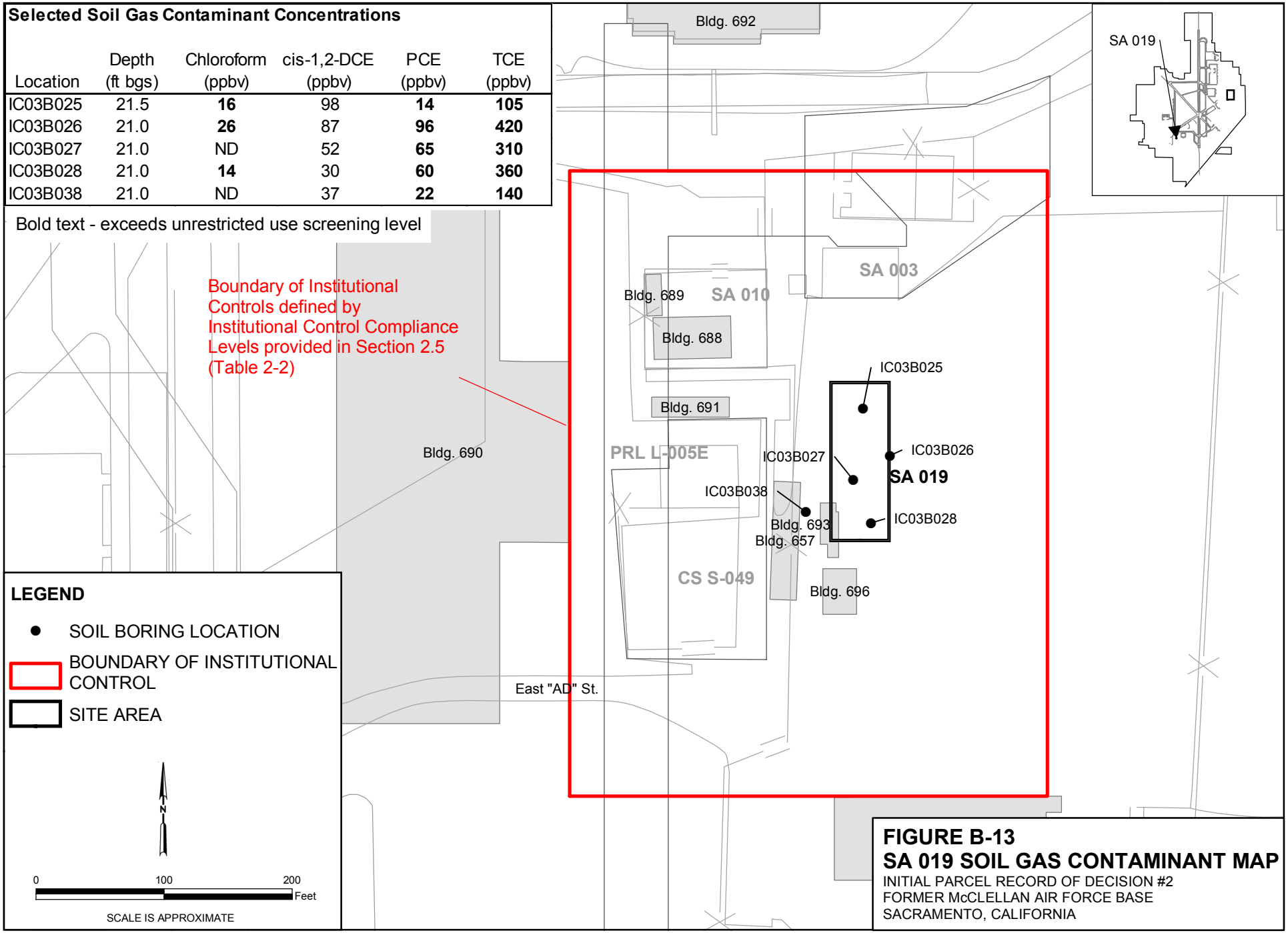

FIGURE B-13
SA 019 SOIL GAS CONTAMINANT MAP
INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

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SECTION B14

SA 105

B14.1 Site Overview and Features

SA 105 is located in the southwestern portion of OU A within IC 40 and resides in the South McClellan District. SA 105 consists of Building 642. A concrete pad, located on the east side of the building, is used as an air conditioner base and a storage area for a 55-gallon drum that contains water treatment chemicals for the air conditioner (CH2M HILL, 2002b). Building 642 was operated as an Air Force environmental health laboratory from 1966 to 1975. The laboratory received wastewater, water, soil, and vegetation samples for analysis (Jacobs, 2002). A variety of acids, bases, solvents, SVOCs, and VOCs were routinely handled at the lab during analytical procedures. After laboratory closure, Building 642 was converted to office space. The building is currently leased for administrative activities.

An SVE system is located several hundred feet northwest of SA 105 in IC 1. The SVE system has been in operation (intermittently) since March 21, 1995. Trichloroethene, tetrachloroethene, and Freon 113 have been the primary VOCs removed from the soil. The level of impact the SVE system has had on soil gas within SA 105 is uncertain.

B14.2 Sources of Contamination

The potential source of contamination at SA 105 may be from PRL L-005F. Soil gas samples collected near an identified offset IWL joint detected elevated levels of VOCs, suggesting leaks in the IWL or sewer lines may have impacted soils around Building 642. The primary contaminants for this ROD include VOCs and metals.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Jacobs. 2001. *Operable Unit A Remedial Investigation Characterization Summaries*. Final. September.

  Text: Vol. 3, IC 40, pgs. 1-28

- Jacobs. 2002. *Operable Unit A Remedial Investigation Characterization Summaries Addendum*. Final. March.

  Text: Vol. 1, SA 105, pgs. 1-11
  Hits Table: Vol. 1, SA 105, Attachment 1, pgs. 1-5
  All Data: Vol. 2, Appendix 1, SA105, pgs. 10-31
  HHRA Data: Vol. 3, Appendix 3, Section 1.11.1, pgs. 1-6, Tables 1.11.1.9 to 1.11.1.15

- CH2M HILL. 2002b. *Initial Parcel Data Gaps Field Sampling Plan/Health and Safety Plan*. Final. May.

- CH2M HILL. 2003. *LRA Initial Parcel Feasibility study #1 (7 sites).* Final. Volume 2. Appendix F. pg F5-1. August.
- CH2M HILL, 2005. *LRA Initial Parcel Feasibility study #2.* Final. May.

Text: Vol. 2, Appendix C, SA105, pgs. 15-1 to 15-6.

B14.3 Sampling Strategy and Type of Contamination

Several field investigations were performed between 1992 and 2001 to evaluate soil and soil gas contamination at SA 105. Samples were analyzed for SVOCs, metals, and VOCs. The primary site contaminants are VOCs and metals.

From 1992 through 1997, eight SSG probes and two soil borings were drilled during Phases 1 and 2 of the RI. During Phase 1 in February 1993, eight SSG probes, SA105SG01 through SA105SG08, were installed around the perimeter of Building 642. Freon® 113, carbon tetrachloride, 1,1-DCE, PCE, and chloroform were detected in soil gas samples. During Phase 2, two soil borings, SA105SB001 and SA105SB002, were drilled near the northeast and northwest corner of Building 642, respectively. Metals were detected slightly above their "combined" background concentrations.

A single soil boring, SA105SB003, was drilled near the northwest corner of Building 642 near SA105SG07 during the Site Closure Data Gaps Investigation. SSG samples were collected and analyzed for VOCs during January 2001 (Jacobs, 2002). VOCs were not detected in the soil gas samples. None of the soil gas samples detected VOCs.

B14.4 Location of Contamination

The following sections describe the lateral and vertical extent of contamination at SA 105. VOCs and metals were the primary contaminants. Figure B-14 identifies the site location and significant site features.

B14.4.1 Metals

With the exception of mercury and hexavalent chromium (measured with method SW7471 and SW7196, respectively), metals were measured using method SW6010 during the Phase 2 investigation. Duplicate arsenic and thallium samples were analyzed with method SW7060 and SW7841, respectively. Concentrations of arsenic, cadmium, copper, mercury, and thallium analyzed by Method SW6010 exceeded combined background screening levels in samples collected between 0 and 25 feet bgs and are presented in Figure B-14. However, the concentrations were below all screening levels. Method SW6010 has been shown to produce unreliable values for arsenic, cadmium, and thallium. Concentrations of arsenic and thallium reported using method SW6010 were 6.2 JS and 24 R mg/kg at 0.5 feet bgs, respectively (the "J" qualifier indicates that the analyte was detected but the quantification is an estimate, the "S" qualifier indicates that the results are from a screening analysis, and the "R" qualifier indicates that a significant rain event occurred prior to sampling). Duplicate samples analyzed using method SW7060 (arsenic) and SW7471 (thallium) were 3.33 and 0.467J mg/kg at 0.5 feet bgs, respectively. A cadmium specific analysis was not performed. The presence of a "chiller" unit in conjunction with the air conditioning

equipment suggests the potential for chromium contamination. Hexavalent chromium was not detected in samples collected from boring SA105SB001 (0.5 and 9.75 feet bgs) or from boring SA105SB002 (2 feet bgs) using method SW7196.

B14.4.2 SVOCs

During Phase 2, SVOCs were detected in two soil samples collected from soil boring SA105SB002 and analyzed by a field screening method (SW4035 for total carcinogenic PAHs) at 0.06 JS mg/kg and 0.21 S mg/kg at depths of 20 and 40 feet bgs, respectively. However, no SVOCs were detected by Method SW8270 (detection limits approximately 1 to 300 µg/kg).

B14.4.3 VOCs

The source of the VOC contamination at SA 105 has not been identified, but could be the IWL, which is located approximately 150 feet to the west of Building 642. An offset joint was identified in this line that could be a source of VOC contamination in the soils around Building 642.

During the Phase 1 investigation in 1993, halogenated VOCs were detected using a field method in all samples collected at approximately 10 feet bgs. Three samples (soil gas probes SA105SG02, SA105SG06, and SA105SG07) were sent to the lab for additional analysis using method TO14. Carbon tetrachloride, chloroform, and tetrachloroethene exceeded unrestricted and industrial use screening levels. Soil samples were not collected during Phase 1.

Three samples from SA105SB003 collected at approximately 5, 10, and 20 feet bgs during January 2001 were analyzed for VOCs using method M18MS. No VOCs were detected. Similarly, CTCL was not detected in confirmation SSG samples collected along the IWL at PRL L-005F and at PRL S-009 and analyzed by TO-15 during the 2006 IP #3 investigation. In addition, elevated soil gas concentrations were reported during the early RI work at Building 600 and PRL S-028 located south of IC 1, and only low concentrations were reported subsequently. Data from each of the sites are discussed in greater detail below.

PRL S-009 is located 50 feet east of SA 105. During the RI, VOCs were detected in a soil gas sample (collected at 20 feet bgs) from soil boring SA105SB001. CTCL was detected at 400 ppbv in the sample. Subsequently, during the IP #3 investigation in 2006, two soil borings were drilled near PRL S-009 (PS09SB001 and PS09SB002). CTCL was not detected in the soil gas samples. The maximum concentrations reported were for methyl ethyl ketone at 11.1 ppbv and 14.1 ppbv, respectively.

PRL L-005F is located west of SA 105 and slightly closer to IC 1. During the IP #3 investigation in 2006, soil gas samples were collected from borings along PRL L-005 at 5, 15, 40, 70, and 100 feet bgs. Borings PLL5B007 and PLL5B008 were located west of SA 105. In PLL5B007, CTCL was only detected in the deepest samples (70 and 100 feet bgs) at a maximum concentration of 170 ppbv. Similarly, in PLL5B008, CTCL was only detected in the deepest samples (40, 70, and 100 feet bgs) at a maximum concentration of 420 ppbv.

PRL S-028 is about 500 feet west of SA 105 and 400 feet south of the IC 1 SVE system. During the OU B RI in 1993, VOCs were detected in soil gas samples collected at PRL S-028. VOCs

(primarily Freon 113) were reported at a maximum concentration of 50,000 ppbv at 20 feet bgs. During the IP #3 investigation in 2006, the maximum concentration detected for Freon 113 was 2.09 ppbv in adjacent boring B600B003 at 100 feet bgs. Freon 113 was not detected in samples collected at 5, 15, 40, and 70 feet bgs.

As discussed above, SA 105 is located several hundred feet away from the active SVE system in IC 1, which has been in operation since 1995. While carbon tetrachloride contamination was reported at SA 105 and other sites south of IC 1 (PRL L-005F, PRL S-009, and Building 600) during the early phases of the RI, more recent sampling has shown that this contamination is present at only low levels. This contamination was likely remediated by the IC 1 SVE system.

B14.5 Contamination Exposure and Migration

VOCs were detected in soil gas samples in the 1993 event, but not detected during the 2001 event. Currently, impacts to human health from VOCs are not expected. The concentrations of metals (using the duplicate 7000-series analyses) in surface and subsurface soil at SA 105 are less than screening levels and therefore not expected to impact groundwater or surface water.

B14.6 Current and Potential Future Site and Resource Uses

The site is currently leased for administrative activities. SA 105 will likely continue to be used for commercial/industrial purposes.

B14.7 Human Health Risk Assessment

Because no carcinogenic COCs were identified for this site, no cancer risk calculations were evaluated for SA 105.

For SA 105, the non-cancer hazard indices for the future adult and child residential scenario are less than 1 for both soil intervals (0 to 2 and 0 to 10 feet bgs). In addition, the hazard indices are also less than 1 for the outdoor occupational worker and future construction worker scenarios. The potential for adverse non-cancer health effects for the adult resident and worker scenarios is unlikely at SA 105. Table B14-3 presents the non-cancer hazard indices and the various exposure scenarios and exposure routes at SA 105.

The maximum detected concentration of lead at SA 105 (11.9 mg/kg) is well below the unrestricted use (residential) soil screening level of 150 mg/kg.

An ecological risk assessment was performed for SA 105. Surface contamination at SA 105 was identified as a potential source of contamination to nearby vernal pools. A scoping level/Tier 1 evaluation of ecological risk was performed, and the risks were found to be negligible (CH2M HILL, IP FS#1, Appendix F, 2003). Based on this analysis, no further ecological investigation was recommended.

B14.8 Uncertainties

An uncertainty exists regarding the source of the SSG contamination (i.e., IWL, sewer line, or other release).

B14.9 Basis for No Action

Phase 1 and 2 investigations detected VOCs in SSG in all samples collected around the perimeter of Building 642; however, no VOCs were detected in SSG samples collected during 2001 at the location of the previous maximum concentrations. Metals were detected below their screening levels in subsurface soils, and therefore, are not expected to impact groundwater or human health. Therefore, no action is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

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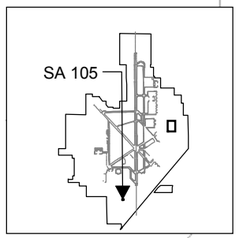
Selected Soil Gas Contaminant Concentrations

Location	Depth (ft bgs)	Carbontetrachloride (ppbv)	PCE (ppbv)	1,1-DCE (ppbv)	Freon 113 (ppbv)	Chloroform (ppbv)
SA105SB001	21.2	**400**	**25**	11 J	36	**940**
SA105SB002	21.3	**7.3**	1.2	0.82	0.64 J	**17**
SA105SB003	5	ND	ND	ND	ND	ND
	10	ND	ND	ND	ND	ND
	20	ND	ND	ND	ND	ND
SA105SG02	10	**220**	ND	ND	480	**32**
SA105SG06	4	ND	ND	ND	2,400	ND
SA105SG07*	10	**6,800**	**2,100**	2,700	47,000 J	**480**

Note: Field screening of SA105SG01 through SA105SG08 detected VOCs in all locations.Samples from SA105SG02, SA105SG06, and SA105SG07 were also analyzed by method TO14.
Bold text - exceeds screening levels



EW-268
EW-273
Former Bldg. 666
EW-354
EW-259
EW-266
EW-269
EW-260
EW-261
EW-267
Dudley Blvd.
Ditch
Storm Drain
HHRA Soil Exposure Area
Grass
SA105SB002
SA105SG6
SA105SG5
SA105SG4
SA105SB003
SA105SG7
SA105SG8
SA 105
Bldg. 642
PRL S-009
Bldg. 644
Bldg. 646
Grass
SA105SB001
Cement Pad with Air Conditioning Unit
SA105SG1
SA105SG3
SA105SG2
Storm Drain
Asphalt
PRL L-005F
Bldg. 600
Storm Drain

LEGEND

- SOIL BORING LOCATION
- SOIL GAS SAMPLE LOCATION (TO-14, M18MS)
- SHALLOW SOIL GAS SAMPLE LOCATION (FIELD METHOD)
- SOIL VAPOR EXTRACTION WELLS
- 300' ROI FOR IC1 SVE SYSTEM
- WETLANDS
- SITE AREA
- HHRA SOIL EXPOSURE AREA

N

0 50 100 Feet
SCALE IS APPROXIMATE

FIGURE B-14
SA 105 SOIL GAS CONTAMINANT MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

SAC \\ZION\SACGIS\PROJ\MCCLELLAN\340972_TO400\MAPFILES\IP2_ROD\LRA_SA_105.MXD SSCOPES 6/27/2008 07:49:12

Attachment B14
SA 105 Human Health Risk Assessment

ATTACHMENT B14

SA 105 Human Health Risk Assessment

The baseline human health risk assessment estimates what risks the site poses if no action were taken. This section of the ROD summarizes the results of the updated baseline risk assessment for SA 105. This risk assessment was originally presented in the OU A RICS2 (Jacobs, 2001). This update uses the same risk assessment methodology as OU A for all exposure pathways. For chemicals that have had toxicity value updates since the OU A RICS Addendum was published, more recent toxicity criteria have been used.

Identification of Chemicals of Concern

Several field investigations were performed between 1992 and 2001 to evaluate soil and soil gas contamination at SA 105. Samples were analyzed for SVOCs, metals, and VOCs. SSG samples were collected and analyzed for VOCs during January 2001 (Jacobs, 2002). VOCs were not detected in the soil gas samples.

The potential contaminants of concern (COCs) for SA 105 are metals. Tables B14-1 presents the soil data summaries for the COCs (tables are located at the end of this attachment).

This table includes the range of potential COC concentrations, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the exposure point concentrations (EPCs), and how the EPCs were derived for each of the media and exposure areas of SA 105. In general, the lower value of the maximum concentration or the upper 95th percent confidence limit on the mean was used as the EPC for potential COCs detected in more than one sample.

As described in Section B.14.4.3, VOCs were detected in soil gas at SA 105 during the 1993 investigation but have not been detected in subsequent soil gas sampling events. Consequently, the 1993 data do not appear to be representative of current conditions at SA 105. For the updated risk assessment, VOCs were not included in the calculations.

Exposure Assessment

A conceptual model was developed that describes the potential exposure pathways associated with soil and groundwater at SA 105 (see Figure 2-3 in Section 2.4 of the ROD). Although SA 105 will likely be used for commercial/industrial purposes in the future; several exposure scenarios were evaluated in the human health risk assessment to provide information for future risk-management decisions.

The following exposure scenarios were quantitatively evaluated in the human health risk assessment:

- Exposure of hypothetical future residents (adults and children) to soil (0 to 2 feet bgs)
- Exposure of hypothetical future residents (adults and children) to soil (0 to 10 feet bgs)
- Exposure of outdoor workers to soil (0 to 2 feet bgs)
- Exposure of construction workers to soil (0 to 15 feet bgs)

The exposure routes that were considered in the risk assessment for residents and workers potentially exposed to soil include incidental soil ingestion, inhalation of VOCs (indoor air for residents and ambient air for outdoor workers and construction workers) and resuspended particulates, and dermal contact with soil. For the residential scenarios, the ingestion of homegrown produce was also included for noncarcinogens only. For the indoor worker, potential risk associated with inhalation of VOCs in indoor air was evaluated.

Toxicity Assessment

The toxicity data that were used in the human health risk assessment are summarized on Table B14-2. Health effects are divided into two categories: cancer and non-cancer effects. The COCs identified for SA 102 are evaluated for noncarcinogenic effects only.

Table B14-2 presents the reference doses (RfDs) used to evaluate the potential for non-cancer health effects. The oral RfDs were used to estimate potential health effects associated with dermal exposure. In addition, when inhalation reference concentrations are not available for the potential COCs, the oral RfDs were used to evaluate potential health effects from the inhalation exposure route.

The hierarchy of sources for toxicity values follows EPA and Air Force guidance (EPA, 2003 and USAF, 2006) and is listed below in order of preference:

1. EPA Integrated Risk Information System (IRIS) – online database (EPA, 2007)
2. EPA's Provisional Peer Reviewed Toxicity Values (as cited in the 2004 EPA Region 9 Preliminary Remediation Goal [PRG] table [EPA, 2004])
3. California Environmental Protection Agency (Cal-EPA) cancer potency factors and reference exposure levels (REL) - online database (Cal-EPA, 2007)
4. Other EPA sources (i.e., Health Effects Assessment Summary Table [HEAST], National Center for Environmental Assessment [NCEA] provisional toxicity values, and route-extrapolated toxicity values as cited in the 2004 EPA Region 9 PRG table [EPA, 2004]).

Toxicity criteria for several contaminants have changed since the human health risk assessment was first presented. The risk estimates have been updated with the most current toxicity factors.

The following non-cancer toxicity reference doses were updated:

- Copper – Oral: 0.037 to 0.04 mg/kg-day; Inhalation: 0.037 to 0.04 mg/kg-day

Risk Characterization

The toxicity values described above were used in the human health risk assessment along with the exposure information to estimate the potential risks from contacting potential COCs in soil and air. For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a results of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$\text{Risk} = \text{CDI} \times \text{SF} \quad (4)$$

Where:

Risk = a unitless probability (e.g., 1×10^{-6}) of an individual's developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in a million chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with an RfD derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of the receptor average daily exposure to the route-specific reference dose is called a hazard quotient (HQ). An HQ less than one indicates that the receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index is generated by adding the HQs over the exposure routes. A hazard index less than one indicates that, based on the sum of all HQs from different exposure routes, toxic noncarcinogenic effects are unlikely. A hazard index greater than one indicates that site-related exposure may present a risk to human health.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = \text{CDI}/\text{RfD} \quad (2)$$

Where:

CDI = chronic daily intake (milligrams per kilogram per day [mg/kg-day])
RfD = reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term.)

Because no carcinogenic COCs were identified for this site, no cancer risk calculations were evaluated for SA 105.

For SA 105, the non-cancer hazard indices for the future adult and child residential scenario are less than 1 for both soil intervals (0 to 2 and 0 to 10 feet bgs). In addition, the hazard indices are also less than 1 for the outdoor occupational worker and future construction worker scenarios. The potential for adverse non-cancer health effects for the adult resident and worker scenarios is unlikely at SA 105. Table B14-3 presents the non-cancer hazard indices and the various exposure scenarios and exposure routes at SA 105.

The maximum detected concentration of lead at SA 105 (11.9 mg/kg) is well below the unrestricted use (residential) soil screening level of 150 mg/kg.

Uncertainties

There are uncertainties associated with the risk estimates for SA 105. The source of the SSG contamination at the site is unknown. In addition, the current reuse plans for this site are indefinite, but do not include residential or other "sensitive" use scenarios (day-cares, schools, hospitals, etc.). Hence, the use of the residential scenario for the site should be considered hypothetical at this time.

Arsenic, cadmium, copper, mercury, and thallium had concentrations measured by Method SW6010 that exceeded the combined background levels. Of those metals, only copper was carried through the risk calculations as a COC. There is uncertainty associated with the elimination of metals as COCs based on background comparisons. However, the background levels of cadmium, mercury, and thallium at the former McClellan AFB do not exceed risk-based screening levels and therefore, the risks and/or hazard quotients associated with background levels of these metals are less than 1×10^{-6} or 1, respectively. For arsenic, background levels exceed the risk-based screening level based on carcinogenic effects. The potential cancer risk associated with background levels of arsenic is 4×10^{-5}.

While carbon tetrachloride and other VOC contamination was reported at SA 105 and other sites south of IC 1 (PRL L-005F, PRL S-009, and Building 600) during the early phases of the RI, more recent sampling has shown that this contamination is present at only low levels. This contamination was likely remediated by the IC 1 SVE system. If the 1993 data are not used, there are no carcinogenic COCs for calculating risks for the indoor air pathway. Although the 1993 data are not considered representative of current conditions, potential cancer risks and non-cancer hazards were calculated using the 1993 data for purposes of evaluating uncertainties. By including the 1993 data set, the potential cancer risks for SA 105 are as follows:

- Future adult resident (0-to-2-foot-bgs depth interval): 3×10^{-3}
- Future adult resident (0-to-10-foot-bgs depth interval): 3×10^{-3}
- Outdoor occupational worker: 9×10^{-9}
- Indoor occupational worker: 2×10^{-4}
- Future construction worker: 2×10^{-9}

The main contributor to the cumulative potential cancer risks for the residential scenarios and the indoor occupational worker is the inhalation of carbon tetrachloride. The main contributor to the cumulative potential cancer risks for the outdoor occupational and construction worker scenarios is the inhalation of carbon tetrachloride and PCE.

By including the 1993 data set, the potential non-cancer hazard indices at SA 105 are as follows:

- Future adult resident (0-to-2- and 0-to-10-foot-bgs depth interval): 15
- Future child resident (0-to-2- and 0-to-10-foot-bgs depth interval): 15
- Outdoor occupational worker: 3×10^{-4}
- Indoor occupational worker: 1
- Future construction worker: 3×10^{-4}

The main contributor to the cumulative potential non-cancer hazard indices for all evaluated scenarios is the inhalation of carbon tetrachloride and PCE. As noted above, carbon tetrachloride and PCE were not detected at SA 105 in the most recent sampling events so risks and hazard indices that include these VOCs are most likely overestimates of current exposure conditions.

References

California Environmental Protection Agency (Cal-EPA). 2007. Office of Environmental Health Hazard Assessment (OEHHA). Cal-EPA – OEHHA Toxicity Criteria Database.

Jacobs. 2001. *Operable Unit A Remedial Investigation Characterization Summaries*. Final. September.

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U.S. Environmental Protection Agency (EPA). 2004. Region 9 Preliminary Remediation Goal (PRG) table. October.

U.S. Environmental Protection Agency (EPA). 2003. "Human Health Toxicity Values in Superfund Risk Assessments." OSWER Directive 9285.7-53. December 5.

Table B14-1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations
SA 105

Scenario Timeframe:	**Future**
Medium	**Soil**
Exposure Medium	**Soil**

Exposure Point	Chemical of Concern	Concentration Detected (mg/kg) Min	Concentration Detected (mg/kg) Max	Frequency of Detection	95th UCL Concentration (mg/kg)	Statistical Measure[a]	Exposure Point Concentration[b] (mg/kg)
SA 105 - Soil On-site Direct Contact (0-2 ft bgs)	Copper	7.9	11.3	2/2	NA	Lognormal	11.3
	Lead	11.1	11.1	1/2	NA	Lognormal	11.1
SA105 - Soil On-site Direct Contact (0-10 ft bgs)	Copper	7.9	17.1	4/4	16.6	Normal	16.6
	Lead	8.5	11.9	3/4	13	Normal	11.9
SA105 - Soil On-site Direct Contact (0-15 ft bgs)	Copper	7.9	17.1	4/4	16.6	Normal	16.6
	Lead	8.5	11.9	3/4	13	Normal	11.9

[a] The statistical measure indicates the basis for the exposure point concentration.

[b] The exposure point concentration is the lower value of the maximum concentration or the 95th UCL concentration.

95th UCL = 95 percent upper confidence limit on the mean.

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Table B14-2
Non-Cancer Toxicity Data Summary
SA 105

Pathway: Ingestion, Dermal									
Chemical of Concern	Chronic/ subchronic	Oral RfD	Oral RfD Units	Dermal RfD	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Copper	Chronic	4.0E-02	(mg/kg-day)	4.0E-02	(mg/kg-day)	Gastro-intestinal system		HEAST	1997
Lead									
Pathway: Inhalation									
Chemical of Concern	Chronic/ subchronic	Inhalation RfD	Oral RfD Units			Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
Copper	Chronic	4.0E-02	(mg/kg-day)			Gastro-intestinal system		HEAST	1997
Lead									

Notes:
Blank cells indicate information is not available or not applicable.
HEAST = Health Effects Assessment Summary Tables
mg/kg-day = milligrams per kilogram per day

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Table B14-3
Risk Characterization Summary - Non-Carcinogens
SA 105

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
	Soil	SA 105 - Soil On-site Direct Contact (0-2 ft bgs)	Copper	1.1E+01	mg/kg	Gastro-intestinal system	3.9E-04	8.6E-08	1.6E-05	--	4.0E-04
			Lead	1.1E+01	mg/kg		--	--	--	--	--
			TOTAL				**3.9E-04**	**8.6E-08**	**1.6E-05**	**--**	**4.E-04**
		SA 105 - Soil On-site Direct Contact (0-10 ft bgs)	Copper	1.7E+01	mg/kg	Gastro-intestinal system	5.6E-04	1.3E-07	2.3E-05	2.3E-03	2.9E-03
			Lead	1.2E+01	mg/kg		--	--	--	--	--
			TOTAL				**5.6E-04**	**1.3E-07**	**2.3E-05**	**2.3E-03**	**3.E-03**

Scenario Timeframe:	**Future**
Receptor Population:	**Resident**
Receptor Age:	**Child**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 105 - Soil On-site Direct Contact (0-2 ft bgs)	Copper	1.1E+01	mg/kg	Gastro-intestinal system	3.6E-03	2.0E-07	1.0E-04	4.4E-03	8.1E-03
			Lead	1.1E+01	mg/kg		--	--	--	--	--
			TOTAL				**3.6E-03**	**2.0E-07**	**1.0E-04**	**4.4E-03**	**8.E-03**
		SA 105 - Soil On-site Direct Contact (0-10 ft bgs)	Copper	1.7E+01	mg/kg	Gastro-intestinal system	5.3E-03	3.0E-07	1.6E-04	6.5E-03	1.2E-02
			Lead	1.2E+01	mg/kg		--	--	--	--	--
			TOTAL				**5.3E-03**	**3.0E-07**	**1.6E-04**	**6.5E-03**	**1.E-02**

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Occupational**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 105 - Soil On-site Direct Contact (0-2 ft bgs)	Copper	1.1E+01	mg/kg	Gastro-intestinal system	1.4E-04	6.1E-08	3.1E-05	--	1.7E-04
			Lead	1.1E+01	mg/kg		--	--	--	--	--
			TOTAL				**1.4E-04**	**6.1E-08**	**3.1E-05**	**--**	**2.E-04**

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Exposure Point Concentration	Exposure Point Concentration Units	Primary Target Organ	Non-Carcinogenic Hazard Quotient				
							Ingestion	Inhalation	Dermal	Produce	Exposure Routes Total
Soil	Soil	SA 105 - Soil On-site Direct Contact (0-15 ft bgs)	Copper	1.7E+01	mg/kg	Gastro-intestinal system	1.9E-03	8.1E-05	1.9E-04	--	2.2E-03
			Lead	1.2E+01	mg/kg		--	--	--	--	--
			TOTAL				**1.9E-03**	**8.1E-05**	**1.9E-04**	**--**	**2.E-03**

SECTION B15

Tank 783 (OU C)

B15.1 Site Overview and Features

Located in the southwest portion of OU C in the West McClellan District near Building 783, Tank 783 was a former 1,000-gallon underground wastewater/waste fuel tank. Tank 783 is surrounded by Bays G, H, and M of Building 783 to the west and south, and Tank 788 to the north-northeast. The tank was installed in 1957 and removed in 1989. According to David Cromwell, a retired Federal Civilian employee who worked for the Directorate of Supply (DS) and Defense Logistics Agency (DLA) in Buildings 783, 786, and 788, the tank received wastewater from Building 783 in support of a waterfall paint booth and later was used for waste POL material when the waterfall paint booth operation was relocated to Building 650 (Personal Interview, January 2004).

B15.2 Source of Contamination

The potential contaminants are metals, SVOCs, and VOCs from leaks and corrosion of the UST. The tank was removed in 1989. Confirmation samples were collected after the tank removal and from one boring in 1997. These data suggest that the tank did not leak. In July 1997, the RWQCB declared, based on available information, that no additional action was warranted at the Tank 783 site (Letter to McClellan from RWQCB, July 8, 1997).

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Air Force. 1990. *Soil Management Decision Document for B783 UST Removal*. April.
- Letter to McClellan from RWQCB dated July 8, 1997
- Radian. 1997. *Operable Unit C and Remedial Investigation Characterization Summaries*. Final. August.

  Text: Vol. 2, Other Areas, Tank 783, pgs. 1-10
  Hits Table: Vol. 2, Other Areas, Tank 783, Attachment 1, pg. 1
  All Data: Vol. 3, Appendix A, Other Areas, Tank 783, pg. 1
- Personal Interview between Mike Prall, AFRPA, and Dave Cromwell. 2004. January.
- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May.

B15.3 Sampling Strategy and Type of Contamination

An investigation was conducted by McClellan EM at the time of the tank's removal in 1989. Confirmation samples were collected after the tank was removed. Two soil samples, collected at 4 feet bgs (EM878) and 8 feet bgs (EM877), were analyzed for halogenated

volatile organics (EPA 8010), aromatic volatile organics (EPA 8020), total recoverable hydrocarbons (EPA 418.1), and total petroleum hydrocarbons (modified EPA 8015).

A preliminary assessment was conducted by CH2M HILL in 1993. No subsurface samples were collected during this investigation. However, the Tank 783 site was identified as an area to be investigated through records review, location visits, and interviews with base personnel during this investigation.

The Phase 1 RI was conducted in a 1997 and is documented in the RICS. A single soil boring (T783SB01) was drilled and sampled during the RI. However, the soil boring was drilled approximately 40 feet west of the former tank location. Soil samples, collected at 10 feet and 20 feet, were analyzed for TPH (Method SW8015) and organic lead (Method CA338). Soil gas samples, collected at 22 feet and 36 feet, were analyzed for vinyl chloride (E18PF) and VOCs (M18MS).

According to the RICS, no groundwater or surface soil samples were collected at the Tank 783 site. No surface soil samples were collected because the site conceptual model is not consistent with surface contamination, and therefore, no impacts to surface water are predicted.

B15.4 Location of Contamination

The following sections describe the extent of contamination at Tank 783. No detected contaminants in subsurface soil exceeded the screening levels for the protection of human health and groundwater. Analytical data indicate that Tank 783 did not leak. Figure B-15 identifies the site location and significant site features.

B15.5 VOCs

No volatile organics were detected (1 µg/kg detection limit) except for a single detection of toluene reported at a concentration of 0.003 mg/kg (1990, Soil Management Decision Document, B783 UST Removal). This sample was collected during tank removal in 1989 from sample location EM878. No VOCs were detected in soil or soil gas from the boring advanced in 1997 (Radian, 1997).

B15.5.1 TPH

No concentrations of gasoline, diesel, or motor oil range petroleum hydrocarbons (5, 10, and 50 mg/kg detection limits, respectively) were detected (1990, Soil Management Decision Document, B783 UST Removal). A recoverable hydrocarbon (TRH) concentration of 171 mg/kg was detected in one sample collected in 1989, however this result does not agree with TPH analytical results which indicate that the site is not contaminated. TPH was not detected in the boring advanced in 1997 (Radian, 1997).

B15.5.2 Contamination Exposure and Migration

The analytical data for the Tank 783 site indicates that minimal soil and soil gas contamination is present. The site conceptual model is not consistent with surface contamination, and therefore, no impacts to surface water are predicted. Review of the

analytical data indicates that no detected contaminants in subsurface soil exceeded the screening levels for the protection of groundwater. Therefore, impacts to groundwater are also not predicted.

B15.6 Current and Potential Future Site and Resource Uses

The site is currently vacant. In the future, the Tank 783 site will likely be used for commercial/industrial purposes.

B15.7 Human Health Risk Assessment

None of the constituents detected during the tank closure sampling exceeded current risk-based screening levels for unrestricted use. A baseline HHRA was not completed for the Tank 783 site as no contaminants were detected (Radian, 1997). Thus, no potential impacts to human health have been identified. Based on this review, the Tank 783 site is available for unrestricted use.

B15.8 Uncertainties

The sampling and analyses performed during the remedial investigation were sufficient and appropriate for the potential contaminants and release mechanisms at this site. There were no uncertainties identified for this site.

B15.9 Basis for No Action

The most recent analytical data for the Tank 783 site indicates that minimal soil and soil gas contamination is present. Confirmation samples collected after tank removal confirm that only low-levels of fuel-related or VOC contamination exists at the site and do not present a threat to human health or water quality. Therefore, no action is necessary at this site to protect human health or welfare or the environment.

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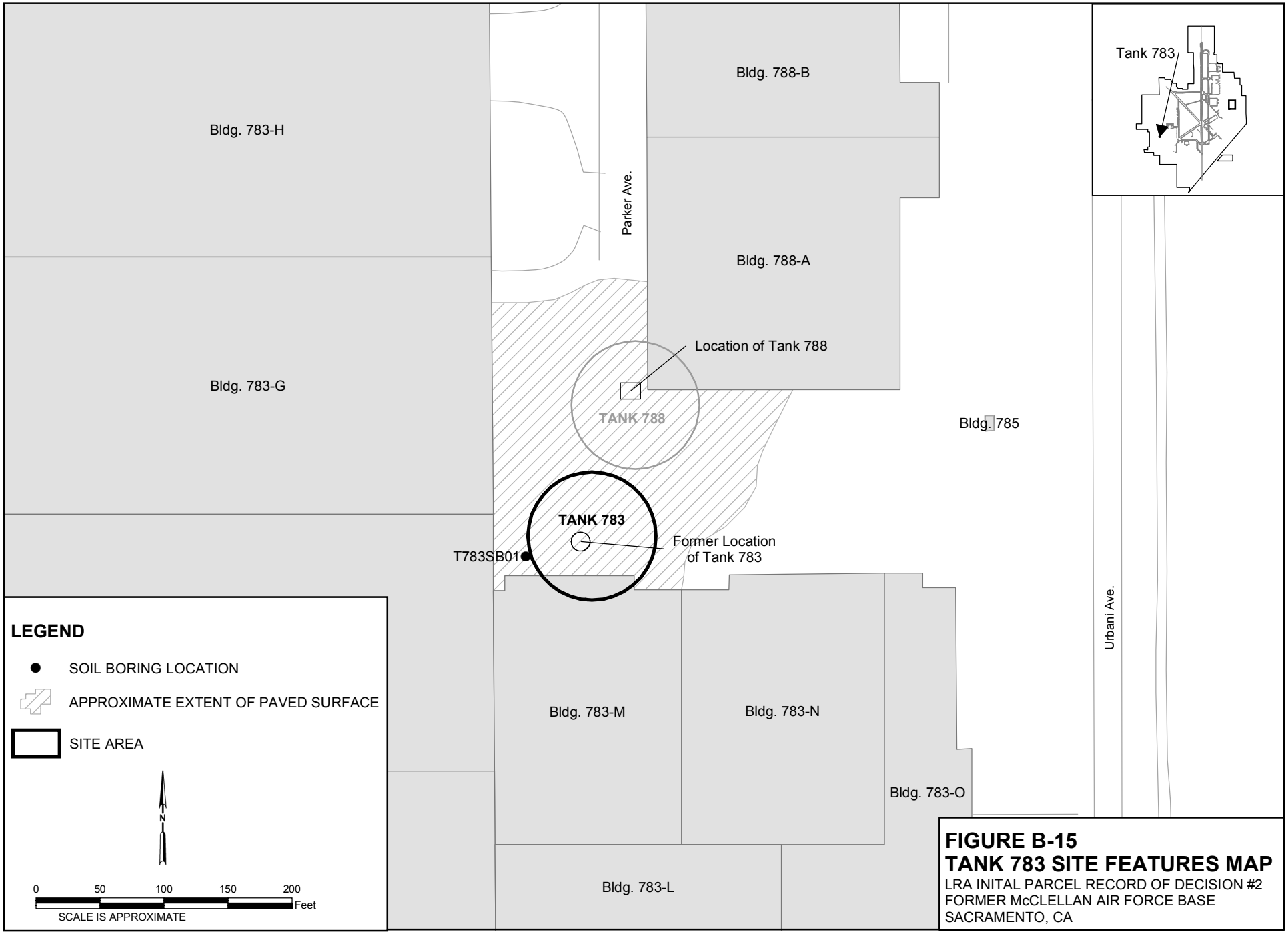

FIGURE B-15
TANK 783 SITE FEATURES MAP
LRA INITAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CA

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SECTION B16

Tank 788 (OU C)

B16.1 Site Overview and Features

Located in the western portion of OU C (in the West McClellan District) adjacent to the southwest corner of Building 788, Tank 788 is an underground concrete vault that contains two separate tanks for acid neutralization and pH adjustment. The system was installed in the late 1980s and functioned to neutralize rinse water received from lead-acid battery wash operations. After neutralization, the rinse water was discharged to the sanitary sewer. Discharging was terminated if the pH fell outside the range of 7 to 9.5. The system was operational until the late 1990s. Tank 788 remains in place at the site, but has been decommissioned (i.e., tanks cleaned, wastes disposed, and lines plugged).

Tank specifications and design information are unavailable. However, drawings for an acid neutralization tank similar to Tank 788 were found with the Tank 783 files (Tank 783 is located approximately 100 feet south/southwest of Tank 788). According to the drawings, the concrete vault is installed at 7.7 feet bgs. Each tank within the vault has a diameter of 3 feet and a height of 4 feet, resulting in an approximate volume of 30 cubic feet per tank. All construction joints contain waterstops and the interior of the vault is sealed with an acid-resistant coating. The centerline of the influent pipeline is approximately 4.5 feet bgs, while the centerline of the effluent pipeline is approximately 7 feet bgs. Base personnel (Mike Prall) confirmed Tank 788 was constructed to these specifications.

Although the vault is located underground, it did not contain fuel-related material, and therefore, it is not considered an underground storage tank by the County of Sacramento (Radian, 1994). The Tank 788 site is fully paved and is located between Building 788 and Bays M and N of Building 783.

B16.2 Source of Contamination

The potential contaminants are metals and VOCs. Results of the RICS investigation (Radian, 1997) reported no detectable soil or soil gas contamination in the Tank 788 area exceeding screening levels. Contamination was not identified at Tank 788.

Following is a list of documents, in chronological order, that were used to prepare this summary:

- Radian. 1994. *Installation Restoration Program (IRP) Operable Unit C Remedial Investigation Sampling and Analysis Plan*. Final. May. Pg. 5.17-1.
- Letter to McClellan from RWQCB dated July 9, 1997

- Radian. 1997. *Operable Unit C Remedial Investigation Characterization Summaries*. Final. August.

  Text: Vol. 2, Other Areas, Tank 788, pgs. 1-11
  Hits Table: Vol. 2, Other Areas, Tank 788, Attachment 1, pg. 1-2
  All Data: Vol. 3, Appendix A, Other Areas, Tank 788, pg. 1-2

- CH2M HILL. 2005. *LRA Initial Parcel Feasibility Study* #2. Final. May.

B16.3 Sampling Strategy and Type of Contamination

A preliminary assessment was conducted by CH2M HILL in 1993. No subsurface samples were collected during this investigation.

In 1994 one soil boring was advanced and sampled during the RI. Laboratory analyses were performed on five soil samples (including one field duplicate) and four soil gas samples obtained from soil boring T788SB01 (Radian, 1997). Soil samples, collected at depths of 10 and 20 feet bgs, were analyzed for metals and pH using analytical methods SW6010 and SW9045. Soil gas samples, collected at depths of 16 and 41 feet bgs, were analyzed for VOCs using analytical methods E18PF and M18MS.

After the RI, in the late 1990s, Tank 788 was decommissioned in place.

B16.4 Location of Contamination

Data indicate that the site is not contaminated and does not pose a risk to human health or the environment. No metals exceeded the "combined" background levels and no VOCs were detected. The pH of soil samples collected at 10 and 20 feet was 8.2 and 7.7, respectively. The location and significant site features are shown on Figure B-16.

B16.5 Contamination Exposure and Migration

VOC and non-VOC contamination is not present at the site because no contamination was found. Therefore, there is no risk of exposure or of contaminant migration.

B16.6 Current and Potential Future Site and Resource Uses

The site is currently completely paved. In the future, Tank 788 will likely be used for commercial/industrial purposes.

B16.7 Human Health Risk Assessment

None of the constituents detected during previous investigations exceed current risk-based screening levels for unrestricted use. A baseline HHRA was not completed for Tank 788 as no contaminants of potential concern were identified (Radian, 1997). Thus, no potential impacts to human health have been identified.

B16.8 Uncertainties

The sampling and analyses performed during the remedial investigation were sufficient and appropriate for the potential contaminants and release mechanisms at this site. There were no uncertainties identified for this site.

B16.9 Basis for No Action

A review of the analytical data for Tank 788 indicates that no soil or soil gas contamination is present, suggesting that no leaks from Tank 788 and associated piping have occurred. In July 1997, the RWQCB declared, based on available information, that no additional action was warranted at the Tank 788 site (Letter to McClellan from RWQCB, July 8, 1997). Thus, no action is required at this site to protect human health or welfare or the environment.

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FIGURE B-16
TANK 788 SITE FEATURES MAP
LRA INITAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CA

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Appendix C
Screening Levels

SECTION C1

Introduction

Detected concentrations of VOCs, SVOCs, TPH, and metals (reported above background values) were compared with risk-based screening levels. The risk-based screening levels correspond to the lesser of the concentrations equivalent to 1×10^{-6} carcinogenic risk or a noncarcinogenic hazard quotient (HQ) of 1 for a residential scenario including homegrown produce ingestion and an industrial/occupational scenario. Additionally, the contaminant concentrations were compared with screening levels for the protection of surface water and groundwater. These screening levels were calculated using surface water and vadose zone modeling to determine threshold values above which impacts to water resources may be present (see Appendix B of the LRA IP FS #2 for derivation of the screening levels). The screening levels for protection of human health for unrestricted and industrial use, surface water, and groundwater are provided in the tables below.

Toxicity criteria used to develop the screening levels for protection of human health were selected using the hierarchy of sources as per the US EPA OSWER Directive 9285.7-53 (Human Health Toxicity Values in Superfund Risk Assessments, December 2003) and Air Force policy (Toxicity Values for Use in Risk Assessments and Establishing Risk-Based Cleanup Levels, July 2006). In that use of the hierarchy does not always result in selection of the more conservative toxicity criteria between federal and California values, DTSC disagrees with this approach. However, based on a comparative review of the remedies proposed, DTSC noted that use of the risk hierarchy did not affect remedy selections for this ROD.

TABLE C-1
Screening Levels for Non-Volatile Organic Compounds
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, California

Contaminant	Screening Levels (mg/kg) for Protection of			
	Human Health, Unrestricted Use, in Surface and Shallow Soils[a] (0 to 15 ft bgs)	Human Health, Industrial Use, in Surface and Shallow Soils[a] (0 to 15 ft bgs)	Groundwater in Surface, Shallow, and Deep Soils (0 ft bgs to groundwater)	Surface Water in Surface Soils (0 to 1 ft bgs)
Inorganics				
Aluminum	3.5E+04	9.1E+05	8.4E+04	2.8E+03
Antimony	1.4E+01	3.7E+02	6.0E+02	1.9E+02
Arsenic	9.3E-02	1.4E+00	3.3E+00	5.8E-01
Barium	6.9E+03	1.8E+05	7.8E+03	3.2E+03
Beryllium	6.9E+01	1.8E+03	3.6E+02	1.3E+02
Cadmium	6.2E+00	1.0E+03	9.6E+01	2.3E+00
Chromium, total[b]	2.6E+03	5.5E+03	8.1E+04	1.6E+03
Chromium, hexavalent[b]	1.1E+02	7.8E+02	2.1E+02	3.5E+02
Cobalt	6.9E+02	1.8E+04	4.7E+04	1.6E+03
Copper	1.4E+03	3.7E+04	2.5E+05	1.3E+02
Cyanide	6.9E+02	1.8E+04	--	1.7E+02
Iron	1.0E+04	2.8E+05	9.1E+04	9.6E+03
Lead	1.48+02		4.3E+03	2.9E+01
Manganese	8.3E+02	2.2E+04	2.8E+04	1.6E+03
Mercury	6.6E+00	2.8E+02	1.2E+02	1.6E+00
Molybdenum	1.7E+02	4.6E+03	1.0E+03	3.2E+02
Nickel	4.3E+02	1.8E+04	5.8E+03	7.7E+02
Selenium	1.1E+02	4.6E+03	2.0E+03	1.6E+02
Silver	1.7E+02	4.6E+03	3.5E+03	2.3E+01
Thallium	2.3E+00	6.1E+01	1.4E+01	5.4E+01
Vanadium	3.5E+01	9.2E+02	1.3E+04	1.6E+03
Zinc	3.1E+03	2.8E+05	1.4E+05	1.7E+03
Semivolatile Organic Compounds				
Acenapthene	2.9E+02	1.6E+04	2.9E+02	6.4E+02
Aldrin	9.2E-03	1.1E-01	9.2E-03	4.1E-03
Anthracene	2.4E+03	1.0E+05	2.4E+03	3.1E+05
Benzo(a)anthracene	8.8E-02	8.8E-01	1.6E+00	1.4E-01
Benzo(a)pyrene	1.7E-02	1.4E-01	1.2E+00	1.4E-01
Benzo(b)fluoranthene	1.1E-01	8.8E-01	1.6E+00	1.4E-01
Benzo(g,h,i)perylene	7.5E+02	1.1E+04	7.5E+02	--
Benzo(k)fluoranthene	1.1E-01	8.8E-01	1.1E-01	1.4E-01
bis(2-chloroethyl)ether	6.8E-04	4.6E-01	4.6E-01	9.9E-01
bis(2-ethylhexyl) phthalate (DEHP)	1.2E+01	9.6E+01	2.2E+01	5.8E+01
Butylbenzylphthalate (BBP)	2.3E+03	9.6E+04	2.3E+03	9.6E+01
Chrysene	8.8E-01	8.7E+00	1.7E+00	1.4E-01
DDD	5.0E-01	7.6E+00	5.0E-01	2.6E-02
DDE	4.9E-01	5.4E+00	4.9E-01	1.9E-02
DDT	4.7E-01	5.4E+00	4.7E-01	1.9E-02

TABLE C-1
Screening Levels for Non-Volatile Organic Compounds
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, California

Contaminant	Screening Levels (mg/kg) for Protection of			
	Human Health, Unrestricted Use, in Surface and Shallow Soils[a] (0 to 15 ft bgs)	Human Health, Industrial Use, in Surface and Shallow Soils[a] (0 to 15 ft bgs)	Groundwater in Surface, Shallow, and Deep Soils (0 ft bgs to groundwater)	Surface Water in Surface Soils (0 to 1 ft bgs)
Dibenzo(a,h)anthracene	3.8E-02	2.6E-01	2.5E-02	1.4E-01
Dieldrin	5.8E-03	1.1E-01	8.4E-01	4.7E-03
Diethylphthalate (DEPH)	6.1E+02	3.8E+05	6.1E+02	9.6E+01
2,4-Dimethylphenol	1.3E+01	9.6E+03	1.3E+01	1.3E+04
Dimethylphthalate (DMPH)	2.4E+03	4.8E+06	2.4E+03	9.6E+01
2,6-Dinitrotoluene	2.4E-03	2.0E+00	6.3E-01	1.6E+00
di-n-Butylphthalate (DNBP)	9.3E+02	4.8E+04	9.3E+02	9.6E+01
Di-n-octylphthalate	1.2E+03	1.9E+04	6.1E+02	9.6E+01
Endosulfan	3.4E+01	3.9E+03	3.4E+01	1.8E+00
Endrin	4.2E+00	2.0E+02	4.2E+00	1.1E+00
Fluoranthene	4.9E+02	1.5E+04	4.9E+02	9.6E+03
Fluorene	2.4E+02	1.3E+04	2.4E+02	4.1E+04
Heptachlorepoxide	7.6E-03	2.0E-01	7.6E-03	3.2E-03
Indeno(1,2,3-cd)pyrene	1.2E-01	8.8E-01	1.2E-01	1.4E-01
2-Methylnaphthalene[c]	1.6E+01	1.7E+02	2.5E+01	--
2-Methylphenol	2.0E+01	2.4E+04	2.0E+01	1.1E+03
Naphthalene[c]	2.4E+00	5.1E+00	5.6E+01	6.7E+02
n-nitroso-di-n-propylamine	1.2E-04	1.9E-01	5.9E-01	1.6E-01
N-nitrosodiphenylamine (NNSPH)	1.8E+00	2.7E+02	5.4E-01	1.6E+02
Polychlorinated Biphenyl (PCB)	6.3E-02	5.3E-01	5.9E+00	5.4E-03
Phenanthrene	2.7E+02	1.1E+04	2.7E+02	--
Pyrene	3.5E+02	1.1E+04	3.5E+02	3.1E+04
Total Petroleum Hydrocarbons				
TPH-D	--	--	100	100
TPH-G	--	--	10	10

[a] Values for protection of human health are equivalent to the lesser of the carcinogenic risk of 1E-06 or a hazard quotient of 1 for each contaminant for exposure to soil through direct contact, inhalation, and ingestion for the residential and industrial scenarios.

[b] For protection of human health and water quality, if chromium has been speciated, then the values for hexavalent and total chromium will be used as calculated. If chromium has not been speciated, the U.S. Environmental Protection Agency Preliminary Remediation Goal for total chromium in residential soil (210 mg/kg) will be used as a screening level for protection of human health, and the screening levels for hexavalent chromium will be used for protection of groundwater and surface water (210 and 350 mg/kg, respectively).

[c] The screening levels for protection of human health exclude the indoor air inhalation pathway. See Table C-2 for values considering only this pathway.

Notes:

-- = a screening level was not developed
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethene
DDT = dichlorodiphenyltrichloroethane
EPA = U.S. Environmental Protection Agency
ft bgs = feet below ground surface
mg/kg = milligram per kilogram
TPH-D = total petroleum hydrocarbons as diesel
TPH-G = total petroleum hydrocarbons as gasoline

TABLE C-2
Screening Levels for Protection of Human Health in Shallow Soil Gas
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, California

Chemical	Soil Gas Concentration Protective of Human Health for Indoor Air (ppbv)[a]	
	Unrestricted Use Scenario	Industrial Use Scenario
Acetone	130,000	1,900,000
Benzene	9.9	170
Benzyl chloride	0.97	16
Bromomethane (methyl bromide)	130	1,900
Carbon tetrachloride	2.6	44
Chlorobenzene	22,000	320,000
Chloroethane	110	1,900
Chloroform	2.2	36
Chloromethane	65	1,100
1,2-Dichlorobenzene	3,300	48,000
1,3-Dichlorobenzene	1,700	25,000
1,4-Dichlorobenzene	3.5	58
Dichlorodifluoromethane (Freon® 12)	4,000	59,000
1,1-Dichloroethane	38	630
1,2-Dichloroethane	2.3	39
1,1-Dichloroethene	5,000	73,000
cis-1,2-Dichloroethene	880	13,000
trans-1,2-Dichloroethene	1,800	26,000
1,2-Dichloropropane	5.1	86
Ethylbenzene	23,000	330,000
Ethylene dibromide (1,2-Dibromoethane)	0.055	0.93
Hexachloro-1,3-butadiene	1.0	17
Hexane[d]	20,000	290,000
Methylene chloride (dichloromethane)	150	2,500
Methyl ethyl ketone (2-butanone)	170,000	2,400,000
Methyl isobutyl ketone (4-methyl-2-pentanone)	73,000	1,100,000
Methyl tert-butyl ether (MTBE)	260	4,400
2-Methylnaphthalene	52	760
n-Butylbenzene	2,600	37,000

TABLE C-2
Screening Levels for Protection of Human Health in Shallow Soil Gas
LRA Initial Parcel Record of Decision #2, Former McClellan Air Force Base, California

Chemical	Soil Gas Concentration Protective of Human Health for Indoor Air (ppbv)[a]	
	Unrestricted Use Scenario	Industrial Use Scenario
n-Propylbenzene	2,800	42,000
Naphthalene	1.4	23
Styrene	25,000	360,000
1,1,2,2-Tetrachloroethane	0.61	10
Tetrachloroethene (PCE)	5.8	98
Toluene[b]	130,000	1,900,000
1,2,4-Trichlorobenzene	47	690
1,1,1-Trichloroethane	41,000	610,000
1,1,2-Trichloroethane	2.8	47
Trichloroethene (TCE)	23	380
Trichlorofluoromethane (Freon® 11)	12,000	180,000
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon® 113)[b,c]	390,000	5,600,000
1,2,4-Trimethylbenzene	120	1,800
1,3,5-Trimethylbenzene	120	1,800
Vinyl Chloride	11	360
Xylene, o-	2,300	33,000
Xylene, m-	2,300	33,000
Xylene, p-	2,300	33,000

[a] Values for protection of human health for volatile organic compounds are equivalent to the lesser of the carcinogenic risk of 1E-06 or a hazard quotient of 1 for each contaminant for exposure to soil gas through indoor air inhalation for the residential and industrial scenarios.

[b] The indicated Preliminary Cleanup Goals exceed the breathing zone concentration considered to be Immediately Dangerous to Life and Health (National Institute for Occupational Safety and Health, 2004) for, methyl isobutyl ketone (500,000 ppbv), toluene (500,000 ppbv), and 1,1,2-trichloro-1,2,2-trifluoroethane (2,000,000 ppbv).

[c] The listed risk-based concentration exceeds the soil vapor saturation concentration for 1,1,2-trichloro-1,2,2-trifluoroethane (360,000 ppbv).

[d] For cyclohexane, heptane, and trimethylpentane, hexane was used as a surrogate for migration modeling and toxicity.

Note:

ppbv = parts per million by volume

Appendix D
Pre-Decision Summary Results for AOC G-2, AOC H-12, and CS S-049

SECTION D1

Introduction

This report comprises the *Local Reuse Authority (LRA) Initial Parcel #2 Pre-Decision Sampling Results for AOC G-2, AOC H-12, and CS S-049* to support the pending *LRA Initial Parcel Record of Decision #2 (IP ROD #2)* for the former McClellan Air Force Base (AFB or Base), California, hereinafter referred to as McClellan. As identified in the *Final Phase 1 Local Reuse Authority (LRA) Initial Parcel #2 Pre-Decision Work Plan* (Work Plan), pre-design sampling for both volatile organic compounds (VOCs) in soil gas and non-volatile organic compounds (non-VOCs) in soils was needed at three IP #2 sites (CH2M HILL, 2007). The sites addressed in this report consist of Area of Concern (AOC) G-2 (Former Tank Farm 7), AOC H-12 (Former Weather Squadron Maintenance), and Confirmed Site (CS) S-049 (Former Maintenance Shed).

This pre-design sampling was performed to refine the final remedies for the three sites as necessary. The data will be used to better define the excavation boundaries, reassess risk, and, if appropriate, support modifications to the selected remedies in this ROD. The data will also be used to better estimate programming costs for the subsequent remedial actions to be performed during Phase 2. Phase 2 will consist of remedial design activities, including the development of a Phase 2 Remedial Action Work Plan (RAWP) that describes in detail the methods and procedures that will be employed during the proposed remedial action.

The screening levels used in this report are included in Appendix C of this ROD.

This report is organized as follows:

- **Section D1: Introduction –** Summarizes the objectives of the field sampling.
- **Section D2: AOC G-2 –** Presents the results of the field sampling, an updated excavation volume, and the institutional control boundaries for AOC G-2.
- **Section D3: AOC H-1**2 **–** Presents the results of the field sampling, an updated excavation volume, and the institutional control boundaries for AOC H-12.
- **Section D4: CS S-049 –** Presents the results of the field sampling and the institutional control boundaries for CS S-049.
- **Section D5: References**
- **Attachment D1: Documentation for Proposed Step-out Sampling**
- **Attachment D2: Validated Analytical Data (on CD)**
- **Attachment D3: Boring Logs**
- **Attachment D4: Technical Memorandum: AOC H-12 (Building 929) Indoor and Ambient Air Samples**
- **Attachment D5: Technical Memorandum: AOC H-12 (Building 948) Indoor and Ambient Air Samples**

SECTION D2

AOC G-2

D2.1 Site Description

AOC G-2 is located in the south-central portion of Operable Unit (OU) G, and is within the proposed Core Aviation/Industrial District. The site borders the East McClellan District, residential housing to the south and east, and a significant source of VOC contamination, Potential Release Location (PRL) T-044, to the west. AOC G-2 was formerly known as Tank Farm 7, which operated from the mid-1950s until 1999 when it was demolished under the fuels program. AOC G-2 served as a storage location for petroleum, oil, and lubricants.

A biovent system was installed at the site in 2000 and operated until 2003. The site is partially located within the area of influence of a soil vapor extraction (SVE) system installed in 2001 at PRL T-044. The area has been monitored for soil gas contamination as a part of both the SVE and bioventing programs.

AOC G-2 was included in the IP ROD #2 (Air Force Real Property Agency [AFRPA], 2006) for both VOC contaminants in shallow soil gas and non-VOC contaminants in soil. Based on the IP ROD #2, excavation and offsite disposal with institutional controls (Alternative 4R and Alternative 3) was the selected remedy to address the contamination at AOC G-2. Additional sampling and analysis were performed prior to completing the ROD to better define the excavation target volume. Based on the results from these samples (which are discussed below), a more definitive target volume for excavation has been estimated.

D2.2 Sampling Rationale and Objectives

Additional sampling was needed to determine current concentrations of total petroleum hydrocarbons (TPH) within the berm and define the required excavation volume, assess the presence or absence of PAHs within the berm, and measure the current concentrations of VOCs in soil gas beneath and outside the bermed area with the radium of influence of the PRL T-044 SVE system. The data collected during the pre-decision sampling effort will help to fully delineate the volume of soil to be excavated. The data quality objectives (DQOs) for the original 12 borings (AG02SB024 to AG02SB035) and the 7 step-out borings (AG02SB036 to AG02SB042) are included in Attachment D1.

D2.3 Field Activities

The following activities were performed during the pre-decision sampling effort at AOC G-2 to satisfy the DQOs:

- Drilling and sampling a total of 19 borings (AG02SB024, AG02SB025, AG02SB026, AG02SB028 to AG02SB034, AG02SB036, AG02SB039, and AG02SB042) to 15 feet below ground surface (bgs); three borings (AG02SB038, AG02SB040, and AG02SB042) to 10 feet bgs; one boring (AG02SB035) to 100 feet bgs; and one boring (AG02SB027) to groundwater (approximately 110 feet bgs)

- Analyzing 20 soil gas samples for VOCs
- Analyzing 34 soil samples for polycyclic aromatic hydrocarbons (PAHs)
- Analyzing 29 soil samples for total petroleum hydrocarbons, diesel (TPH-D)
- Analyzing 53 soil samples for total petroleum hydrocarbons, gasoline (TPH-G)
- Analyzing 27 soil samples for VOCs
- Analyzing 1 groundwater sample for TPH-D, TPH-G, and VOCs

Samples were collected between August and October 2007. All fieldwork was performed in accordance with the Work Plan (CH2M HILL, 2007) and the McClellan AFB Basewide Quality Assurance Project Plan (QAPP) (URS, 2003). No deviations from the Work Plan occurred at AOC G-2. Step-out sampling was conducted at AOC G-2, and the documentation for the step-out decisions is included in Attachment D1. Analytical data collected during the pre-decision sampling effort is included in Attachment D2. Lithologic logs for the borings are included in Attachment D3.

D2.4 Pre-Decision Sampling Results

Data from the pre-decision sampling effort are summarized in Table D2-1. The data summary in Table D2-1 includes all detected organic contaminants. Analytes with concentrations exceeding screening levels are presented in Table D2-2. Boring locations are shown on Figure D-1a.

Analytes detected at concentrations greater than screening levels include TPH-D, TPH-G, naphthalene, and PAHs in soil and several VOCs in soil gas. No analytes were detected in groundwater at concentrations exceeding maximum contaminant levels (MCLs). The soil and soil gas contamination appears to be limited to the upper 15 feet of soil.

D2.4.1 Soil Gas

Fuel-related VOCs at concentrations exceeding the unrestricted and industrial use screening levels were detected in soil gas samples collected between 5 and 15 feet bgs within the bermed area (Figure D-1b). Maximum concentrations include hexane at a concentration of 1,380,000 parts per billion by volume (ppbv), m,p-xylene at 271,000 ppbv, o-xylene at 59,000 ppbv, and 1,2,4-trimethylbenzene at 12,500 ppbv, all detected in soil gas samples from AG02SB027. The maximum VOC detected in the deep soil gas samples from AG02SB027 was hexane at concentrations of 22,200 ppbv (field duplicate sample from 40 feet bgs), 7,450 ppbv (normal sample from 40 feet bgs), and 7,190 ppbv (from 60 feet bgs).

Benzene was the only VOC detected in soil gas samples collected outside the bermed area at concentrations exceeding a screening level. It was detected in the 15-foot-bgs soil gas samples from AG02SB033 and AG02SB034 at concentrations of 10.0 ppbv and 19.7 ppbv, respectively. Both borings are located south of the bermed area.

Deep soil gas samples were also collected from AG02SB035, located just north of the bermed area. The maximum VOC detected in deep soil gas samples was acetone at a concentration of 137 ppbv in the sample from 100 feet bgs.

Three halogenated VOCs (1,1,2,2-tetrachloroethane, trichloroethene [TCE], and tetrachloroethene [PCE]) were detected in soil gas samples from AOC G-2. Maximum concentrations include 1,1,2,2-tetrachloroethane at 1,340 ppbv (from AG02SB032), TCE at 13.4 ppbv (from AG02SB027), and PCE at 47.8 ppbv (from AG02SB029). 1,1,2,2,-Tetrachloroethane was detected in two soil gas samples collected within the bermed area, and both concentrations exceed the unrestricted and industrial use screening levels and the screening levels for the protection of groundwater. PCE was detected in one sample (collected within the bermed area), and the concentration exceeds the unrestricted use screening level. AOC G-2 is located just east of PRL T-44, which has been previously identified as a source of halogenated soil gas and groundwater contamination. PRL T-44 is most likely the source of the halogenated soil gas contamination detected at AOC G-2, but halogenated VOCs may have been used at AOC G-2 also.

D2.4.2 TPH in Soil

TPH-D and TPH-G were detected in soil samples collected at AOC G-2 between the surface and 10 feet bgs at concentrations exceeding screening levels. TPH-D was detected at a maximum concentration of 3,000 milligrams per kilogram (mg/kg) from AG02SB027 at 10 feet bgs. The maximum TPH-G concentration was 15,000 mg/kg from AG02SB026 at 10 feet bgs. TPH-D and TPH-G were not detected in deeper samples at concentrations exceeding screening levels. Concentrations of TPH-D and TPH-G in soil samples collected below 10 feet bgs were all less than 4 mg/kg. All TPH concentrations exceeding screening levels were detected within the bermed area.

D2.4.3 PAHs in Soil

Seven PAHs were detected in soil samples collected between the surface and 10 feet bgs at concentrations greater than screening levels for unrestricted use. Four of the seven detected PAHs, including naphthalene, benzo(a)pyrene, benzo(a)anthracene, and benzo(b)fluoranthene, had concentrations greater than industrial use screening levels. All PAHs with concentrations greater than screening levels were detected in samples collected within the bermed area. Naphthalene was the most frequently detected PAH. The maximum concentration was 9.2 mg/kg from AG02SB027 at 10 feet bgs. PAHs were not detected in any soil samples collected at 15 feet bgs.

D2.4.4 VOCs in Groundwater

One groundwater sample was collected from AG02SB027. Three fuel-related VOCs were detected; ethylbenzene at a concentration of 0.17 micrograms per liter (µg/L), m,p-xylene at 0.72 µg/L, and o-xylene at 0.25 µg/L. All concentrations were less than their respective MCLs.

D2.5 Conclusions

It appears that the soil contamination associated with AOC G-2 is limited to the upper 15 feet of soil. The presence of PAHs has been confirmed and the lateral extent appears to be limited to within the bermed area, in the same area as the TPH contamination. VOCs in shallow soil gas are present outside the bermed area. Based on the results of this sampling effort and previous investigations, a more accurate target volume can be estimated. The estimated target area for soil to be excavated is shown on Figure D-1a.

SECTION D3

AOC H-12

D3.1 Site Description

AOC H-12 is located in the east-central portion of OU H. It consists of Building 929 and the surrounding area. The conceptual model for this site includes surface spills and releases from maintenance operations at Building 929, which may have included paints, solvents, sulfur, mercury, chromates, fuels, oils, and lubricants. These contaminants may have been released directly to the ditch or washed into the ditch from the surface. In either case, the ditch sediments could have been impacted prior to the ditch being lined with gunite. Once contaminated, overflows from the ditch may have impacted soils along both the east and west sides. Finally, the Remedial Investigation Characterization Summaries (RICS) noted that, prior to the lining of the ditch in the 1960s, weed control around the drainage ditch was achieved through surface application of polychlorinated biphenyl (PCB)-laden oil, resulting in the contamination in the soil along the sides of the ditch and the sediments beneath the lining.

Building 929 is located approximately 20 feet east of the lined concrete drainage ditch. The building has a strip of grass that surrounds the building and slopes gently away in all directions. Two concrete pads, each approximately 5 by 5 feet, were previously used to support weather equipment. The pads remain in the grassy area along the ditch. Two floor drains were observed in the concrete floor of Building 929; one of the floor drains is located in the unused paint spray booth. Surface water from the Base and offbase areas to the east flows through a covered drain pipe south of the site into the ditch located on the west side of Building 929.

AOC H-12 was included in the IP ROD #2 (AFRPA, 2006) for both VOC contaminants in shallow soil gas and non-VOC contaminants in soil. A combination of a vapor barrier or gas collection system with institutional controls (Alternative 3) for VOCs in soil gas and excavation and offsite disposal (Alternative 4U) for non-VOCs in soil was the selected remedy in the IP ROD #2. Additional sampling and analysis were performed during the remedial design to better define the excavation target volume. Based on the results from the pre-decision sampling effort (which are discussed below), a more definitive target volume for excavation was estimated and the institutional control boundary was determined.

D3.2 Sampling Rationale and Objectives

Additional sampling and analysis was performed to address two uncertainties at AOC H-12. First, the volume of mercury- and PCB-contaminated soil requiring excavation beneath and along both sides of the ditch needed to be refined. Second, the presence of VOCs in shallow soil gas at the north end of the site needed to be confirmed. The DQOs for the original 2 soil borings and 14 hand augers (AH12SB010, AH12SB011, and AH12HA011 to AH12HA024) are included in Attachment D1. Three step-out sampling events were conducted at AOC H-12 and a total of 7 hand augers (AH12HA025 to AH12HA031) and 12 soil borings (AH12SB012 to AH12SB023) were sampled. The DQOs for these locations are included in Attachment D1.

D3.3 Field Activities

The following activities were performed during the pre-decision sampling effort at AOC H-12 to satisfy the data quality objectives:

- Drilling and sampling 14 borings (AH12SB010 to AH12SB023) and 21 hand augers (AH12HA011 to AH12HA031)
- Analyzing 19 soil samples for mercury
- Analyzing 30 soil samples for PCBs
- Analyzing 32 soil gas samples for VOCs
- Collecting two indoor air gas samples from inside Building 929 and one ambient air gas sample from just outside the building near the northwest corner.

Samples were collected between August and November 2007. All fieldwork was performed in accordance with the Work Plan (CH2M HILL, 2007) and the McClellan AFB Basewide QAPP (URS, 2003). No deviations from the Work Plan occurred at AOC H-12. Step-out sampling was conducted, and the documentation for the step-out decisions is included in Attachment D1. Analytical data collected during the pre-decision sampling effort is included in Attachment D2. Lithologic logs for the borings are included in Attachment D3.

D3.4 Pre-Decision Sampling Results

Data from the pre-decision sampling effort are summarized in Table D3-1. The data summary in Table D3-1 includes only metals greater than combined background concentrations and organic analytes greater than detection limits. Analytes with concentrations exceeding screening levels are presented in Table D3-2. Boring locations are shown on Figures D-2 and D-3.

D3.4.1 Soil Gas

Nine VOCs were detected at concentrations exceeding unrestricted use screening levels (Table D3-2) in soil gas samples collected between 5 and 15 feet bgs. Three VOCs, including carbon tetrachloride, chloroform, and naphthalene, had concentrations greater than industrial use screening levels. The maximum detected concentration was chloroform at 1,160 ppbv from AH12SB012 at 15 feet bgs. The maximum concentration of carbon tetrachloride was also reported in the 15-foot sample from AH12SB012 at a concentration of 124 ppbv. Naphthalene was detected at a maximum concentration of 234 ppbv from AH12SB020 at 15 feet bgs. Concentrations of VOCs exceeding unrestricted use screening levels are shown on Figure D-2.

Two indoor air gas samples and one ambient gas sample were collected at AOC H-12. The two indoor air samples were collected within Building 929, and the ambient air sample was collected just outside the building. Chloroform was detected in all three samples at concentrations greater than unrestricted and industrial use screening levels. Benzene was the only other VOC detected greater than screening levels. It was detected in Indoor Air sample 2, collected near a floor drain, at concentrations greater than unrestricted and industrial use screening levels. Several other VOCs were detected, but all concentrations

were less than screening levels (Table D3-3). More details on the ambient air samples and indoor air samples can be found in Attachment D4 of this appendix.

D3.4.2 PCBs

PCB-1260, at concentrations exceeding surface water screening levels, was detected in several surface samples collected in and along the drainage ditch. Concentrations greater than surface water screening levels ranged from 8.97 µg/kg (AH12HA014) to a maximum concentration of 72.3 µg/kg (AH12HA017) (Figure D-3). The maximum concentration also exceeded the unrestricted use screening level. PCB-1260 was not detected in any of the soil samples collected at 2 feet bgs.

D3.4.3 Mercury

Mercury was detected in several surface samples collected from AOC H-12 during the pre-decision sampling effort. All concentrations were less than screening levels. The maximum concentration was 0.22 mg/kg from AH12HA017.

D3.5 Conclusions

Based on the results from this pre-decision sampling effort, surface water contaminated with PCB-1260 is present at AOC H-12. Concentrations of PCBs exceed the screening levels for the protection of surface water and human health for unrestricted use. Shallow soil gas contamination was also detected in shallow soil gas samples.

An updated Human Health Risk Assessment (HHRA) for AOC H-12 is included in Appendix B of this ROD. Based on the results of the pre-decision sampling and the updated HHRA, the excavation and institutional control boundaries have been modified and are shown on Figures D-2 and D-3.

SECTION D4

CS S-049

D4.1 Site Description

CS S-049 is located in OU B in the southwestern corner of investigation cluster (IC) 3 within the Core Airfield/Industrial District. The site was used as a maintenance facility from the late 1970s until the early 1990s. The conceptual site model suggests that the soil at CS S-049 may have been contaminated from one or more surface releases of the various materials handled at the site, including pesticides, herbicides, fuels, oils, and solvents. In 1990, approximately 190 cubic yards of contaminated surface soils were excavated from CS S-049. The exact dimensions of the excavation cavity are unknown and no confirmation samples were collected after the removal action.

Currently, CS S-049 is mostly covered with asphalt and is used as a parking lot to support Building 690. Some small unpaved areas are present within the site boundaries, and grassy areas surround the northern and eastern boundaries. The area just south of the site is unpaved. Surface water from CS S-049 drains directly onto the grassy and unpaved areas surrounding the site.

CS S-049 was included in the IP ROD #2 (AFRPA, 2006) for both VOC contaminants in shallow soil gas and non-VOC contaminants in soil. Based on the IP ROD #2, excavation and offsite disposal with institutional controls (Alternative 4R) was the selected remedy to address the contamination at CS S-049. Additional sampling and analysis was preformed during the remedial design phase to better define the excavation target volume. Based on the results from this sampling effort (which are discussed below), it was determined that institutional controls (Alternative 2) prohibiting residential use are sufficient to protect human health and the environment. Institutional controls would eliminate or limit exposure to contaminants, thereby facilitating continued occupational/industrial reuse of the site.

D4.2 Sampling Rationale and Objectives

Additional sampling was proposed to determine the required excavation volume at CS S-049. Samples were collected in shallow soil adjacent and beneath the previous excavation to fully delineate the volume of soil to be excavated. The DQOs for the 13 soil borings (CS40SB001 to CS49SB013) are in Attachment D1.

D4.3 Field Activities

The following activities were performed during the pre-decision sampling effort at CS S-049 to satisfy the DQOs:

- Drilling and sampling 13 borings (CS49SB001 to CS49SB013) to 8 feet bgs
- Analyzing 25 soil samples for TPH-D
- Analyzing 26 soil samples for metals

- Analyzing 25 soil samples for pesticides and herbicides
- Analyzing 26 soil samples for SVOCs
- Analyzing 26 soil samples for PAHs

Soil samples were collected in August 2007. All fieldwork was performed in accordance with the Work Plan (CH2M HILL, 2007) and the McClellan AFB Basewide QAPP (URS, 2003). Based on the results of the shallower samples, the samples collected at 8 feet bgs were not analyzed. The following deviations from the Work Plan occurred at CS S-049:

- The 0.5-foot sample from CS49SB004 was not analyzed for TPH-D and pesticides/herbicides because of a laboratory error.

Analytical data collected during the pre-decision sampling effort is included in Attachment D2. Lithologic logs for the borings are included in Attachment D3.

D4.4 Pre-Decision Sampling Results

Data from the pre-decision sampling effort are summarized in Table D4-1. The data summary in Table D4-1 includes only metals greater than combined background concentrations and organic analytes greater than detection limits. Analytes with concentrations exceeding screening levels are presented in Table D4-2. Boring locations are shown on Figure D-3.

Analytes detected at concentrations greater than screening levels include metals, pesticides, and PAHs. With the exception of vanadium detected above screening levels in the sample collected from CS49SB003 at 3 feet bgs, contaminants with concentrations exceeding a screening level, including pesticides, metals, and PAHs, were only reported in the 0.5-foot bgs samples.

D4.4.1 TPH

TPH-D was detected in all samples collected at 0.5 feet bgs and in one subsurface sample. The maximum concentration was 63 mg/kg from CS49SB006 at 0.5 feet bgs. A subsurface sample was collected at 3 feet bgs from CS49SB006, and TPH-D was detected at a concentration of 2.9 mg/kg in this sample. None of the reported concentrations exceed screening levels.

D4.4.2 Metals

Metals detected at concentrations greater than combined background include arsenic, beryllium, cadmium, chromium, copper, lead, selenium, silver, and vanadium. Lead was detected at a concentration of 120 mg/kg in the field duplicate sample collected from CS49SB002 at 0.5 feet. This concentration exceeds the screening level for the protection of surface water, but is less than the surface background concentration of 137 mg/kg. Lead was not detected in the corresponding native sample.

Vanadium was detected in only one sample from CS S-049. It was detected in a sample from CS49SB003 at 3 feet bgs at a concentration of 76 mg/kg, which is greater than the unrestricted use screening level. This detection likely does not represent contamination because vanadium was not detected above background in any other samples, indicating that

a release most likely did not occur. The conceptual site model does not indicate that CS S-049 is a potential source of metals, including vanadium.

Copper exceeds the screening level for protection of surface water in one sample. It was detected at a concentration of 240 mg/kg at 0.5 feet bgs from CS49SB004. This concentration also exceeds the surface background concentration.

Arsenic was detected in the 0.5-foot-bgs samples from CS49SB011 and CS49SB013 at a maximum concentration of 5.6 mg/kg. Both concentrations exceed screening levels for protection of human health for industrial use, protection of groundwater, and protection of surface water. However, both concentrations are less than the surface background concentration of 5.8 mg/kg.

D4.4.3 Pesticides and Herbicides

DDE, DDT, and dieldrin were detected at concentrations greater than screening levels for protection of surface water in several samples collected at 0.5 feet bgs (Table D4-2). Maximum concentrations were 0.034, 0.13, and 0.012 mg/kg, respectively. Concentrations of dieldrin also exceed the unrestricted use screening level in the 0.5-foot-bgs samples from CS49SB002 and CS49SB012 (Figure D-3). No pesticides or herbicides were detected above screening levels in the samples collected at 3 feet bgs.

D4.4.4 SVOCs

No SVOCs (with the exception of the PAHs summarized below) were detected at concentrations greater than screening levels. Bis(2-ethylhexyl)phthalate was the most frequently detected SVOC. The maximum concentration was 0.37 mg/kg in the 0.5-foot-bgs sample from CS49SB002.

D4.4.5 PAHs

Benzo(a)pyrene was detected above the unrestricted use screening level at a concentration of 0.035 mg/kg in the field duplicate sample at 0.5-foot bgs from CS49SB002. This sample was analyzed by Method SW8270C; however, benzo(a)pyrene was not detected in the corresponding native sample or in the sample analyzed by Method SW8310 from the same depth interval. Dibenzo(a,h)anthracene was detected above the unrestricted use screening level in samples collected at 0.5 feet bgs from CS49SB002 and CS49SB010 (Figure D-3). In the sample collected from CS49SB002, dibenzo(a,h)anthracene exceeds the screening level in the field duplicate but not in the corresponding native sample.

D4.5 Conclusions

Based on the results from this pre-decision sampling effort, sporadic surface contamination is present at CS S-049. Concentrations of contaminants exceed the screening levels for the protection of surface water and human health for unrestricted use. Only arsenic concentrations exceed the screening levels for industrial use; however, the arsenic concentrations were less than the surface soil background concentration. Previous investigations identified TPH-D contamination at 12 feet bgs in one sample. However, TPH-D was not detected in the sample collected at 20 feet bgs.

An updated HHRA for CS S-049 is included in Appendix B of this ROD. The risks indicate that excavation is no longer necessary to protect human health. Because the site will be used for industrial use only, institutional controls would be implemented to eliminate or limit exposure to contaminants.

SECTION D5

References

Air Force Real Property Agency (AFRPA). 2006. *Local Reuse Authority (LRA) Initial Parcel Record of Decision #2.* June.

CH2M HILL. 2007. *Phase 1 Local Reuse Authority (LRA) Initial Parcel #2 Pre-Decision Work Plan.* Final. August.

URS. 2003. *Former McClellan Air Force Base Basewide Quality Assurance Project Plan, Revision 5.* Final. September.

TABLE D2-1

Reported Analytes and Metals Above Combined Background for AOC G-2

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW	Exceeds MCL
AG02SB024	8/23/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	16	mg/kg		N					
AG02SB024	8/23/2007	SW8015-P	SO	0.5	Gasoline Range Organics (C6-C10)	1.8	mg/kg	J	N					
AG02SB024	8/23/2007	SW8310	SO	0.5	Dibenzo (a,h) anthracene	0.014	mg/kg	J	N					
AG02SB024	8/23/2007	SW8015-E	SO	5	ND									
AG02SB024	8/23/2007	SW8015-P	SO	5	ND									
AG02SB024	8/23/2007	SW8310	SO	5	ND									
AG02SB024	8/23/2007	SW8015-E	SO	10	Diesel Range Organics (C10-C24)	15	mg/kg		N					
AG02SB024	8/23/2007	SW8015-P	SO	10	Gasoline Range Organics (C6-C10)	9.1	mg/kg		N					
AG02SB024	8/23/2007	SW8310	SO	10	ND									
AG02SB024	8/23/2007	SW8015-E	SO	15	ND									
AG02SB024	8/23/2007	SW8015-P	SO	15	ND									
AG02SB024	8/23/2007	SW8310	SO	15	ND									
AG02SB025	**8/23/2007**	**SW8015-E**	**SO**	**0.5**	**Diesel Range Organics (C10-C24)**	**510**	**mg/kg**		**N**			**X**	**X**	
AG02SB025	8/23/2007	SW8015-P	SO	0.5	ND									
AG02SB025	8/23/2007	SW8260B	SO	0.5	ND									
AG02SB025	8/23/2007	SW8310	SO	0.5	Fluoranthene	0.024	mg/kg	J	N					
AG02SB025	8/23/2007	SW8310	SO	0.5	Naphthalene	0.013	mg/kg	J	N					
AG02SB025	**8/23/2007**	**SW8015-E**	**SO**	**5**	**Diesel Range Organics (C10-C24)**	**110**	**mg/kg**	**J**	**FD**			**X**		
AG02SB025	8/23/2007	SW8015-E	SO	5	Diesel Range Organics (C10-C24)	25	mg/kg	J	N					
AG02SB025	**8/23/2007**	**SW8015-P**	**SO**	**5**	**Gasoline Range Organics (C6-C10)**	**570**	**mg/kg**	**J**	**FD**			**X**		
AG02SB025	**8/23/2007**	**SW8015-P**	**SO**	**5**	**Gasoline Range Organics (C6-C10)**	**130**	**mg/kg**	**J**	**N**			**X**		
AG02SB025	8/23/2007	SW8260B	SO	5	Ethylbenzene	0.043	mg/kg		FD					
AG02SB025	8/23/2007	SW8260B	SO	5	m,p-Xylene	0.18	mg/kg	J	FD					
AG02SB025	8/23/2007	SW8260B	SO	5	o-Xylene	0.0075	mg/kg	J	FD					
AG02SB025	8/23/2007	SW8260B	SO	5	tert-Butyl Alcohol	0.03	mg/kg	J	FD					
AG02SB025	8/23/2007	SW8260B	SO	5	Benzene	0.0011	mg/kg	J+	N					
AG02SB025	8/23/2007	SW8260B	SO	5	Ethylbenzene	0.025	mg/kg	J+	N					
AG02SB025	8/23/2007	SW8260B	SO	5	m,p-Xylene	0.038	mg/kg	J+	N					
AG02SB025	8/23/2007	SW8310	SO	5	Benzo (a) anthracene	0.0038	mg/kg	J	FD					
AG02SB025	8/23/2007	SW8310	SO	5	Fluorene	0.1	mg/kg		FD					
AG02SB025	**8/23/2007**	**SW8310**	**SO**	**5**	**Naphthalene**	**0.37**	**mg/kg**		**FD**	**X**				
AG02SB025	8/23/2007	SW8310	SO	5	Phenanthrene	0.29	mg/kg		FD					
AG02SB025	8/23/2007	SW8310	SO	5	Anthracene	0.19	mg/kg		N					
AG02SB025	8/23/2007	SW8310	SO	5	Benzo (a) anthracene	0.0045	mg/kg	J	N					
AG02SB025	8/23/2007	SW8310	SO	5	Fluorene	0.16	mg/kg		N					
AG02SB025	**8/23/2007**	**SW8310**	**SO**	**5**	**Naphthalene**	**0.35**	**mg/kg**		**N**	**X**				
AG02SB025	8/23/2007	SW8310	SO	5	Phenanthrene	0.5	mg/kg		N					
AG02SB025	8/23/2007	SW8015-E	SO	10	Diesel Range Organics (C10-C24)	10	mg/kg	J	N					
AG02SB025	**8/23/2007**	**SW8015-P**	**SO**	**10**	**Gasoline Range Organics (C6-C10)**	**1300**	**mg/kg**		**N**			**X**		
AG02SB025	8/23/2007	SW8260B	SO	10	Benzene	0.069	mg/kg	J	N					
AG02SB025	8/23/2007	SW8260B	SO	10	Ethylbenzene	2.2	mg/kg		N					
AG02SB025	8/23/2007	SW8260B	SO	10	m,p-Xylene	9.9	mg/kg		N					
AG02SB025	8/23/2007	SW8260B	SO	10	o-Xylene	3.2	mg/kg		N					
AG02SB025	8/23/2007	SW8260B	SO	10	Toluene	2.6	mg/kg		N					
AG02SB025	8/23/2007	SW8310	SO	10	ND									

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TABLE D2-1

Reported Analytes and Metals Above Combined Background for AOC G-2

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW	Exceeds MCL
AG02SB025	8/23/2007	SW8015-E	SO	15	ND									
AG02SB025	8/23/2007	SW8015-P	SO	15	ND									
AG02SB025	8/23/2007	SW8260B	SO	15	Ethylbenzene	0.009	mg/kg	J	N					
AG02SB025	8/23/2007	SW8260B	SO	15	m,p-Xylene	0.029	mg/kg		N					
AG02SB025	8/23/2007	SW8260B	SO	15	o-Xylene	0.01	mg/kg	J	N					
AG02SB025	8/23/2007	SW8260B	SO	15	Toluene	0.0071	mg/kg	J	N					
AG02SB025	8/23/2007	SW8310	SO	15	ND									
AG02SB025	8/23/2007	SW8015-E	SO	20	ND									
AG02SB025	8/23/2007	SW8015-P	SO	20	ND									
AG02SB025	8/23/2007	SW8260B	SO	20	Ethylbenzene	0.0021	mg/kg	J	N					
AG02SB025	8/23/2007	SW8260B	SO	20	m,p-Xylene	0.0087	mg/kg	J	N					
AG02SB025	8/23/2007	SW8260B	SO	20	o-Xylene	0.0024	mg/kg	J	N					
AG02SB025	8/23/2007	SW8260B	SO	20	Toluene	0.0022	mg/kg	J	N					
AG02SB025	8/23/2007	SW8310	SO	20	ND									
AG02SB026	8/23/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	23	mg/kg		N					
AG02SB026	8/23/2007	SW8015-P	SO	0.5	Gasoline Range Organics (C6-C10)	0.49	mg/kg	J	N					
AG02SB026	8/23/2007	SW8310	SO	0.5	Dibenzo (a,h) anthracene	0.013	mg/kg	J	N					
AG02SB026	8/23/2007	SW8310	SO	0.5	Indeno (1,2,3-c,d) pyrene	0.01	mg/kg	J	N					
AG02SB026	8/23/2007	SW8015-E	SO	5	Diesel Range Organics (C10-C24)	5.4	mg/kg	J	N					
AG02SB026	8/23/2007	SW8015-P	SO	5	Gasoline Range Organics (C6-C10)	0.43	mg/kg	J	N					
AG02SB026	8/23/2007	SW8310	SO	10	ND									
AG02SB026	**8/23/2007**	**SW8015-E**	**SO**	**10**	**Diesel Range Organics (C10-C24)**	**1900**	**mg/kg**		**N**			**X**		
AG02SB026	**8/23/2007**	**SW8015-P**	**SO**	**10**	**Gasoline Range Organics (C6-C10)**	**15000**	**mg/kg**		**N**			**X**		
AG02SB026	8/23/2007	SW8310	SO	10	Acenaphthene	0.71	mg/kg	J+	N					
AG02SB026	8/23/2007	SW8310	SO	10	Anthracene	1.6	mg/kg	J+	N					
AG02SB026	**8/23/2007**	**SW8310**	**SO**	**10**	**Benzo (a) anthracene**	**2.3**	**mg/kg**	**J+**	**N**	**X**	**X**			
AG02SB026	**8/23/2007**	**SW8310**	**SO**	**10**	**Benzo (a) pyrene**	**1.4**	**mg/kg**	**J+**	**N**	**X**	**X**			
AG02SB026	**8/23/2007**	**SW8310**	**SO**	**10**	**Benzo (b) fluoranthene**	**1.2**	**mg/kg**	**J+**	**N**	**X**	**X**			
AG02SB026	8/23/2007	SW8310	SO	10	Benzo (g,h,i) perylene	0.088	mg/kg	J+	N					
AG02SB026	**8/23/2007**	**SW8310**	**SO**	**10**	**Benzo(k)fluoranthene**	**0.32**	**mg/kg**	**J+**	**N**	**X**				
AG02SB026	8/23/2007	SW8310	SO	10	Chrysene	0.16	mg/kg	J+	N					
AG02SB026	**8/23/2007**	**SW8310**	**SO**	**10**	**Dibenzo (a,h) anthracene**	**0.099**	**mg/kg**	**J+**	**N**	**X**				
AG02SB026	8/23/2007	SW8310	SO	10	Fluorene	0.91	mg/kg	J+	N					
AG02SB026	**8/23/2007**	**SW8310**	**SO**	**10**	**Indeno (1,2,3-c,d) pyrene**	**0.54**	**mg/kg**	**J+**	**N**	**X**				
AG02SB026	**8/23/2007**	**SW8310**	**SO**	**10**	**Naphthalene**	**1**	**mg/kg**	**J+**	**N**	**X**	**X**			
AG02SB026	8/23/2007	SW8310	SO	10	Phenanthrene	5.9	mg/kg	J+	N					
AG02SB026	8/23/2007	SW8015-E	SO	15	ND									
AG02SB026	8/23/2007	SW8015-P	SO	15	ND									
AG02SB026	8/23/2007	SW8310	SO	15	ND									
AG02SB026	8/23/2007	SW8015-E	SO	22.5	ND									
AG02SB026	8/23/2007	SW8015-P	SO	22.5	ND									
AG02SB026	8/23/2007	SW8310	SO	22.5	ND									
AG02SB027	**8/23/2007**	**SW8015-E**	**SO**	**0.5**	**Diesel Range Organics (C10-C24)**	**1000**	**mg/kg**		**FD**			**X**	**X**	
AG02SB027	**8/23/2007**	**SW8015-E**	**SO**	**0.5**	**Diesel Range Organics (C10-C24)**	**920**	**mg/kg**		**N**			**X**	**X**	
AG02SB027	**8/23/2007**	**SW8015-P**	**SO**	**0.5**	**Gasoline Range Organics (C6-C10)**	**900**	**mg/kg**	**J**	**FD**			**X**	**X**	

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TABLE D2-1

Reported Analytes and Metals Above Combined Background for AOC G-2

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW	Exceeds MCL
AG02SB027	**8/23/2007**	**SW8015-P**	**SO**	**0.5**	**Gasoline Range Organics (C6-C10)**	**450**	**mg/kg**	**J**	**N**			**X**	**X**	
AG02SB027	8/23/2007	SW8260B	SO	0.5	Benzene	0.00064	mg/kg	J+	FD					
AG02SB027	8/23/2007	SW8260B	SO	0.5	Ethylbenzene	0.17	mg/kg	J+	FD					
AG02SB027	8/23/2007	SW8260B	SO	0.5	m,p-Xylene	0.036	mg/kg	J+	FD					
AG02SB027	8/23/2007	SW8260B	SO	0.5	o-Xylene	0.00099	mg/kg	J+	FD					
AG02SB027	8/23/2007	SW8260B	SO	0.5	Benzene	0.00058	mg/kg	J+	N					
AG02SB027	8/23/2007	SW8260B	SO	0.5	Ethylbenzene	0.51	mg/kg	J+	N					
AG02SB027	8/23/2007	SW8260B	SO	0.5	m,p-Xylene	0.1	mg/kg	J+	N					
AG02SB027	8/23/2007	SW8260B	SO	0.5	o-Xylene	0.001	mg/kg	J+	N					
AG02SB027	8/23/2007	SW8310	SO	0.5	Benzo (a) anthracene	0.071	mg/kg		FD					
AG02SB027	8/23/2007	SW8310	SO	0.5	Fluorene	0.71	mg/kg		FD					
AG02SB027	**8/23/2007**	**SW8310**	**SO**	**0.5**	**Naphthalene**	**1.9**	**mg/kg**		**FD**	**X**	**X**			
AG02SB027	8/23/2007	SW8310	SO	0.5	Phenanthrene	1.7	mg/kg		FD					
AG02SB027	8/23/2007	SW8310	SO	0.5	Benzo (a) anthracene	0.084	mg/kg		N					
AG02SB027	8/23/2007	SW8310	SO	0.5	Fluorene	0.71	mg/kg		N					
AG02SB027	**8/23/2007**	**SW8310**	**SO**	**0.5**	**Naphthalene**	**1.5**	**mg/kg**		**N**	**X**	**X**			
AG02SB027	8/23/2007	SW8310	SO	0.5	Phenanthrene	1.8	mg/kg		N					
AG02SB027	8/23/2007	SW8015-E	SO	5	Diesel Range Organics (C10-C24)	75	mg/kg	J+	N					
AG02SB027	**8/23/2007**	**SW8015-P**	**SO**	**5**	**Gasoline Range Organics (C6-C10)**	**120**	**mg/kg**	**J+**	**N**			**X**		
AG02SB027	8/23/2007	SW8260B	SO	5	Ethylbenzene	0.009	mg/kg	J+	N					
AG02SB027	8/23/2007	SW8260B	SO	5	m,p-Xylene	0.013	mg/kg	J+	N					
AG02SB027	8/23/2007	SW8260B	SO	5	o-Xylene	0.0011	mg/kg	J	N					
AG02SB027	8/23/2007	SW8260B	SO	5	Toluene	0.0011	mg/kg	J	N					
AG02SB027	**8/23/2007**	**SW8310**	**SO**	**5**	**Benzo (a) anthracene**	**1.6**	**mg/kg**	**J-**	**N**	**X**	**X**			
AG02SB027	8/23/2007	SW8310	SO	5	Fluorene	0.14	mg/kg	J	N					
AG02SB027	**8/23/2007**	**SW8310**	**SO**	**5**	**Naphthalene**	**0.48**	**mg/kg**		**N**	**X**				
AG02SB027	8/23/2007	SW8310	SO	5	Phenanthrene	0.3	mg/kg	J	N					
AG02SB027	**8/23/2007**	**TO15**	**GS**	**5**	**1,2,4-Trimethylbenzene**	**3200**	**PPBV**		**N**	**X**	**X**			
AG02SB027	**8/23/2007**	**TO15**	**GS**	**5**	**1,3,5-Trimethylbenzene**	**644**	**PPBV**		**N**	**X**				
AG02SB027	8/23/2007	TO15	GS	5	Acetone	234	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	5	Ethylbenzene	1200	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	5	m,p-Xylene	1480	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	5	n-Propylbenzene	2540	PPBV		N					
AG02SB027	**8/23/2007**	**SW8015-E**	**SO**	**10**	**Diesel Range Organics (C10-C24)**	**3000**	**mg/kg**		**N**			**X**		
AG02SB027	**8/23/2007**	**SW8015-P**	**SO**	**10**	**Gasoline Range Organics (C6-C10)**	**100**	**mg/kg**		**N**			**X**		
AG02SB027	8/23/2007	SW8260B	SO	10	Benzene	0.18	mg/kg	J+	N					
AG02SB027	8/23/2007	SW8260B	SO	10	Ethylbenzene	4.4	mg/kg	J+	N					
AG02SB027	8/23/2007	SW8260B	SO	10	m,p-Xylene	6.1	mg/kg	J+	N					
AG02SB027	8/23/2007	SW8260B	SO	10	o-Xylene	0.4	mg/kg	J+	N					
AG02SB027	8/23/2007	SW8260B	SO	10	Toluene	0.033	mg/kg	J+	N					
AG02SB027	8/23/2007	SW8310	SO	10	Benzo (a) anthracene	0.061	mg/kg		N					
AG02SB027	8/23/2007	SW8310	SO	10	Fluorene	1.9	mg/kg		N					
AG02SB027	**8/23/2007**	**SW8310**	**SO**	**10**	**Naphthalene**	**9.2**	**mg/kg**		**N**	**X**	**X**			
AG02SB027	8/23/2007	SW8310	SO	10	Phenanthrene	4.1	mg/kg		N					
AG02SB027	8/23/2007	SW8015-E	SO	15	Diesel Range Organics (C10-C24)	3.6	mg/kg	J	N					

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TABLE D2-1

Reported Analytes and Metals Above Combined Background for AOC G-2

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW	Exceeds MCL
AG02SB027	8/23/2007	SW8015-P	SO	15	ND									
AG02SB027	8/23/2007	SW8260B	SO	15	Benzene	0.0016	mg/kg	J	N					
AG02SB027	8/23/2007	SW8260B	SO	15	Ethylbenzene	0.0026	mg/kg	J	N					
AG02SB027	8/23/2007	SW8260B	SO	15	m,p-Xylene	0.0062	mg/kg	J	N					
AG02SB027	8/23/2007	SW8260B	SO	15	o-Xylene	0.0011	mg/kg	J	N					
AG02SB027	8/23/2007	SW8260B	SO	15	tert-Butyl Alcohol	0.036	mg/kg	J	N					
AG02SB027	8/23/2007	SW8260B	SO	15	Toluene	0.00095	mg/kg	J	N					
AG02SB027	8/23/2007	SW8310	SO	15	ND									
AG02SB027	**8/23/2007**	**TO15**	**GS**	**15**	**1,2,4-Trimethylbenzene**	**12500**	**PPBV**	**J**	**N**	**X**	**X**			
AG02SB027	**8/23/2007**	**TO15**	**GS**	**15**	**1,3,5-Trimethylbenzene**	**5270**	**PPBV**	**J**	**N**	**X**	**X**			
AG02SB027	**8/23/2007**	**TO15**	**GS**	**15**	**Ethylbenzene**	**56200**	**PPBV**		**N**	**X**				
AG02SB027	**8/23/2007**	**TO15**	**GS**	**15**	**Hexane**	**1380000**	**PPBV**		**N**	**X**	**X**			
AG02SB027	**8/23/2007**	**TO15**	**GS**	**15**	**m,p-Xylene**	**271000**	**PPBV**		**N**	**X**	**X**			
AG02SB027	**8/23/2007**	**TO15**	**GS**	**15**	**n-Propylbenzene**	**7900**	**PPBV**	**J-**	**N**	**X**				
AG02SB027	**8/23/2007**	**TO15**	**GS**	**15**	**o-Xylene**	**59500**	**PPBV**		**N**	**X**	**X**			
AG02SB027	**8/23/2007**	**TO15**	**GS**	**15**	**Toluene**	**84500**	**PPBV**		**N**			**X**		
AG02SB027	8/23/2007	TO15	GS	40	1,2,4-Trimethylbenzene	483	PPBV	J	FD					
AG02SB027	8/23/2007	TO15	GS	40	1,3,5-Trimethylbenzene	150	PPBV	J	FD					
AG02SB027	8/23/2007	TO15	GS	40	Ethylbenzene	1090	PPBV	J	FD					
AG02SB027	8/23/2007	TO15	GS	40	Hexane	22200	PPBV	J	FD					
AG02SB027	8/23/2007	TO15	GS	40	m,p-Xylene	5490	PPBV	J	FD					
AG02SB027	8/23/2007	TO15	GS	40	n-Propylbenzene	289	PPBV	J	FD					
AG02SB027	8/23/2007	TO15	GS	40	o-Xylene	1200	PPBV	J	FD					
AG02SB027	8/23/2007	TO15	GS	40	Toluene	1240	PPBV	J	FD					
AG02SB027	8/23/2007	TO15	GS	40	1,2,4-Trimethylbenzene	339	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	40	1,3,5-Trimethylbenzene	97.1	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	40	Benzene	248	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	40	Ethylbenzene	572	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	40	Hexane	7190	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	40	m,p-Xylene	3060	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	40	n-Propylbenzene	163	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	40	o-Xylene	686	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	40	Toluene	610	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	60	1,2,4-Trimethylbenzene	1180	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	60	1,3,5-Trimethylbenzene	355	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	60	Ethylbenzene	1560	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	60	Hexane	7450	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	60	m,p-Xylene	6540	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	60	n-Propylbenzene	505	PPBV	J-	N					
AG02SB027	8/23/2007	TO15	GS	60	o-Xylene	1520	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	60	Toluene	755	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	80	1,2,4-Trimethylbenzene	901	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	80	1,3,5-Trimethylbenzene	287	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	80	Acetone	101	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	80	Ethylbenzene	824	PPBV		N					

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TABLE D2-1

Reported Analytes and Metals Above Combined Background for AOC G-2

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW	Exceeds MCL
AG02SB027	8/23/2007	TO15	GS	80	Hexane	4070	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	80	m,p-Xylene	4010	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	80	MEK (2-Butanone)	48	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	80	n-Butylbenzene	104	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	80	n-Propylbenzene	357	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	80	o-Xylene	971	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	80	Toluene	380	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	100	1,2,4-Trimethylbenzene	734	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	100	1,3,5-Trimethylbenzene	274	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	100	Ethylbenzene	478	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	100	Hexane	1760	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	100	m,p-Xylene	2630	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	100	MEK (2-Butanone)	21.9	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	100	n-Propylbenzene	240	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	100	o-Xylene	688	PPBV		N					
AG02SB027	8/23/2007	TO15	GS	100	TCE	13.4	PPBV	J	N					
AG02SB027	8/23/2007	TO15	GS	100	Toluene	140	PPBV		N					
AG02SB027	8/23/2007	SW8260B	WG	110	m,p-Xylene	0.65	ug/L	J	FD					
AG02SB027	8/23/2007	SW8260B	WG	110	o-Xylene	0.21	ug/L	J	FD					
AG02SB027	8/23/2007	SW8260B	WG	110	Ethylbenzene	0.17	ug/L	J	N					
AG02SB027	8/23/2007	SW8260B	WG	110	m,p-Xylene	0.72	ug/L	J	N					
AG02SB027	8/23/2007	SW8260B	WG	110	o-Xylene	0.25	ug/L	J	N					
AG02SB028	8/23/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	1.6	mg/kg	J	N					
AG02SB028	8/23/2007	SW8015-P	SO	0.5	ND									
AG02SB028	8/23/2007	SW8310	SO	0.5	ND									
AG02SB028	8/23/2007	SW8015-E	SO	5	ND									
AG02SB028	8/23/2007	SW8015-P	SO	5	ND									
AG02SB028	8/23/2007	SW8310	SO	5	ND									
AG02SB028	8/23/2007	SW8015-E	SO	14	ND									
AG02SB028	8/23/2007	SW8015-P	SO	14	ND									
AG02SB028	8/23/2007	SW8310	SO	14	ND									
AG02SB028	8/23/2007	SW8015-P	SO	15	ND									
AG02SB029	8/28/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	1.3	mg/kg	J	N					
AG02SB029	8/28/2007	SW8015-P	SO	0.5	Gasoline Range Organics (C6-C10)	0.74	mg/kg	J	N					
AG02SB029	8/28/2007	SW8260B	SO	0.5	ND									
AG02SB029	8/28/2007	SW8310	SO	0.5	ND									
AG02SB029	8/28/2007	SW8015-E	SO	5	Diesel Range Organics (C10-C24)	45	mg/kg		N					
AG02SB029	**8/28/2007**	**SW8015-P**	**SO**	**5**	**Gasoline Range Organics (C6-C10)**	**69**	**mg/kg**		**N**			**X**		
AG02SB029	8/28/2007	SW8260B	SO	5	Ethylbenzene	0.21	mg/kg	J	N					
AG02SB029	8/28/2007	SW8260B	SO	5	m,p-Xylene	1.3	mg/kg		N					
AG02SB029	8/28/2007	SW8260B	SO	5	o-Xylene	0.16	mg/kg	J	N					
AG02SB029	8/28/2007	SW8310	SO	5	Fluorene	0.016	mg/kg	J	N					
AG02SB029	8/28/2007	SW8310	SO	5	Phenanthrene	0.1	mg/kg	J	N					
AG02SB029	**8/28/2007**	**TO15**	**GS**	**5**	**1,2,4-Trimethylbenzene**	**1300**	**PPBV**	**J**	**N**	**X**				
AG02SB029	**8/28/2007**	**TO15**	**GS**	**5**	**1,3,5-Trimethylbenzene**	**744**	**PPBV**	**J**	**N**	**X**				

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TABLE D2-1

Reported Analytes and Metals Above Combined Background for AOC G-2

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW	Exceeds MCL
AG02SB029	8/28/2007	TO15	GS	5	Ethylbenzene	1790	PPBV	J	N					
AG02SB029	**8/28/2007**	**TO15**	**GS**	**5**	**Hexane**	**32300**	**PPBV**		**N**	**X**				
AG02SB029	**8/28/2007**	**TO15**	**GS**	**5**	**m,p-Xylene**	**7870**	**PPBV**		**N**	**X**				
AG02SB029	8/28/2007	TO15	GS	5	o-Xylene	593	PPBV	J	N					
AG02SB029	8/28/2007	SW8015-E	SO	10	ND									
AG02SB029	8/28/2007	SW8015-P	SO	10	ND									
AG02SB029	8/28/2007	SW8260B	SO	10	m,p-Xylene	0.0016	mg/kg	J	N					
AG02SB029	8/28/2007	SW8310	SO	10	ND									
AG02SB029	8/28/2007	SW8015-P	SO	15	Gasoline Range Organics (C6-C10)	2.2	mg/kg	J	N					
AG02SB029	8/28/2007	SW8260B	SO	15	m,p-Xylene	0.0044	mg/kg	J	N					
AG02SB029	8/28/2007	SW8260B	SO	15	o-Xylene	0.0016	mg/kg	J	N					
AG02SB029	**8/28/2007**	**TO15**	**GS**	**15**	**1,1,2,2-Tetrachloroethane**	**323**	**PPBV**		**N**	**X**	**X**	**X**		
AG02SB029	**8/28/2007**	**TO15**	**GS**	**15**	**1,2,4-Trimethylbenzene**	**1180**	**PPBV**		**N**	**X**				
AG02SB029	**8/28/2007**	**TO15**	**GS**	**15**	**1,3,5-Trimethylbenzene**	**589**	**PPBV**		**N**	**X**				
AG02SB029	8/28/2007	TO15	GS	15	Acetone	479	PPBV	J	N					
AG02SB029	8/28/2007	TO15	GS	15	Ethylbenzene	895	PPBV		N					
AG02SB029	8/28/2007	TO15	GS	15	Hexane	3180	PPBV		N					
AG02SB029	**8/28/2007**	**TO15**	**GS**	**15**	**m,p-Xylene**	**4360**	**PPBV**		**N**	**X**				
AG02SB029	8/28/2007	TO15	GS	15	MEK (2-Butanone)	143	PPBV	J-	N					
AG02SB029	8/28/2007	TO15	GS	15	Methylene Chloride	110	PPBV	J	N					
AG02SB029	8/28/2007	TO15	GS	15	n-Propylbenzene	231	PPBV	J	N					
AG02SB029	8/28/2007	TO15	GS	15	o-Xylene	349	PPBV		N					
AG02SB029	**8/28/2007**	**TO15**	**GS**	**15**	**Tetrachloroethylene**	**47.8**	**PPBV**	**J**	**N**	**X**				
AG02SB029	8/28/2007	TO15	GS	15	Toluene	35	PPBV	J	N					
AG02SB030	8/23/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	86	mg/kg	J	N					
AG02SB030	8/23/2007	SW8015-P	SO	0.5	ND									
AG02SB030	**8/23/2007**	**SW8310**	**SO**	**0.5**	**Benzo (b) fluoranthene**	**0.076**	**mg/kg**		**N**	**X**				
AG02SB030	**8/23/2007**	**SW8310**	**SO**	**0.5**	**Dibenzo (a,h) anthracene**	**0.031**	**mg/kg**	**J**	**N**	**X**				
AG02SB030	8/23/2007	SW8310	SO	0.5	Fluoranthene	0.13	mg/kg		N					
AG02SB030	8/23/2007	SW8310	SO	0.5	Indeno (1,2,3-c,d) pyrene	0.073	mg/kg		N					
AG02SB030	8/23/2007	SW8310	SO	0.5	Naphthalene	0.012	mg/kg	J	N					
AG02SB030	8/23/2007	SW8310	SO	0.5	Phenanthrene	0.061	mg/kg	J	N					
AG02SB030	8/23/2007	SW8310	SO	0.5	Pyrene	0.03	mg/kg	J	N					
AG02SB030	8/23/2007	SW8015-E	SO	5	ND									
AG02SB030	8/23/2007	SW8015-P	SO	5	ND									
AG02SB030	8/23/2007	SW8310	SO	5	ND									
AG02SB030	8/23/2007	SW8015-E	SO	10	ND									
AG02SB030	8/23/2007	SW8015-P	SO	10	ND									
AG02SB030	8/23/2007	SW8310	SO	10	ND									
AG02SB030	8/23/2007	SW8015-P	SO	15	ND									
AG02SB031	8/23/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.0068	mg/kg	J	N					
AG02SB031	8/23/2007	SW8310	SO	0.5	Indeno (1,2,3-c,d) pyrene	0.057	mg/kg		N					
AG02SB031	8/23/2007	SW8310	SO	5	ND									
AG02SB031	8/23/2007	SW8310	SO	10	ND									
AG02SB032	8/28/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.012	mg/kg	J	N					

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TABLE D2-1

Reported Analytes and Metals Above Combined Background for AOC G-2

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW	Exceeds MCL
AG02SB032	8/28/2007	SW8310	SO	0.5	Fluoranthene	0.014	mg/kg	J	N					
AG02SB032	8/28/2007	SW8310	SO	0.5	Pyrene	0.064	mg/kg	J	N					
AG02SB032	8/28/2007	SW8310	SO	5	ND									
AG02SB032	8/28/2007	SW8310	SO	10	ND									
AG02SB032	8/28/2007	TO15	GS	5	Acetone	747	PPBV	J	N					
AG02SB032	8/28/2007	TO15	GS	5	Ethylbenzene	117	PPBV	J	N					
AG02SB032	8/28/2007	TO15	GS	5	Hexane	1270	PPBV	J	N					
AG02SB032	8/28/2007	TO15	GS	5	m,p-Xylene	482	PPBV	J	N					
AG02SB032	**8/28/2007**	**TO15**	**GS**	**5**	**Methylene Chloride**	**329**	**PPBV**	**J**	**N**	**X**				
AG02SB032	**8/28/2007**	**TO15**	**GS**	**15**	**1,1,2,2-Tetrachloroethane**	**1340**	**PPBV**		**N**	**X**	**X**	**X**		
AG02SB032	8/28/2007	TO15	GS	15	Ethylbenzene	188	PPBV	J	N					
AG02SB032	8/28/2007	TO15	GS	15	m,p-Xylene	916	PPBV		N					
AG02SB033	8/29/2007	TO15	GS	5	Acetone	166	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	5	Ethylbenzene	2.78	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	5	Hexane	40.4	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	5	m,p-Xylene	12.2	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	5	MEK (2-Butanone)	34.9	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	5	Methylene Chloride	18.4	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	5	o-Xylene	2.14	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	5	Toluene	3	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	15	1,2,4-Trimethylbenzene	18.1	PPBV	J	FD					
AG02SB033	8/29/2007	TO15	GS	15	1,3,5-Trimethylbenzene	7.3	PPBV	J	FD					
AG02SB033	8/29/2007	TO15	GS	15	Acetone	412	PPBV		FD					
AG02SB033	8/29/2007	TO15	GS	15	Chloromethane	4.15	PPBV	J	FD					
AG02SB033	8/29/2007	TO15	GS	15	Ethylbenzene	16.3	PPBV	J	FD					
AG02SB033	8/29/2007	TO15	GS	15	Hexane	99.1	PPBV		FD					
AG02SB033	8/29/2007	TO15	GS	15	m,p-Xylene	74.2	PPBV		FD					
AG02SB033	8/29/2007	TO15	GS	15	MEK (2-Butanone)	73.2	PPBV	J	FD					
AG02SB033	8/29/2007	TO15	GS	15	n-Propylbenzene	5.82	PPBV	J	FD					
AG02SB033	8/29/2007	TO15	GS	15	o-Xylene	12.9	PPBV	J	FD					
AG02SB033	8/29/2007	TO15	GS	15	TCE	2.96	PPBV	J	FD					
AG02SB033	8/29/2007	TO15	GS	15	Toluene	17.4	PPBV	J	FD					
AG02SB033	8/29/2007	TO15	GS	15	1,2,4-Trimethylbenzene	16.5	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	15	1,3,5-Trimethylbenzene	6.44	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	15	Acetone	307	PPBV		N					
AG02SB033	**8/29/2007**	**TO15**	**GS**	**15**	**Benzene**	**10.3**	**PPBV**	**J**	**N**	**X**				
AG02SB033	8/29/2007	TO15	GS	15	Ethylbenzene	12.4	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	15	Hexane	99.5	PPBV		N					
AG02SB033	8/29/2007	TO15	GS	15	m,p-Xylene	55.6	PPBV		N					
AG02SB033	8/29/2007	TO15	GS	15	MEK (2-Butanone)	64.3	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	15	Methylene Chloride	7.54	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	15	o-Xylene	9.66	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	15	TCE	2.67	PPBV	J	N					
AG02SB033	8/29/2007	TO15	GS	15	Toluene	16.2	PPBV	J	N					
AG02SB034	8/28/2007	TO15	GS	5	1,2,4-Trimethylbenzene	40.2	PPBV		N					

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TABLE D2-1

Reported Analytes and Metals Above Combined Background for AOC G-2

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW	Exceeds MCL
AG02SB034	8/28/2007	TO15	GS	5	1,3,5-Trimethylbenzene	31.8	PPBV		N					
AG02SB034	8/28/2007	TO15	GS	5	Acetone	245	PPBV		N					
AG02SB034	8/28/2007	TO15	GS	5	Ethylbenzene	74.7	PPBV		N					
AG02SB034	8/28/2007	TO15	GS	5	Hexane	69.4	PPBV		N					
AG02SB034	8/28/2007	TO15	GS	5	m,p-Xylene	274	PPBV		N					
AG02SB034	8/28/2007	TO15	GS	5	MEK (2-Butanone)	86.9	PPBV	J-	N					
AG02SB034	8/28/2007	TO15	GS	5	Methylene Chloride	3.1	PPBV	J	N					
AG02SB034	8/28/2007	TO15	GS	5	n-Propylbenzene	23	PPBV		N					
AG02SB034	8/28/2007	TO15	GS	5	o-Xylene	31.3	PPBV		N					
AG02SB034	8/28/2007	TO15	GS	5	TCE	3.22	PPBV	J	N					
AG02SB034	8/28/2007	TO15	GS	5	Tetrachloroethylene	1.89	PPBV	J	N					
AG02SB034	8/28/2007	TO15	GS	5	Toluene	7.64	PPBV	J	N					
AG02SB034	8/28/2007	TO15	GS	5	Trichlorotrifluoroethane	0.683	PPBV	J	N					
AG02SB034	8/28/2007	TO15	GS	15	1,2,4-Trimethylbenzene	85	PPBV		FD					
AG02SB034	8/28/2007	TO15	GS	15	1,3,5-Trimethylbenzene	38.4	PPBV		FD					
AG02SB034	8/28/2007	TO15	GS	15	Acetone	376	PPBV		FD					
AG02SB034	8/28/2007	TO15	GS	15	Ethylbenzene	52.5	PPBV		FD					
AG02SB034	8/28/2007	TO15	GS	15	Hexane	109	PPBV		FD					
AG02SB034	8/28/2007	TO15	GS	15	m,p-Xylene	243	PPBV		FD					
AG02SB034	8/28/2007	TO15	GS	15	MEK (2-Butanone)	61.8	PPBV	J	FD					
AG02SB034	8/28/2007	TO15	GS	15	n-Propylbenzene	19.3	PPBV	J	FD					
AG02SB034	8/28/2007	TO15	GS	15	o-Xylene	33.5	PPBV		FD					
AG02SB034	8/28/2007	TO15	GS	15	Toluene	29	PPBV		FD					
AG02SB034	8/28/2007	TO15	GS	15	1,2,4-Trimethylbenzene	72.2	PPBV		N					
AG02SB034	8/28/2007	TO15	GS	15	1,3,5-Trimethylbenzene	31.2	PPBV		N					
AG02SB034	8/28/2007	TO15	GS	15	Acetone	367	PPBV		N					
AG02SB034	**8/28/2007**	**TO15**	**GS**	**15**	**Benzene**	**19.7**	**PPBV**	**J**	**N**	**X**				
AG02SB034	8/28/2007	TO15	GS	15	Ethylbenzene	43	PPBV		N					
AG02SB034	8/28/2007	TO15	GS	15	Hexane	104	PPBV		N					
AG02SB034	8/28/2007	TO15	GS	15	m,p-Xylene	192	PPBV		N					
AG02SB034	8/28/2007	TO15	GS	15	MEK (2-Butanone)	74.1	PPBV	J	N					
AG02SB034	8/28/2007	TO15	GS	15	n-Propylbenzene	15.2	PPBV	J	N					
AG02SB034	8/28/2007	TO15	GS	15	o-Xylene	27.1	PPBV		N					
AG02SB034	8/28/2007	TO15	GS	15	Toluene	29.8	PPBV		N					
AG02SB035	8/22/2007	TO15	GS	5	1,2,4-Trimethylbenzene	0.884	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	5	Acetone	274	PPBV	J-	N					
AG02SB035	8/22/2007	TO15	GS	5	Benzene	3.83	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	5	MEK (2-Butanone)	38.8	PPBV	J-	N					
AG02SB035	8/22/2007	TO15	GS	5	Methyl t-butyl ether (MtBE)	7.44	PPBV	J-	N					
AG02SB035	8/22/2007	TO15	GS	5	Toluene	2.87	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	15	1,2,4-Trimethylbenzene	0.565	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	15	Acetone	200	PPBV	J-	N					
AG02SB035	8/22/2007	TO15	GS	15	Ethylbenzene	0.691	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	15	Hexane	27	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	15	m,p-Xylene	1.54	PPBV	J	N					

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TABLE D2-1

Reported Analytes and Metals Above Combined Background for AOC G-2

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW	Exceeds MCL
AG02SB035	8/22/2007	TO15	GS	15	MEK (2-Butanone)	28.6	PPBV	J-	N					
AG02SB035	8/22/2007	TO15	GS	15	Methylene Chloride	35.3	PPBV		N					
AG02SB035	8/22/2007	TO15	GS	15	o-Xylene	0.659	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	15	Toluene	2.83	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	40	1,2,4-Trimethylbenzene	0.803	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	40	1,3-DCB	0.174	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	40	1,4-DCB	0.304	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	40	Acetone	98.8	PPBV	J-	N					
AG02SB035	8/22/2007	TO15	GS	40	Ethylbenzene	0.825	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	40	m,p-Xylene	1.74	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	40	MEK (2-Butanone)	18.4	PPBV	J-	N					
AG02SB035	8/22/2007	TO15	GS	40	o-Xylene	0.76	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	40	TCE	2.15	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	40	Toluene	3.88	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	40	Trichlorotrifluoroethane	0.521	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	60	1,2,4-Trimethylbenzene	0.257	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	60	Acetone	67.9	PPBV	J-	N					
AG02SB035	8/22/2007	TO15	GS	60	Chloroform	0.527	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	60	Ethylbenzene	0.189	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	60	m,p-Xylene	0.513	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	60	MEK (2-Butanone)	9.53	PPBV	J-	N					
AG02SB035	8/22/2007	TO15	GS	60	MIBK (Methyl Isobutyl Ketone)	0.756	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	60	o-Xylene	0.243	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	60	TCE	4.08	PPBV		N					
AG02SB035	8/22/2007	TO15	GS	60	Tetrachloroethylene	0.486	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	60	Toluene	0.729	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	60	Trichlorotrifluoroethane	1.62	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	80	1,2,4-Trichlorobenzene	0.335	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	80	1,2,4-Trimethylbenzene	0.478	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	80	Acetone	102	PPBV	J-	N					
AG02SB035	8/22/2007	TO15	GS	80	Benzene	5	PPBV		N					
AG02SB035	8/22/2007	TO15	GS	80	Chloroform	0.86	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	80	Ethylbenzene	0.741	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	80	Hexane	6.05	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	80	m,p-Xylene	1.29	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	80	MEK (2-Butanone)	18.8	PPBV	J-	N					
AG02SB035	8/22/2007	TO15	GS	80	MIBK (Methyl Isobutyl Ketone)	10.3	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	80	o-Xylene	0.598	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	80	TCE	3.51	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	80	Tetrachloroethylene	0.406	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	80	Toluene	4.25	PPBV	J	N					
AG02SB035	8/22/2007	TO15	GS	80	Trichlorotrifluoroethane	2.15	PPBV	J	N					
AG02SB035	8/23/2007	TO15	GS	100	1,2,4-Trimethylbenzene	0.563	PPBV	J	N					
AG02SB035	8/23/2007	TO15	GS	100	1,3,5-Trimethylbenzene	0.241	PPBV	J	N					
AG02SB035	8/23/2007	TO15	GS	100	Acetone	137	PPBV	J-	N					

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TABLE D2-1

Reported Analytes and Metals Above Combined Background for AOC G-2

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW	Exceeds MCL
AG02SB035	8/23/2007	TO15	GS	100	Chloromethane	1.1	PPBV	J	N					
AG02SB035	8/23/2007	TO15	GS	100	Ethylbenzene	0.536	PPBV	J	N					
AG02SB035	8/23/2007	TO15	GS	100	m,p-Xylene	2.2	PPBV	J	N					
AG02SB035	8/23/2007	TO15	GS	100	MEK (2-Butanone)	25.7	PPBV	J-	N					
AG02SB035	8/23/2007	TO15	GS	100	MIBK (Methyl Isobutyl Ketone)	52.9	PPBV		N					
AG02SB035	8/23/2007	TO15	GS	100	o-Xylene	0.911	PPBV	J	N					
AG02SB035	8/23/2007	TO15	GS	100	Tetrachloroethylene	0.429	PPBV	J	N					
AG02SB035	8/23/2007	TO15	GS	100	Toluene	3.4	PPBV	J	N					
AG02SB036	10/10/2007	SW8015-P	SO	0.5	ND				FD					
AG02SB036	10/10/2007	SW8015-P	SO	0.5	ND				N					
AG02SB036	**10/10/2007**	**SW8015-P**	**SO**	**5**	**Gasoline Range Organics (C6-C10)**	**260**	**mg/kg**		**N**			**X**		
AG02SB036	10/10/2007	SW8015-P	SO	10	ND				N					
AG02SB036	10/10/2007	SW8015-P	SO	14	ND				N					
AG02SB037	10/9/2007	SW8015-P	SO	0.5	Gasoline Range Organics (C6-C10)	2.9	mg/kg	J	N					
AG02SB037	10/9/2007	SW8015-P	SO	5	ND				N					
AG02SB037	10/9/2007	SW8015-P	SO	10	ND				N					
AG02SB037	10/9/2007	SW8015-P	SO	15	ND				N					
AG02SB038	10/9/2007	SW8015-P	SO	0.5	Gasoline Range Organics (C6-C10)	1.8	mg/kg	J	N					
AG02SB038	10/9/2007	SW8015-P	SO	5	ND				N					
AG02SB038	10/9/2007	SW8015-P	SO	10	ND				N					
AG02SB039	10/9/2007	SW8015-P	SO	0.5	ND				N					
AG02SB039	10/9/2007	SW8015-P	SO	5	ND				N					
AG02SB039	10/9/2007	SW8015-P	SO	10	ND				N					
AG02SB039	10/9/2007	SW8015-P	SO	15	ND				N					
AG02SB040	10/10/2007	SW8015-P	SO	0.5	ND				N					
AG02SB040	10/10/2007	SW8015-P	SO	10	ND				N					
AG02SB041	10/10/2007	SW8015-P	SO	10	ND				FD					
AG02SB041	10/10/2007	SW8015-P	SO	0.5	ND				N					
AG02SB041	10/10/2007	SW8015-P	SO	10	ND				N					
AG02SB042	10/10/2007	SW8015-P	SO	0.5	ND				N					
AG02SB042	10/10/2007	SW8015-P	SO	5	ND				N					
AG02SB042	10/10/2007	SW8015-P	SO	10	ND				N					
AG02SB042	10/10/2007	SW8015-P	SO	15	ND				N					

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TABLE D2-2

Analytes Greater Than Screening Levels for AOC G-2

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW	Exceeds MCL
AG02SB025	8/23/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	510	mg/kg		N			X	X	
AG02SB025	8/23/2007	SW8015-E	SO	5	Diesel Range Organics (C10-C24)	110	mg/kg	J	FD			X		
AG02SB025	8/23/2007	SW8015-P	SO	5	Gasoline Range Organics (C6-C10)	570	mg/kg	J	FD			X		
AG02SB025	8/23/2007	SW8015-P	SO	5	Gasoline Range Organics (C6-C10)	130	mg/kg	J	N			X		
AG02SB025	8/23/2007	SW8310	SO	5	Naphthalene	0.37	mg/kg		FD	X				
AG02SB025	8/23/2007	SW8310	SO	5	Naphthalene	0.35	mg/kg		N	X				
AG02SB025	8/23/2007	SW8015-P	SO	10	Gasoline Range Organics (C6-C10)	1300	mg/kg		N			X		
AG02SB026	8/23/2007	SW8015-E	SO	10	Diesel Range Organics (C10-C24)	1900	mg/kg		N			X		
AG02SB026	8/23/2007	SW8015-P	SO	10	Gasoline Range Organics (C6-C10)	15000	mg/kg		N			X		
AG02SB026	8/23/2007	SW8310	SO	10	Benzo (a) anthracene	2.3	mg/kg	J+	N	X	X			
AG02SB026	8/23/2007	SW8310	SO	10	Benzo (a) pyrene	1.4	mg/kg	J+	N	X	X			
AG02SB026	8/23/2007	SW8310	SO	10	Benzo (b) fluoranthene	1.2	mg/kg	J+	N	X	X			
AG02SB026	8/23/2007	SW8310	SO	10	Benzo(k)fluoranthene	0.32	mg/kg	J+	N	X				
AG02SB026	8/23/2007	SW8310	SO	10	Dibenzo (a,h) anthracene	0.099	mg/kg	J+	N	X				
AG02SB026	8/23/2007	SW8310	SO	10	Indeno (1,2,3-c,d) pyrene	0.54	mg/kg	J+	N	X				
AG02SB026	8/23/2007	SW8310	SO	10	Naphthalene	1	mg/kg	J+	N	X	X			
AG02SB027	8/23/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	1000	mg/kg		FD			X	X	
AG02SB027	8/23/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	920	mg/kg		N			X	X	
AG02SB027	8/23/2007	SW8015-P	SO	0.5	Gasoline Range Organics (C6-C10)	900	mg/kg	J	FD			X	X	
AG02SB027	8/23/2007	SW8015-P	SO	0.5	Gasoline Range Organics (C6-C10)	450	mg/kg	J	N			X	X	
AG02SB027	8/23/2007	SW8310	SO	0.5	Naphthalene	1.9	mg/kg		FD	X	X			
AG02SB027	8/23/2007	SW8310	SO	0.5	Naphthalene	1.5	mg/kg		N	X	X			
AG02SB027	8/23/2007	SW8015-P	SO	5	Gasoline Range Organics (C6-C10)	120	mg/kg	J+	N			X		
AG02SB027	8/23/2007	SW8310	SO	5	Benzo (a) anthracene	1.6	mg/kg	J-	N	X	X			
AG02SB027	8/23/2007	SW8310	SO	5	Naphthalene	0.48	mg/kg		N	X				
AG02SB027	8/23/2007	TO15	GS	5	1,2,4-Trimethylbenzene	3200	PPBV		N	X	X			
AG02SB027	8/23/2007	TO15	GS	5	1,3,5-Trimethylbenzene	644	PPBV		N	X				
AG02SB027	8/23/2007	SW8015-E	SO	10	Diesel Range Organics (C10-C24)	3000	mg/kg		N			X		
AG02SB027	8/23/2007	SW8015-P	SO	10	Gasoline Range Organics (C6-C10)	100	mg/kg		N			X		
AG02SB027	8/23/2007	SW8310	SO	10	Naphthalene	9.2	mg/kg		N	X	X			
AG02SB027	8/23/2007	TO15	GS	15	1,2,4-Trimethylbenzene	12500	PPBV	J	N	X	X			
AG02SB027	8/23/2007	TO15	GS	15	1,3,5-Trimethylbenzene	5270	PPBV	J	N	X	X			
AG02SB027	8/23/2007	TO15	GS	15	Ethylbenzene	56200	PPBV		N	X				
AG02SB027	8/23/2007	TO15	GS	15	Hexane	1380000	PPBV		N	X	X			
AG02SB027	8/23/2007	TO15	GS	15	m,p-Xylene	271000	PPBV		N	X	X			
AG02SB027	8/23/2007	TO15	GS	15	n-Propylbenzene	7900	PPBV	J-	N	X				
AG02SB027	8/23/2007	TO15	GS	15	o-Xylene	59500	PPBV		N	X	X			
AG02SB027	8/23/2007	TO15	GS	15	Toluene	84500	PPBV		N			X		
AG02SB029	8/28/2007	SW8015-P	SO	5	Gasoline Range Organics (C6-C10)	69	mg/kg		N			X		
AG02SB029	8/28/2007	TO15	GS	5	1,2,4-Trimethylbenzene	1300	PPBV	J	N	X				
AG02SB029	8/28/2007	TO15	GS	5	1,3,5-Trimethylbenzene	744	PPBV	J	N	X				
AG02SB029	8/28/2007	TO15	GS	5	Hexane	32300	PPBV		N	X				
AG02SB029	8/28/2007	TO15	GS	5	m,p-Xylene	7870	PPBV		N	X				

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TABLE D2-2

Analytes Greater Than Screening Levels for AOC G-2

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW	Exceeds MCL
AG02SB029	8/28/2007	TO15	GS	15	1,1,2,2-Tetrachloroethane	323	PPBV		N	X	X	X		
AG02SB029	8/28/2007	TO15	GS	15	1,2,4-Trimethylbenzene	1180	PPBV		N	X				
AG02SB029	8/28/2007	TO15	GS	15	1,3,5-Trimethylbenzene	589	PPBV		N	X				
AG02SB029	8/28/2007	TO15	GS	15	m,p-Xylene	4360	PPBV		N	X				
AG02SB029	8/28/2007	TO15	GS	15	Tetrachloroethylene	47.8	PPBV	J	N	X				
AG02SB030	8/23/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.076	mg/kg		N	X				
AG02SB030	8/23/2007	SW8310	SO	0.5	Dibenzo (a,h) anthracene	0.031	mg/kg	J	N	X				
AG02SB032	8/28/2007	TO15	GS	5	Methylene Chloride	329	PPBV	J	N	X				
AG02SB032	8/28/2007	TO15	GS	15	1,1,2,2-Tetrachloroethane	1340	PPBV		N	X	X	X		
AG02SB033	8/29/2007	TO15	GS	15	Benzene	10.3	PPBV	J	N	X				
AG02SB034	8/28/2007	TO15	GS	15	Benzene	19.7	PPBV	J	N	X				
AG02SB036	10/10/2007	SW8015-P	SO	5	Gasoline Range Organics (C6-C10)	260	mg/kg		N			X		

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12HA011	8/22/2007	SW7471A	SO	0.5	Mercury	0.018	mg/kg	J	N				
AH12HA011	**8/22/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**11.9**	**UG/KG**		**N**				**X**
AH12HA012	8/22/2007	SW7471A	SO	0.5	ND								
AH12HA012	**8/22/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**11.4**	**UG/KG**		**N**				**X**
AH12HA013	8/21/2007	SW7471A	SO	0.5	Mercury	0.19	mg/kg	J-	N				
AH12HA013	**8/21/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**13.9**	**UG/KG**		**N**				**X**
AH12HA014	**8/22/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**8.97**	**UG/KG**		**N**				**X**
AH12HA015	8/21/2007	SW7471A	SO	0.5	Mercury	0.2	mg/kg	J	N				
AH12HA015	**8/21/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**34.1**	**UG/KG**		**N**				**X**
AH12HA015	8/21/2007	SW8082	SO	2	ND								
AH12HA016	8/21/2007	SW7471A	SO	0.5	Mercury	0.031	mg/kg	J	N				
AH12HA016	**8/21/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**12.1**	**UG/KG**		**N**				**X**
AH12HA017	8/21/2007	SW7471A	SO	0.5	Mercury	0.22	mg/kg	J	N				
AH12HA017	**8/21/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**72.3**	**UG/KG**		**N**	**X**			**X**
AH12HA017	8/21/2007	SW8082	SO	2	ND								
AH12HA018	8/21/2007	SW7471A	SO	0.5	Mercury	0.058	mg/kg	J	N				
AH12HA018	**8/21/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**20.5**	**UG/KG**		**FD**				**X**
AH12HA018	**8/21/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**27.4**	**UG/KG**		**N**				**X**
AH12HA019	8/21/2007	SW7471A	SO	0.5	Mercury	0.11	mg/kg	J	N				
AH12HA019	**8/21/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**24.2**	**UG/KG**		**N**				**X**
AH12HA020	8/21/2007	SW7471A	SO	0.5	Mercury	0.16	mg/kg	J	N				
AH12HA020	**8/21/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**35.6**	**UG/KG**		**N**				**X**
AH12HA020	8/21/2007	SW8082	SO	2	ND								
AH12HA021	8/22/2007	SW7471A	SO	0.5	Mercury	0.082	mg/kg	J	N				
AH12HA021	**8/22/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**19.9**	**UG/KG**		**N**				**X**
AH12HA022	8/22/2007	SW7471A	SO	0.5	Mercury	0.079	mg/kg	J					
AH12HA022	**8/22/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**19.8**	**UG/KG**		**FD**				**X**
AH12HA022	**8/22/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**18.9**	**UG/KG**		**N**				**X**
AH12HA023	8/22/2007	SW7471A	SO	0.5	Mercury	0.13	mg/kg	J	N				
AH12HA023	**8/22/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**31.6**	**UG/KG**		**N**				**X**
AH12HA023	8/21/2007	SW8082	SO	2	ND								
AH12HA024	8/22/2007	SW7471A	SO	0.5	Mercury	0.058	mg/kg	J	N				
AH12HA024	**8/22/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**22.4**	**UG/KG**		**N**				**X**
AH12HA025	10/8/2007	SW8082	SO	0.5	ND								
AH12HA026	**10/8/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**10.2**	**UG/KG**		**N**				**X**
AH12HA027	10/8/2007	SW8082	SO	0.5	ND								
AH12HA028	10/8/2007	SW8082	SO	0.5	ND								

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12HA029	10/8/2007	SW8082	SO	0.5	ND								
AH12HA030	**10/8/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**9.01**	**UG/KG**		**N**				**X**
AH12HA031	10/8/2007	SW8082	SO	0.5	ND								
AH12SB010	8/24/2007	SW7471A	SO	0.5	ND								
AH12SB010	**8/24/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**11.3**	**UG/KG**		**FD**				**X**
AH12SB010	**8/24/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**10.3**	**UG/KG**		**N**				**X**
AH12SB010	8/24/2007	TO15	GS	5	1,1,2-TCA	0.546	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	5	1,2,4-Trimethylbenzene	13.6	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	5	1,3,5-Trimethylbenzene	4.03	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	5	Acetone	50.6	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	5	Carbon Tetrachloride	0.165	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	5	Chloroform	0.752	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	5	Ethylbenzene	5.86	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	5	Hexane	20.2	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	5	m,p-Xylene	29.9	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	5	MEK (2-Butanone)	14.3	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	5	Methylene Chloride	2.76	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	5	n-Propylbenzene	3.82	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	5	o-Xylene	7.52	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	5	TCE	0.144	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	5	Toluene	5.4	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	5	Trichlorofluoromethane	0.577	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	15	1,1-DCA	0.328	PPBV	J	FD				
AH12SB010	8/24/2007	TO15	GS	15	1,2,4-Trimethylbenzene	2.12	PPBV	J	FD				
AH12SB010	8/24/2007	TO15	GS	15	1,3,5-Trimethylbenzene	0.588	PPBV	J	FD				
AH12SB010	8/24/2007	TO15	GS	15	Acetone	64.1	PPBV		FD				
AH12SB010	8/24/2007	TO15	GS	15	Benzene	4.93	PPBV		FD				
AH12SB010	**8/24/2007**	**TO15**	**GS**	**15**	**Carbon Tetrachloride**	**9.75**	**PPBV**		**FD**	**X**			
AH12SB010	**8/24/2007**	**TO15**	**GS**	**15**	**Chloroform**	**59.9**	**PPBV**		**FD**	**X**	**X**		
AH12SB010	8/24/2007	TO15	GS	15	Dichlorodifluoromethane	0.497	PPBV	J	FD				
AH12SB010	8/24/2007	TO15	GS	15	Ethylbenzene	1.54	PPBV	J	FD				
AH12SB010	8/24/2007	TO15	GS	15	Hexane	17.5	PPBV		FD				
AH12SB010	8/24/2007	TO15	GS	15	m,p-Xylene	5.46	PPBV	J	FD				
AH12SB010	8/24/2007	TO15	GS	15	MEK (2-Butanone)	15.2	PPBV		FD				
AH12SB010	8/24/2007	TO15	GS	15	Methylene Chloride	2.85	PPBV		FD				
AH12SB010	8/24/2007	TO15	GS	15	n-Propylbenzene	0.701	PPBV	J	FD				
AH12SB010	8/24/2007	TO15	GS	15	o-Xylene	1.48	PPBV	J	FD				

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB010	8/24/2007	TO15	GS	15	TCE	1.55	PPBV	J	FD				
AH12SB010	8/24/2007	TO15	GS	15	Tetrachloroethylene	2.96	PPBV		FD				
AH12SB010	8/24/2007	TO15	GS	15	Toluene	4.7	PPBV		FD				
AH12SB010	8/24/2007	TO15	GS	15	Trichlorofluoromethane	18.4	PPBV		FD				
AH12SB010	8/24/2007	TO15	GS	15	Trichlorotrifluoroethane	0.384	PPBV	J	FD				
AH12SB010	8/24/2007	TO15	GS	15	1,1-DCA	0.221	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	15	1,2,4-Trimethylbenzene	6	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	15	1,3,5-Trimethylbenzene	1.66	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	15	2-Methylnaphthalene	1.93	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	15	Acetone	60	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	15	Benzene	5.42	PPBV		N				
AH12SB010	**8/24/2007**	**TO15**	**GS**	**15**	**Carbon Tetrachloride**	**8.85**	**PPBV**		**N**	**X**			
AH12SB010	**8/24/2007**	**TO15**	**GS**	**15**	**Chloroform**	**51.4**	**PPBV**		**N**	**X**	**X**		
AH12SB010	8/24/2007	TO15	GS	15	Ethylbenzene	2.59	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	15	Hexane	22.1	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	15	m,p-Xylene	11.5	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	15	MEK (2-Butanone)	13	PPBV	J-	N				
AH12SB010	8/24/2007	TO15	GS	15	Methylene Chloride	2.7	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	15	n-Propylbenzene	1.7	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	15	o-Xylene	3.16	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	15	TCE	0.84	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	15	Tetrachloroethylene	3.05	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	15	Toluene	5.53	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	15	Trichlorofluoromethane	17.7	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	40	1,2,4-Trimethylbenzene	5.02	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	40	1,3,5-Trimethylbenzene	1.4	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	40	1,3-DCB	0.169	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	40	1,4-DCB	0.203	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	40	Acetone	162	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	40	Benzene	2.57	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	40	Carbon Tetrachloride	1.79	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	40	Chloroform	62.8	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	40	Ethylbenzene	2.45	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	40	Hexane	14.2	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	40	m,p-Xylene	11.1	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	40	MEK (2-Butanone)	31.2	PPBV	J-	N				
AH12SB010	8/24/2007	TO15	GS	40	Methylene Chloride	8.23	PPBV		N				

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Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB010	8/24/2007	TO15	GS	40	n-Propylbenzene	1.28	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	40	o-Xylene	2.91	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	40	TCE	0.896	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	40	Tetrachloroethylene	0.862	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	40	Toluene	6.27	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	40	Trichlorofluoromethane	3.43	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	60	1,1-DCA	4.5	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	60	1,2,4-Trimethylbenzene	4.95	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	60	Acetone	72.5	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	60	Carbon Tetrachloride	23.6	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	60	Chloroform	1140	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	60	Ethylbenzene	2.25	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	60	Hexane	20.6	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	60	m,p-Xylene	7.95	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	60	MEK (2-Butanone)	30.3	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	60	Methylene Chloride	7.5	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	60	o-Xylene	2.25	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	60	TCE	22.5	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	60	Tetrachloroethylene	4.95	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	60	Toluene	7.5	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	60	Trichlorofluoromethane	78.9	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	80	1,1-DCA	4.17	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	80	1,2,4-Trimethylbenzene	3.16	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	80	1,3,5-Trimethylbenzene	0.808	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	80	Acetone	64.7	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	80	Benzene	4.85	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	80	Carbon Tetrachloride	24.2	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	80	Chloroform	515	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	80	Ethylbenzene	1.88	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	80	Hexane	19.9	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	80	m,p-Xylene	8.14	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	80	MEK (2-Butanone)	16.8	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	80	Methylene Chloride	4.24	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	80	TCE	39.9	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	80	Tetrachloroethylene	9.56	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	80	Toluene	5.92	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	80	Trichlorofluoromethane	171	PPBV		N				

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB010	8/24/2007	TO15	GS	80	Trichlorotrifluoroethane	2.09	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	100	1,1-DCA	5.93	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	100	1,2,4-Trimethylbenzene	2.21	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	100	Acetone	109	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	100	Benzene	4.42	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	100	Carbon Tetrachloride	33.9	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	100	Chloroform	414	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	100	Dichlorodifluoromethane	2.14	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	100	Ethylbenzene	1.79	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	100	Hexane	28.1	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	100	m,p-Xylene	6.69	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	100	MEK (2-Butanone)	18.4	PPBV	J-	N				
AH12SB010	8/24/2007	TO15	GS	100	Methyl t-butyl ether (MtBE)	7.94	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	100	Methylene Chloride	19	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	100	o-Xylene	2	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	100	TCE	101	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	100	Tetrachloroethylene	30.3	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	100	Toluene	6	PPBV	J	N				
AH12SB010	8/24/2007	TO15	GS	100	Trichlorofluoromethane	355	PPBV		N				
AH12SB010	8/24/2007	TO15	GS	100	Trichlorotrifluoroethane	3.93	PPBV	J	N				
AH12SB011	8/24/2007	SW7471A	SO	0.5	Mercury	0.017	mg/kg	J	N				
AH12SB011	**8/24/2007**	**SW8082**	**SO**	**0.5**	**PCB-1260**	**9.77**	**UG/KG**		**N**				**X**
AH12SB011	8/24/2007	TO15	GS	5	1,2,4-Trimethylbenzene	2.21	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	5	1,3,5-Trimethylbenzene	0.398	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	5	Acetone	176	PPBV		N				
AH12SB011	8/24/2007	TO15	GS	5	Benzene	6.19	PPBV	J	N				
AH12SB011	**8/24/2007**	**TO15**	**GS**	**5**	**Carbon Tetrachloride**	**3.66**	**PPBV**	**J**	**N**	**X**			
AH12SB011	**8/24/2007**	**TO15**	**GS**	**5**	**Chloroform**	**50.4**	**PPBV**		**N**	**X**	**X**		
AH12SB011	8/24/2007	TO15	GS	5	Ethylbenzene	2.14	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	5	Hexane	9.85	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	5	m,p-Xylene	5.21	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	5	MEK (2-Butanone)	34.3	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	5	Methylene Chloride	2.97	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	5	o-Xylene	1.45	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	5	TCE	14	PPBV		N				
AH12SB011	**8/24/2007**	**TO15**	**GS**	**5**	**Tetrachloroethylene**	**6.41**	**PPBV**	**J**	**N**	**X**			
AH12SB011	8/24/2007	TO15	GS	5	Toluene	7.64	PPBV		N				

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB011	8/24/2007	TO15	GS	5	Trichlorofluoromethane	23	PPBV		N				
AH12SB011	8/24/2007	TO15	GS	15	1,2,4-Trimethylbenzene	2.4	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	15	Acetone	146	PPBV		N				
AH12SB011	8/24/2007	TO15	GS	15	Benzene	9.41	PPBV	J	N				
AH12SB011	**8/24/2007**	**TO15**	**GS**	**15**	**Carbon Tetrachloride**	**3.97**	**PPBV**	**J**	**N**	**X**			
AH12SB011	**8/24/2007**	**TO15**	**GS**	**15**	**Chloroform**	**690**	**PPBV**		**N**	**X**	**X**		
AH12SB011	8/24/2007	TO15	GS	15	Ethylbenzene	2.09	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	15	Hexane	34.4	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	15	m,p-Xylene	5.33	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	15	MEK (2-Butanone)	42.1	PPBV	J-	N				
AH12SB011	8/24/2007	TO15	GS	15	Methylene Chloride	13.2	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	15	o-Xylene	1.88	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	15	TCE	5.23	PPBV	J	N				
AH12SB011	**8/24/2007**	**TO15**	**GS**	**15**	**Tetrachloroethylene**	**6.58**	**PPBV**	**J**	**N**	**X**			
AH12SB011	8/24/2007	TO15	GS	15	Toluene	7.63	PPBV	J	N				
AH12SB011	8/24/2007	TO15	GS	15	Trichlorofluoromethane	6.9	PPBV	J	N				
AH12SB012	10/9/2007	SW8082	SO	0.5	ND								
AH12SB012	10/9/2007	TO15	GS	7	Acetone	144	PPBV		N				
AH12SB012	10/9/2007	TO15	GS	7	Benzene	2.22	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	7	Carbon Tetrachloride	1.07	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	7	Chloroform	2.13	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	7	Ethylbenzene	0.682	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	7	Hexane	8.69	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	7	m,p-Xylene	2.17	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	7	MEK (2-Butanone)	11.5	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	7	Methylene Chloride	3.71	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	7	o-Xylene	0.767	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	7	TCE	1.66	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	7	Tetrachloroethylene	1.02	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	7	Toluene	2.64	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	7	Trichlorofluoromethane	19.4	PPBV		N				
AH12SB012	10/9/2007	TO15	GS	15	1,1-DCA	3.68	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	15	1,1-DCE	4.68	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	15	1,3,5-Trimethylbenzene	1.78	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	15	Acetone	245	PPBV		N				
AH12SB012	**10/9/2007**	**TO15**	**GS**	**15**	**Benzene**	**12.6**	**PPBV**	**J**	**N**	**X**			
AH12SB012	**10/9/2007**	**TO15**	**GS**	**15**	**Carbon Tetrachloride**	**92.2**	**PPBV**		**N**	**X**	**X**		

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB012	**10/9/2007**	**TO15**	**GS**	**15**	**Chloroform**	**892**	**PPBV**		**N**	**X**	**X**		
AH12SB012	10/9/2007	TO15	GS	15	Ethylbenzene	6.36	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	15	Hexane	35.3	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	15	m,p-Xylene	22.9	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	15	MEK (2-Butanone)	171	PPBV		N				
AH12SB012	10/9/2007	TO15	GS	15	Methylene Chloride	11.4	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	15	MIBK (Methyl Isobutyl Ketone)	119	PPBV		N				
AH12SB012	**10/9/2007**	**TO15**	**GS**	**15**	**Naphthalene**	**37.1**	**PPBV**	**J**	**N**	**X**	**X**		
AH12SB012	10/9/2007	TO15	GS	15	n-Propylbenzene	7.02	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	15	o-Xylene	6.69	PPBV	J	N				
AH12SB012	**10/9/2007**	**TO15**	**GS**	**15**	**TCE**	**56.3**	**PPBV**		**N**	**X**			
AH12SB012	**10/9/2007**	**TO15**	**GS**	**15**	**Tetrachloroethylene**	**43.6**	**PPBV**		**N**	**X**			
AH12SB012	10/9/2007	TO15	GS	15	Toluene	83	PPBV		N				
AH12SB012	10/9/2007	TO15	GS	15	Trichlorofluoromethane	605	PPBV		N				
AH12SB012	10/9/2007	TO15	GS	15	Trichlorotrifluoroethane	6.8	PPBV	J	N				
AH12SB012	10/9/2007	TO15	GS	15	1,1-DCA	4.77	PPBV	J	FD				
AH12SB012	10/9/2007	TO15	GS	15	1,1-DCE	6.4	PPBV	J	FD				
AH12SB012	10/9/2007	TO15	GS	15	Acetone	1200	PPBV		FD				
AH12SB012	**10/9/2007**	**TO15**	**GS**	**15**	**Benzene**	**18.3**	**PPBV**	**J**	**FD**	**X**			
AH12SB012	**10/9/2007**	**TO15**	**GS**	**15**	**Carbon Tetrachloride**	**124**	**PPBV**		**FD**	**X**	**X**		
AH12SB012	**10/9/2007**	**TO15**	**GS**	**15**	**Chloroform**	**1160**	**PPBV**		**FD**	**X**	**X**		
AH12SB012	10/9/2007	TO15	GS	15	Ethylbenzene	2.76	PPBV	J	FD				
AH12SB012	10/9/2007	TO15	GS	15	Hexane	30.2	PPBV	J	FD				
AH12SB012	10/9/2007	TO15	GS	15	m,p-Xylene	7.15	PPBV	J	FD				
AH12SB012	10/9/2007	TO15	GS	15	MEK (2-Butanone)	159	PPBV		FD				
AH12SB012	10/9/2007	TO15	GS	15	Methyl t-butyl ether (MtBE)	29.1	PPBV	J	FD				
AH12SB012	10/9/2007	TO15	GS	15	Methylene Chloride	12.6	PPBV	J	FD				
AH12SB012	10/9/2007	TO15	GS	15	MIBK (Methyl Isobutyl Ketone)	79.1	PPBV	J	FD				
AH12SB012	**10/9/2007**	**TO15**	**GS**	**15**	**Naphthalene**	**191**	**PPBV**		**FD**	**X**	**X**		
AH12SB012	10/9/2007	TO15	GS	15	n-Propylbenzene	5.15	PPBV	J	FD				
AH12SB012	10/9/2007	TO15	GS	15	o-Xylene	2.64	PPBV	J	FD				
AH12SB012	**10/9/2007**	**TO15**	**GS**	**15**	**TCE**	**77.8**	**PPBV**		**FD**	**X**			
AH12SB012	**10/9/2007**	**TO15**	**GS**	**15**	**Tetrachloroethylene**	**57.4**	**PPBV**		**FD**	**X**			
AH12SB012	10/9/2007	TO15	GS	15	Toluene	84.2	PPBV		FD				
AH12SB012	10/9/2007	TO15	GS	15	Trichlorofluoromethane	797	PPBV		FD				
AH12SB012	10/9/2007	TO15	GS	15	Trichlorotrifluoroethane	9.29	PPBV	J	FD				
AH12SB013	10/9/2007	SW8082	SO	0.5	PCB-1260	7.92	UG/KG		FD				

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB013	10/9/2007	SW8082	SO	0.5	PCB-1260	11.8	UG/KG		N				
AH12SB013	10/9/2007	TO15	GS	5	1,2,4-Trimethylbenzene	101	PPBV		N				
AH12SB013	10/9/2007	TO15	GS	5	1,3,5-Trimethylbenzene	41.9	PPBV		N				
AH12SB013	10/9/2007	TO15	GS	5	Acetone	486	PPBV		N				
AH12SB013	**10/9/2007**	**TO15**	**GS**	**5**	**Benzene**	**10.3**	**PPBV**	**J**	**N**	**X**			
AH12SB013	10/9/2007	TO15	GS	5	Ethylbenzene	34.8	PPBV		N				
AH12SB013	10/9/2007	TO15	GS	5	Hexane	79.2	PPBV		N				
AH12SB013	10/9/2007	TO15	GS	5	m,p-Xylene	132	PPBV		N				
AH12SB013	10/9/2007	TO15	GS	5	MEK (2-Butanone)	66.8	PPBV	J	N				
AH12SB013	10/9/2007	TO15	GS	5	Methylene Chloride	26.1	PPBV		N				
AH12SB013	**10/9/2007**	**TO15**	**GS**	**5**	**Naphthalene**	**197**	**PPBV**		**N**	**X**	**X**		
AH12SB013	10/9/2007	TO15	GS	5	n-Butylbenzene	43.3	PPBV		N				
AH12SB013	10/9/2007	TO15	GS	5	n-Propylbenzene	73.5	PPBV		N				
AH12SB013	10/9/2007	TO15	GS	5	o-Xylene	57.5	PPBV		N				
AH12SB013	10/9/2007	TO15	GS	5	Toluene	65.1	PPBV		N				
AH12SB013	10/9/2007	TO15	GS	5	Trichlorofluoromethane	3.71	PPBV	J	N				
AH12SB013	**10/9/2007**	**TO15**	**GS**	**15**	**1,2-DCA**	**8.39**	**PPBV**	**J**	**N**	**X**			
AH12SB013	10/9/2007	TO15	GS	15	Acetone	151	PPBV		N				
AH12SB013	10/9/2007	TO15	GS	15	Benzene	2.23	PPBV	J	N				
AH12SB013	**10/9/2007**	**TO15**	**GS**	**15**	**Carbon Tetrachloride**	**21.2**	**PPBV**		**N**	**X**			
AH12SB013	**10/9/2007**	**TO15**	**GS**	**15**	**Chloroform**	**40**	**PPBV**		**N**	**X**	**X**		
AH12SB013	10/9/2007	TO15	GS	15	Ethylbenzene	0.616	PPBV	J	N				
AH12SB013	10/9/2007	TO15	GS	15	Hexane	10.2	PPBV	J	N				
AH12SB013	10/9/2007	TO15	GS	15	m,p-Xylene	2.08	PPBV	J	N				
AH12SB013	10/9/2007	TO15	GS	15	Methyl t-butyl ether (MtBE)	13.2	PPBV	J	N				
AH12SB013	10/9/2007	TO15	GS	15	Methylene Chloride	7.01	PPBV	J	N				
AH12SB013	10/9/2007	TO15	GS	15	MIBK (Methyl Isobutyl Ketone)	6.55	PPBV	J	N				
AH12SB013	**10/9/2007**	**TO15**	**GS**	**15**	**Naphthalene**	**20.4**	**PPBV**	**J**	**N**	**X**			
AH12SB013	**10/9/2007**	**TO15**	**GS**	**15**	**TCE**	**34**	**PPBV**		**N**	**X**			
AH12SB013	**10/9/2007**	**TO15**	**GS**	**15**	**Tetrachloroethylene**	**18.1**	**PPBV**		**N**	**X**			
AH12SB013	10/9/2007	TO15	GS	15	Toluene	2.39	PPBV	J	N				
AH12SB013	10/9/2007	TO15	GS	15	Trichlorofluoromethane	507	PPBV		N				
AH12SB013	10/9/2007	TO15	GS	15	Trichlorotrifluoroethane	6.01	PPBV	J	N				
AH12SB014	10/9/2007	SW8082	SO	0.5	ND				N				
AH12SB014	10/9/2007	TO15	GS	5	Acetone	156	PPBV		N				
AH12SB014	10/9/2007	TO15	GS	5	Benzene	2.3	PPBV	J	N				
AH12SB014	**10/9/2007**	**TO15**	**GS**	**5**	**Chloroform**	**2.65**	**PPBV**	**J**	**N**	**X**			

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Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB014	10/9/2007	TO15	GS	5	Ethylbenzene	0.663	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	5	Hexane	17.8	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	5	m,p-Xylene	1.41	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	5	MEK (2-Butanone)	19.5	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	5	Methylene Chloride	4.29	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	5	o-Xylene	0.53	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	5	Styrene	6.41	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	5	Toluene	2.87	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	5	Trichlorofluoromethane	1.81	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	15	1,3,5-Trimethylbenzene	14.7	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	15	Acetone	8730	PPBV		N				
AH12SB014	**10/9/2007**	**TO15**	**GS**	**15**	**Benzene**	**28.3**	**PPBV**	**J**	**N**	**X**			
AH12SB014	10/9/2007	TO15	GS	15	Ethylbenzene	22.6	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	15	Hexane	504	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	15	m,p-Xylene	74.6	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	15	MEK (2-Butanone)	4260	PPBV		N				
AH12SB014	**10/9/2007**	**TO15**	**GS**	**15**	**Methylene Chloride**	**405**	**PPBV**		**N**	**X**			
AH12SB014	10/9/2007	TO15	GS	15	MIBK (Methyl Isobutyl Ketone)	1110	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	15	n-Propylbenzene	48.6	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	15	o-Xylene	36.2	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	15	Toluene	138	PPBV	J	N				
AH12SB014	10/9/2007	TO15	GS	15	Trichlorofluoromethane	46.3	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	7	1,3,5-Trimethylbenzene	1.42	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	7	Acetone	392	PPBV		N				
AH12SB015	10/8/2007	TO15	GS	7	Benzene	9.07	PPBV	J	N				
AH12SB015	**10/8/2007**	**TO15**	**GS**	**7**	**Carbon Tetrachloride**	**7.26**	**PPBV**	**J**	**N**	**X**			
AH12SB015	**10/8/2007**	**TO15**	**GS**	**7**	**Chloroform**	**31.8**	**PPBV**		**N**	**X**			
AH12SB015	10/8/2007	TO15	GS	7	Ethylbenzene	4.76	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	7	Hexane	45.9	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	7	m,p-Xylene	14.7	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	7	MEK (2-Butanone)	95.5	PPBV		N				
AH12SB015	10/8/2007	TO15	GS	7	Methylene Chloride	12.2	PPBV		N				
AH12SB015	10/8/2007	TO15	GS	7	n-Propylbenzene	3.57	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	7	o-Xylene	4.59	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	7	TCE	1.3	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	7	Tetrachloroethylene	1.7	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	7	Toluene	30.4	PPBV		N				

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB015	10/8/2007	TO15	GS	7	Trichlorofluoromethane	53.4	PPBV		N				
AH12SB015	10/8/2007	TO15	GS	7	Trichlorotrifluoroethane	1.42	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	15	1,3,5-Trimethylbenzene	0.504	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	15	Acetone	226	PPBV		N				
AH12SB015	10/8/2007	TO15	GS	15	Benzene	3.36	PPBV	J	N				
AH12SB015	**10/8/2007**	**TO15**	**GS**	**15**	**Carbon Tetrachloride**	**12.9**	**PPBV**		**N**	**X**			
AH12SB015	**10/8/2007**	**TO15**	**GS**	**15**	**Chloroform**	**56.1**	**PPBV**		**N**	**X**	**X**		
AH12SB015	10/8/2007	TO15	GS	15	Dichlorodifluoromethane	1.51	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	15	Ethylbenzene	1.18	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	15	Hexane	22.6	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	15	m,p-Xylene	4.12	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	15	MEK (2-Butanone)	56.1	PPBV		N				
AH12SB015	10/8/2007	TO15	GS	15	Methyl t-butyl ether (MtBE)	7.39	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	15	Methylene Chloride	15.3	PPBV		N				
AH12SB015	10/8/2007	TO15	GS	15	o-Xylene	1.26	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	15	TCE	3.02	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	15	Tetrachloroethylene	2.48	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	15	Toluene	3.99	PPBV	J	N				
AH12SB015	10/8/2007	TO15	GS	15	Trichlorofluoromethane	93.7	PPBV		N				
AH12SB015	10/8/2007	TO15	GS	15	Trichlorotrifluoroethane	2.48	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	7	1,2,4-Trimethylbenzene	1.05	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	7	1,3,5-Trimethylbenzene	1.68	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	7	Acetone	304	PPBV		N				
AH12SB016	**10/8/2007**	**TO15**	**GS**	**7**	**Benzene**	**10.6**	**PPBV**		**N**	**X**			
AH12SB016	**10/8/2007**	**TO15**	**GS**	**7**	**Carbon Tetrachloride**	**6.43**	**PPBV**	**J**	**N**	**X**			
AH12SB016	**10/8/2007**	**TO15**	**GS**	**7**	**Chloroform**	**36**	**PPBV**		**N**	**X**			
AH12SB016	10/8/2007	TO15	GS	7	Dichlorodifluoromethane	1.18	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	7	Ethylbenzene	6.17	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	7	Hexane	53.3	PPBV		N				
AH12SB016	10/8/2007	TO15	GS	7	m,p-Xylene	18.6	PPBV		N				
AH12SB016	10/8/2007	TO15	GS	7	MEK (2-Butanone)	53.1	PPBV		N				
AH12SB016	10/8/2007	TO15	GS	7	Methylene Chloride	6.89	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	7	n-Propylbenzene	4.24	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	7	o-Xylene	5.71	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	7	TCE	0.63	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	7	Tetrachloroethylene	2.9	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	7	Toluene	49.4	PPBV		N				

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB016	10/8/2007	TO15	GS	7	Trichlorofluoromethane	91.4	PPBV		N				
AH12SB016	10/8/2007	TO15	GS	7	Trichlorotrifluoroethane	2.18	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	15	1,1-DCE	1.47	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	15	1,2,4-Trichlorobenzene	0.562	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	15	1,3,5-Trimethylbenzene	0.821	PPBV	J	N				
AH12SB016	**10/8/2007**	**TO15**	**GS**	**15**	**1,4-DCB**	**6.39**	**PPBV**	**J**	**N**	**X**			
AH12SB016	10/8/2007	TO15	GS	15	Acetone	279	PPBV		N				
AH12SB016	10/8/2007	TO15	GS	15	Benzene	6.26	PPBV	J	N				
AH12SB016	**10/8/2007**	**TO15**	**GS**	**15**	**Carbon Tetrachloride**	**41.6**	**PPBV**		**N**	**X**			
AH12SB016	**10/8/2007**	**TO15**	**GS**	**15**	**Chloroform**	**293**	**PPBV**		**N**	**X**	**X**		
AH12SB016	10/8/2007	TO15	GS	15	Dichlorodifluoromethane	2.68	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	15	Ethylbenzene	2.29	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	15	Hexane	25.7	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	15	m,p-Xylene	7.95	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	15	MEK (2-Butanone)	76.8	PPBV		N				
AH12SB016	10/8/2007	TO15	GS	15	Methylene Chloride	3.63	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	15	n-Propylbenzene	2.2	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	15	o-Xylene	2.46	PPBV	J	N				
AH12SB016	10/8/2007	TO15	GS	15	TCE	7.26	PPBV	J	N				
AH12SB016	**10/8/2007**	**TO15**	**GS**	**15**	**Tetrachloroethylene**	**7.69**	**PPBV**	**J**	**N**	**X**			
AH12SB016	10/8/2007	TO15	GS	15	Toluene	15	PPBV		N				
AH12SB016	10/8/2007	TO15	GS	15	Trichlorofluoromethane	256	PPBV		N				
AH12SB016	10/8/2007	TO15	GS	15	Trichlorotrifluoroethane	5.27	PPBV	J	N				
AH12SB017	10/29/2007	TO15	GS	5	1,2,4-Trimethylbenzene	0.98	PPBV	J	N				
AH12SB017	10/29/2007	TO15	GS	5	1,3,5-Trimethylbenzene	1.03	PPBV	J	N				
AH12SB017	10/29/2007	TO15	GS	5	Acetone	260	PPBV	=	FD				
AH12SB017	10/29/2007	TO15	GS	5	Acetone	162	PPBV	=	N				
AH12SB017	10/29/2007	TO15	GS	5	Benzene	8.82	PPBV	=	N				
AH12SB017	10/29/2007	TO15	GS	5	Benzene	1.05	PPBV	J	FD				
AH12SB017	10/29/2007	TO15	GS	5	Carbon Tetrachloride	0.774	PPBV	J	N				
AH12SB017	**10/29/2007**	**TO15**	**GS**	**5**	**Chloroform**	**4.64**	**PPBV**	**J**	**N**	**X**			
AH12SB017	10/29/2007	TO15	GS	5	Chloroform	1.22	PPBV	J	FD				
AH12SB017	10/29/2007	TO15	GS	5	Ethylbenzene	3.04	PPBV	J	N				
AH12SB017	10/29/2007	TO15	GS	5	Hexane	23.9	PPBV	J	N				
AH12SB017	10/29/2007	TO15	GS	5	Hexane	13	PPBV	J	FD				
AH12SB017	10/29/2007	TO15	GS	5	m,p-Xylene	11.5	PPBV	=	N				
AH12SB017	10/29/2007	TO15	GS	5	MEK (2-Butanone)	19.7	PPBV	J	N				

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB017	10/29/2007	TO15	GS	5	MEK (2-Butanone)	3.07	PPBV	J	FD				
AH12SB017	10/29/2007	TO15	GS	5	Methylene Chloride	3.02	PPBV	J	FD				
AH12SB017	10/29/2007	TO15	GS	5	Methylene Chloride	2.79	PPBV	J	N				
AH12SB017	**10/29/2007**	**TO15**	**GS**	**5**	**Naphthalene**	**18.8**	**PPBV**	**=**	**N**	**X**			
AH12SB017	10/29/2007	TO15	GS	5	n-Butylbenzene	1.42	PPBV	J	N				
AH12SB017	10/29/2007	TO15	GS	5	n-Propylbenzene	2.27	PPBV	J	N				
AH12SB017	10/29/2007	TO15	GS	5	o-Xylene	4.33	PPBV	J	N				
AH12SB017	10/29/2007	TO15	GS	5	Tetrachloroethylene	0.774	PPBV	J	N				
AH12SB017	10/29/2007	TO15	GS	5	Toluene	37.9	PPBV	=	N				
AH12SB017	10/29/2007	TO15	GS	5	Trichlorofluoromethane	4.46	PPBV	J	N				
AH12SB017	10/29/2007	TO15	GS	15	Acetone	169	PPBV	=	N				
AH12SB017	10/29/2007	TO15	GS	15	Benzene	1.84	PPBV	J	N				
AH12SB017	**10/29/2007**	**TO15**	**GS**	**15**	**Carbon Tetrachloride**	**11.7**	**PPBV**	**J**	**N**	**X**			
AH12SB017	**10/29/2007**	**TO15**	**GS**	**15**	**Chloroform**	**23.7**	**PPBV**	**=**	**N**	**X**			
AH12SB017	10/29/2007	TO15	GS	15	Hexane	12	PPBV	J	N				
AH12SB017	10/29/2007	TO15	GS	15	Methylene Chloride	7.02	PPBV	J	N				
AH12SB017	**10/29/2007**	**TO15**	**GS**	**15**	**TCE**	**29.8**	**PPBV**	**=**	**N**	**X**			
AH12SB017	**10/29/2007**	**TO15**	**GS**	**15**	**Tetrachloroethylene**	**24.2**	**PPBV**	**=**	**N**	**X**			
AH12SB017	10/29/2007	TO15	GS	15	Toluene	4.32	PPBV	J	N				
AH12SB017	10/29/2007	TO15	GS	15	Trichlorofluoromethane	796	PPBV	=	N				
AH12SB017	10/29/2007	TO15	GS	15	Trichlorotrifluoroethane	5.18	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	5	Carbon Tetrachloride	1.33	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	5	Chloroform	1.69	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	5	Ethylbenzene	1.29	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	5	Hexane	35	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	5	m,p-Xylene	3.54	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	5	MEK (2-Butanone)	29.3	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	5	Methylene Chloride	3.06	PPBV	J	N				
AH12SB018	**10/29/2007**	**TO15**	**GS**	**5**	**Naphthalene**	**29.8**	**PPBV**	**=**	**N**	**X**	**X**		
AH12SB018	10/29/2007	TO15	GS	5	o-Xylene	1.21	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	5	Toluene	8.36	PPBV	=	N				
AH12SB018	10/29/2007	TO15	GS	5	Trichlorofluoromethane	6.03	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	5	Trichlorotrifluoroethane	1.05	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	5	Acetone	210	PPBV	=	N				
AH12SB018	10/29/2007	TO15	GS	5	Benzene	6.19	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	15	Acetone	215	PPBV	=	N				
AH12SB018	10/29/2007	TO15	GS	15	Benzene	5.29	PPBV	J	N				

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB018	**10/29/2007**	**TO15**	**GS**	**15**	**Carbon Tetrachloride**	**9.01**	**PPBV**	**=**	**N**	**X**			
AH12SB018	**10/29/2007**	**TO15**	**GS**	**15**	**Chloroform**	**84**	**PPBV**	**=**	**N**	**X**	**X**		
AH12SB018	10/29/2007	TO15	GS	15	Ethylbenzene	0.889	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	15	Hexane	15.8	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	15	m,p-Xylene	2.71	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	15	MEK (2-Butanone)	26.4	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	15	Methylene Chloride	1.29	PPBV	J	N				
AH12SB018	**10/29/2007**	**TO15**	**GS**	**15**	**Naphthalene**	**4.16**	**PPBV**	**J**	**N**	**X**			
AH12SB018	10/29/2007	TO15	GS	15	o-Xylene	0.929	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	15	TCE	4.65	PPBV	J	N				
AH12SB018	**10/29/2007**	**TO15**	**GS**	**15**	**Tetrachloroethylene**	**6.42**	**PPBV**	**J**	**N**	**X**			
AH12SB018	10/29/2007	TO15	GS	15	Toluene	7.27	PPBV	J	N				
AH12SB018	10/29/2007	TO15	GS	15	Trichlorofluoromethane	84.9	PPBV	=	N				
AH12SB019	10/29/2007	TO15	GS	5	Ethylbenzene	0.662	PPBV	J	N				
AH12SB019	10/29/2007	TO15	GS	5	Hexane	51.1	PPBV	=	N				
AH12SB019	10/29/2007	TO15	GS	5	m,p-Xylene	2.19	PPBV	J	N				
AH12SB019	10/29/2007	TO15	GS	5	MEK (2-Butanone)	14	PPBV	J	N				
AH12SB019	10/29/2007	TO15	GS	5	Methylene Chloride	1.66	PPBV	J	N				
AH12SB019	10/29/2007	TO15	GS	5	o-Xylene	0.683	PPBV	J	N				
AH12SB019	10/29/2007	TO15	GS	5	Toluene	6.13	PPBV	=	N				
AH12SB019	10/29/2007	TO15	GS	5	Benzene	4.35	PPBV	=	N				
AH12SB019	10/29/2007	TO15	GS	5	Acetone	119	PPBV	=	N				
AH12SB019	10/29/2007	TO15	GS	15	Acetone	99.5	PPBV	=	N				
AH12SB019	10/29/2007	TO15	GS	15	Benzene	1.83	PPBV	J	N				
AH12SB019	**10/29/2007**	**TO15**	**GS**	**15**	**Carbon Tetrachloride**	**7.34**	**PPBV**	**=**	**N**	**X**			
AH12SB019	**10/29/2007**	**TO15**	**GS**	**15**	**Chloroform**	**10.5**	**PPBV**	**=**	**N**	**X**			
AH12SB019	10/29/2007	TO15	GS	15	Ethylbenzene	0.538	PPBV	J	N				
AH12SB019	10/29/2007	TO15	GS	15	Hexane	35.1	PPBV	=	N				
AH12SB019	10/29/2007	TO15	GS	15	m,p-Xylene	1.8	PPBV	J	N				
AH12SB019	10/29/2007	TO15	GS	15	MEK (2-Butanone)	2.5	PPBV	J	N				
AH12SB019	10/29/2007	TO15	GS	15	Methylene Chloride	2.8	PPBV	J	N				
AH12SB019	10/29/2007	TO15	GS	15	Toluene	4.04	PPBV	J	N				
AH12SB019	10/29/2007	TO15	GS	15	Trichlorofluoromethane	81.6	PPBV	=	N				
AH12SB020	10/29/2007	TO15	GS	5	Hexane	33.7	PPBV	J	N				
AH12SB020	10/29/2007	TO15	GS	5	MEK (2-Butanone)	563	PPBV	=	N				
AH12SB020	10/29/2007	TO15	GS	5	Methylene Chloride	3.13	PPBV	J	N				
AH12SB020	**10/29/2007**	**TO15**	**GS**	**5**	**Naphthalene**	**234**	**PPBV**	**=**	**N**	**X**	**X**		
AH12SB020	10/29/2007	TO15	GS	5	Toluene	6.37	PPBV	J	N				

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB020	10/29/2007	TO15	GS	5	Trichlorofluoromethane	30.8	PPBV	=	N				
AH12SB020	10/29/2007	TO15	GS	5	Benzene	7.88	PPBV	J	N				
AH12SB020	10/29/2007	TO15	GS	5	Acetone	582	PPBV	=	N				
AH12SB020	10/29/2007	TO15	GS	15	Acetone	389	PPBV	=	N				
AH12SB020	**10/29/2007**	**TO15**	**GS**	**15**	**Carbon Tetrachloride**	**6.93**	**PPBV**	**J**	**N**	**X**			
AH12SB020	**10/29/2007**	**TO15**	**GS**	**15**	**Chloroform**	**10.3**	**PPBV**	**J**	**N**	**X**			
AH12SB020	10/29/2007	TO15	GS	15	Hexane	135	PPBV	J	N				
AH12SB020	10/29/2007	TO15	GS	15	m,p-Xylene	9.66	PPBV	J	N				
AH12SB020	10/29/2007	TO15	GS	15	MEK (2-Butanone)	63.4	PPBV	J	N				
AH12SB020	10/29/2007	TO15	GS	15	Methylene Chloride	30.2	PPBV	J	N				
AH12SB020	**10/29/2007**	**TO15**	**GS**	**15**	**TCE**	**81.7**	**PPBV**	**=**	**N**	**X**			
AH12SB020	**10/29/2007**	**TO15**	**GS**	**15**	**Tetrachloroethylene**	**23.9**	**PPBV**	**J**	**N**	**X**			
AH12SB020	10/29/2007	TO15	GS	15	Toluene	23.9	PPBV	J	N				
AH12SB020	10/29/2007	TO15	GS	15	Trichlorofluoromethane	1220	PPBV	=	N				
AH12SB020	10/29/2007	TO15	GS	15	Trichlorotrifluoroethane	9.87	PPBV	J	N				
AH12SB021	11/15/2007	TO15	GS	5	1,2,4-Trimethylbenzene	1.35	PPBV	J	N				
AH12SB021	11/15/2007	TO15	GS	5	Acetone	237	PPBV		N				
AH12SB021	11/15/2007	TO15	GS	5	Benzene	2.34	PPBV	J	N				
AH12SB021	11/15/2007	TO15	GS	5	Ethylbenzene	0.83	PPBV	J	N				
AH12SB021	11/15/2007	TO15	GS	5	Hexane	13.9	PPBV	J	N				
AH12SB021	11/15/2007	TO15	GS	5	m,p-Xylene	3.04	PPBV	J	N				
AH12SB021	11/15/2007	TO15	GS	5	MEK (2-Butanone)	30.7	PPBV	J	N				
AH12SB021	11/15/2007	TO15	GS	5	Methylene Chloride	4.32	PPBV	J	N				
AH12SB021	**11/15/2007**	**TO15**	GS	**5**	**Naphthalene**	**37.9**	**PPBV**		**N**	**X**	**X**		
AH12SB021	11/15/2007	TO15	GS	5	o-Xylene	1.33	PPBV	J	N				
AH12SB021	11/15/2007	TO15	GS	5	Toluene	3.19	PPBV	J	N				
AH12SB021	11/15/2007	TO15	GS	15	Acetone	373	PPBV		N				
AH12SB021	11/15/2007	TO15	GS	15	Benzene	2.86	PPBV	J	N				
AH12SB021	**11/15/2007**	**TO15**	GS	**15**	**Chloroform**	**2.94**	**PPBV**	**J**	**N**	**X**			
AH12SB021	11/15/2007	TO15	GS	15	Hexane	3.12	PPBV	J	N				
AH12SB021	11/15/2007	TO15	GS	15	MEK (2-Butanone)	179	PPBV		N				
AH12SB021	11/15/2007	TO15	GS	15	Methylene Chloride	6.45	PPBV	J	N				
AH12SB021	11/15/2007	TO15	GS	15	MIBK (Methyl Isobutyl Ketone)	9.29	PPBV	J	N				
AH12SB021	11/15/2007	TO15	GS	15	Toluene	3.2	PPBV	J	N				
AH12SB021	11/15/2007	TO15	GS	15	Trichlorofluoromethane	15.6	PPBV		N				
AH12SB022	11/15/2007	TO15	GS	6	1,2,4-Trimethylbenzene	3.31	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	6	1,3,5-Trimethylbenzene	0.9	PPBV	J	N				

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB022	11/15/2007	TO15	GS	6	Acetone	132	PPBV		N				
AH12SB022	11/15/2007	TO15	GS	6	Benzene	2.46	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	6	Chloroform	0.54	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	6	Ethylbenzene	0.96	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	6	Hexane	1.28	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	6	m,p-Xylene	3.32	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	6	MEK (2-Butanone)	27.9	PPBV		N				
AH12SB022	11/15/2007	TO15	GS	6	Methylene Chloride	4.93	PPBV		N				
AH12SB022	**11/15/2007**	**TO15**	GS	**6**	**Naphthalene**	**7.53**	**PPBV**	**J**	**N**	**X**			
AH12SB022	11/15/2007	TO15	GS	6	o-Xylene	1.42	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	6	TCE	4.36	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	6	Tetrachloroethylene	3.16	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	6	Toluene	4.03	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	6	Trichlorofluoromethane	69.5	PPBV		N				
AH12SB022	11/15/2007	TO15	GS	15	1,1,1-TCA	29.7	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	15	1,2,4-Trimethylbenzene	29.5	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	15	Acetone	154	PPBV	J	N				
AH12SB022	**11/15/2007**	**TO15**	GS	**15**	**Benzene**	**30.5**	**PPBV**	**J**	**N**	**X**			
AH12SB022	**11/15/2007**	**TO15**	GS	**15**	**Carbon Tetrachloride**	**35.7**	**PPBV**	**J**	**N**	**X**			
AH12SB022	**11/15/2007**	**TO15**	GS	**15**	**Chloroform**	**51.8**	**PPBV**	**J**	**N**	**X**	**X**		
AH12SB022	11/15/2007	TO15	GS	15	Ethylbenzene	28.1	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	15	Hexane	130	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	15	m,p-Xylene	60.1	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	15	Methylene Chloride	110	PPBV		N				
AH12SB022	11/15/2007	TO15	GS	15	o-Xylene	31	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	15	Styrene	25.5	PPBV	J	N				
AH12SB022	**11/15/2007**	**TO15**	GS	**15**	**TCE**	**126**	**PPBV**		**N**	**X**			
AH12SB022	**11/15/2007**	**TO15**	GS	**15**	**Tetrachloroethylene**	**76.1**	**PPBV**	**J**	**N**	**X**			
AH12SB022	11/15/2007	TO15	GS	15	Toluene	30.6	PPBV	J	N				
AH12SB022	11/15/2007	TO15	GS	15	Trichlorofluoromethane	2470	PPBV		N				
AH12SB022	11/15/2007	TO15	GS	15	Trichlorotrifluoroethane	49.4	PPBV	J	N				
AH12SB023	11/15/2007	TO15	GS	7	1,2,4-Trimethylbenzene	3.47	PPBV	J	N				
AH12SB023	11/15/2007	TO15	GS	7	1,3,5-Trimethylbenzene	1.06	PPBV	J	N				
AH12SB023	11/15/2007	TO15	GS	7	Acetone	185	PPBV		N				
AH12SB023	11/15/2007	TO15	GS	7	Benzene	7.17	PPBV		N				
AH12SB023	11/15/2007	TO15	GS	7	Ethylbenzene	2.42	PPBV	J	N				
AH12SB023	11/15/2007	TO15	GS	7	Hexane	28	PPBV		N				

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TABLE D3-1

Reported Analytes and Metals Above Combined Background for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB023	11/15/2007	TO15	GS	7	m,p-Xylene	7.46	PPBV	J	N				
AH12SB023	11/15/2007	TO15	GS	7	MEK (2-Butanone)	34.8	PPBV		N				
AH12SB023	11/15/2007	TO15	GS	7	Methylene Chloride	23.9	PPBV		N				
AH12SB023	**11/15/2007**	**TO15**	GS	**7**	**Naphthalene**	**6.23**	**PPBV**	**J**	**N**	**X**			
AH12SB023	11/15/2007	TO15	GS	7	o-Xylene	2.71	PPBV	J	N				
AH12SB023	11/15/2007	TO15	GS	7	TCE	1.31	PPBV	J	N				
AH12SB023	11/15/2007	TO15	GS	7	Tetrachloroethylene	0.61	PPBV	J	N				
AH12SB023	11/15/2007	TO15	GS	7	Toluene	17.3	PPBV		N				
AH12SB023	11/15/2007	TO15	GS	15	Acetone	42.7	PPBV	J	N				
AH12SB023	**11/15/2007**	**TO15**	GS	**15**	**Carbon Tetrachloride**	**4.89**	**PPBV**	**J**	**N**	**X**			
AH12SB023	**11/15/2007**	**TO15**	GS	**15**	**Chloroform**	**12.2**	**PPBV**	**J**	**N**	**X**			
AH12SB023	11/15/2007	TO15	GS	15	Methylene Chloride	5.97	PPBV	J	N				
AH12SB023	**11/15/2007**	**TO15**	GS	**15**	**TCE**	**65.4**	**PPBV**		**N**	**X**			
AH12SB023	**11/15/2007**	**TO15**	GS	**15**	**Tetrachloroethylene**	**13.8**	**PPBV**	**J**	**N**	**X**			
AH12SB023	11/15/2007	TO15	GS	15	Toluene	6.69	PPBV	J	N				
AH12SB023	11/15/2007	TO15	GS	15	Trichlorofluoromethane	1670	PPBV		N				
AH12SB023	11/15/2007	TO15	GS	15	Trichlorotrifluoroethane	12.6	PPBV	J	N				

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TABLE D3-2

Analytes Greater Than Screening Levels for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12HA011	8/22/2007	SW8082	SO	0.5	PCB-1260	11.9	UG/KG		N				X
AH12HA012	8/22/2007	SW8082	SO	0.5	PCB-1260	11.4	UG/KG		N				X
AH12HA013	8/21/2007	SW8082	SO	0.5	PCB-1260	13.9	UG/KG		N				X
AH12HA014	8/22/2007	SW8082	SO	0.5	PCB-1260	8.97	UG/KG		N				X
AH12HA015	8/21/2007	SW8082	SO	0.5	PCB-1260	34.1	UG/KG		N				X
AH12HA016	8/21/2007	SW8082	SO	0.5	PCB-1260	12.1	UG/KG		N				X
AH12HA017	8/21/2007	SW8082	SO	0.5	PCB-1260	72.3	UG/KG		N	X			X
AH12HA018	8/21/2007	SW8082	SO	0.5	PCB-1260	20.5	UG/KG		FD				X
AH12HA018	8/21/2007	SW8082	SO	0.5	PCB-1260	27.4	UG/KG		N				X
AH12HA019	8/21/2007	SW8082	SO	0.5	PCB-1260	24.2	UG/KG		N				X
AH12HA020	8/21/2007	SW8082	SO	0.5	PCB-1260	35.6	UG/KG		N				X
AH12HA021	8/22/2007	SW8082	SO	0.5	PCB-1260	19.9	UG/KG		N				X
AH12HA022	8/22/2007	SW8082	SO	0.5	PCB-1260	19.8	UG/KG		FD				X
AH12HA022	8/22/2007	SW8082	SO	0.5	PCB-1260	18.9	UG/KG		N				X
AH12HA023	8/22/2007	SW8082	SO	0.5	PCB-1260	31.6	UG/KG		N				X
AH12HA024	8/22/2007	SW8082	SO	0.5	PCB-1260	22.4	UG/KG		N				X
AH12HA026	10/8/2007	SW8082	SO	0.5	PCB-1260	10.2	UG/KG		N				X
AH12HA030	10/8/2007	SW8082	SO	0.5	PCB-1260	9.01	UG/KG		N				X
AH12SB010	8/24/2007	SW8082	SO	0.5	PCB-1260	11.3	UG/KG		FD				X
AH12SB010	8/24/2007	SW8082	SO	0.5	PCB-1260	10.3	UG/KG		N				X
AH12SB010	8/24/2007	TO15	GS	15	Carbon Tetrachloride	9.75	PPBV		FD	X			
AH12SB010	8/24/2007	TO15	GS	15	Chloroform	59.9	PPBV		FD	X	X		
AH12SB010	8/24/2007	TO15	GS	15	Carbon Tetrachloride	8.85	PPBV		N	X			
AH12SB010	8/24/2007	TO15	GS	15	Chloroform	51.4	PPBV		N	X	X		
AH12SB011	8/24/2007	SW8082	SO	0.5	PCB-1260	9.77	UG/KG		N				X
AH12SB011	8/24/2007	TO15	GS	5	Carbon Tetrachloride	3.66	PPBV	J	N	X			
AH12SB011	8/24/2007	TO15	GS	5	Chloroform	50.4	PPBV		N	X	X		
AH12SB011	8/24/2007	TO15	GS	5	Tetrachloroethylene	6.41	PPBV	J	N	X			
AH12SB011	8/24/2007	TO15	GS	15	Carbon Tetrachloride	3.97	PPBV	J	N	X			
AH12SB011	8/24/2007	TO15	GS	15	Chloroform	690	PPBV		N	X	X		
AH12SB011	8/24/2007	TO15	GS	15	Tetrachloroethylene	6.58	PPBV	J	N	X			
AH12SB012	10/9/2007	TO15	GS	15	Benzene	12.6	PPBV	J	N	X			
AH12SB012	10/9/2007	TO15	GS	15	Carbon Tetrachloride	92.2	PPBV		N	X	X		
AH12SB012	10/9/2007	TO15	GS	15	Chloroform	892	PPBV		N	X	X		

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TABLE D3-2

Analytes Greater Than Screening Levels for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB012	10/9/2007	TO15	GS	15	Naphthalene	37.1	PPBV	J	N	X	X		
AH12SB012	10/9/2007	TO15	GS	15	TCE	56.3	PPBV		N	X			
AH12SB012	10/9/2007	TO15	GS	15	Tetrachloroethylene	43.6	PPBV		N	X			
AH12SB012	10/9/2007	TO15	GS	15	Benzene	18.3	PPBV	J	FD	X			
AH12SB012	10/9/2007	TO15	GS	15	Carbon Tetrachloride	124	PPBV		FD	X	X		
AH12SB012	10/9/2007	TO15	GS	15	Chloroform	1160	PPBV		FD	X	X		
AH12SB012	10/9/2007	TO15	GS	15	Naphthalene	191	PPBV		FD	X	X		
AH12SB012	10/9/2007	TO15	GS	15	TCE	77.8	PPBV		FD	X			
AH12SB012	10/9/2007	TO15	GS	15	Tetrachloroethylene	57.4	PPBV		FD	X			
AH12SB013	10/9/2007	TO15	GS	5	Benzene	10.3	PPBV	J	N	X			
AH12SB013	10/9/2007	TO15	GS	5	Naphthalene	197	PPBV		N	X	X		
AH12SB013	10/9/2007	TO15	GS	15	1,2-DCA	8.39	PPBV	J	N	X			
AH12SB013	10/9/2007	TO15	GS	15	Carbon Tetrachloride	21.2	PPBV		N	X			
AH12SB013	10/9/2007	TO15	GS	15	Chloroform	40	PPBV		N	X	X		
AH12SB013	10/9/2007	TO15	GS	15	Naphthalene	20.4	PPBV	J	N	X			
AH12SB013	10/9/2007	TO15	GS	15	TCE	34	PPBV		N	X			
AH12SB013	10/9/2007	TO15	GS	15	Tetrachloroethylene	18.1	PPBV		N	X			
AH12SB014	10/9/2007	TO15	GS	5	Chloroform	2.65	PPBV	J	N	X			
AH12SB014	10/9/2007	TO15	GS	15	Benzene	28.3	PPBV	J	N	X			
AH12SB014	10/9/2007	TO15	GS	15	Methylene Chloride	405	PPBV		N	X			
AH12SB015	10/8/2007	TO15	GS	7	Carbon Tetrachloride	7.26	PPBV	J	N	X			
AH12SB015	10/8/2007	TO15	GS	7	Chloroform	31.8	PPBV		N	X			
AH12SB015	10/8/2007	TO15	GS	15	Carbon Tetrachloride	12.9	PPBV		N	X			
AH12SB015	10/8/2007	TO15	GS	15	Chloroform	56.1	PPBV		N	X	X		
AH12SB016	10/8/2007	TO15	GS	7	Benzene	10.6	PPBV		N	X			
AH12SB016	10/8/2007	TO15	GS	7	Carbon Tetrachloride	6.43	PPBV	J	N	X			
AH12SB016	10/8/2007	TO15	GS	7	Chloroform	36	PPBV		N	X			
AH12SB016	10/8/2007	TO15	GS	15	1,4-DCB	6.39	PPBV	J	N	X			
AH12SB016	10/8/2007	TO15	GS	15	Carbon Tetrachloride	41.6	PPBV		N	X			
AH12SB016	10/8/2007	TO15	GS	15	Chloroform	293	PPBV		N	X	X		
AH12SB016	10/8/2007	TO15	GS	15	Tetrachloroethylene	7.69	PPBV	J	N	X			
AH12SB017	10/29/2007	TO15	GS	5	Chloroform	4.64	PPBV	J	N	X			
AH12SB017	10/29/2007	TO15	GS	5	Naphthalene	18.8	PPBV	=	N	X			
AH12SB017	10/29/2007	TO15	GS	15	Carbon Tetrachloride	11.7	PPBV	J	N	X			

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TABLE D3-2

Analytes Greater Than Screening Levels for AOC H-12

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
AH12SB017	10/29/2007	TO15	GS	15	Chloroform	23.7	PPBV	=	N	X			
AH12SB017	10/29/2007	TO15	GS	15	TCE	29.8	PPBV	=	N	X			
AH12SB017	10/29/2007	TO15	GS	15	Tetrachloroethylene	24.2	PPBV	=	N	X			
AH12SB018	10/29/2007	TO15	GS	5	Naphthalene	29.8	PPBV	=	N	X	X		
AH12SB018	10/29/2007	TO15	GS	15	Carbon Tetrachloride	9.01	PPBV	=	N	X			
AH12SB018	10/29/2007	TO15	GS	15	Chloroform	84	PPBV	=	N	X	X		
AH12SB018	10/29/2007	TO15	GS	15	Naphthalene	4.16	PPBV	J	N	X			
AH12SB018	10/29/2007	TO15	GS	15	Tetrachloroethylene	6.42	PPBV	J	N	X			
AH12SB019	10/29/2007	TO15	GS	15	Carbon Tetrachloride	7.34	PPBV	=	N	X			
AH12SB019	10/29/2007	TO15	GS	15	Chloroform	10.5	PPBV	=	N	X			
AH12SB020	10/29/2007	TO15	GS	5	Naphthalene	234	PPBV	=	N	X	X		
AH12SB020	10/29/2007	TO15	GS	15	Carbon Tetrachloride	6.93	PPBV	J	N	X			
AH12SB020	10/29/2007	TO15	GS	15	Chloroform	10.3	PPBV	J	N	X			
AH12SB020	10/29/2007	TO15	GS	15	TCE	81.7	PPBV	=	N	X			
AH12SB020	10/29/2007	TO15	GS	15	Tetrachloroethylene	23.9	PPBV	J	N	X			
AH12SB021	11/15/2007	TO15	GS	5	Naphthalene	37.9	PPBV		N	X	X		
AH12SB021	11/15/2007	TO15	GS	15	Chloroform	2.94	PPBV	J	N	X			
AH12SB022	11/15/2007	TO15	GS	6	Naphthalene	7.53	PPBV	J	N	X			
AH12SB022	11/15/2007	TO15	GS	15	Benzene	30.5	PPBV	J	N	X			
AH12SB022	11/15/2007	TO15	GS	15	Carbon Tetrachloride	35.7	PPBV	J	N	X			
AH12SB022	11/15/2007	TO15	GS	15	Chloroform	51.8	PPBV	J	N	X	X		
AH12SB022	11/15/2007	TO15	GS	15	TCE	126	PPBV		N	X			
AH12SB022	11/15/2007	TO15	GS	15	Tetrachloroethylene	76.1	PPBV	J	N	X			
AH12SB023	11/15/2007	TO15	GS	7	Naphthalene	6.23	PPBV	J	N	X			
AH12SB023	11/15/2007	TO15	GS	15	Carbon Tetrachloride	4.89	PPBV	J	N	X			
AH12SB023	11/15/2007	TO15	GS	15	Chloroform	12.2	PPBV	J	N	X			
AH12SB023	11/15/2007	TO15	GS	15	TCE	65.4	PPBV		N	X			
AH12SB023	11/15/2007	TO15	GS	15	Tetrachloroethylene	13.8	PPBV	J	N	X			

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TABLE D3-3

Reported Analytes for Air Sampling at AOC H-12

Initial Parcel ROD #2 Air Sampling

Sample Location	Sample Date	Method	Matrix	Analyte	Result	Units	Exceeds Unrestricted	Exceeds Industrial
Indoor Air 1	**9/27/2007**	**TO15**	**IA**	**Chloroform**	**0.053**	**PPBV**	**X**	**X**
Indoor Air 1	9/27/2007	TO15	IA	Toluene	1.7	PPBV		
Indoor Air 1	9/27/2007	TO15	IA	Ethylbenzene	0.88	PPBV		
Indoor Air 1	9/27/2007	TO15	IA	m,p-Xylene	3.6	PPBV		
Indoor Air 1	9/27/2007	TO15	IA	o-Xylene	0.93	PPBV		
Indoor Air 2	**9/27/2007**	**TO15**	**IA**	**Chloroform**	**0.059**	**PPBV**	**X**	**X**
Indoor Air 2	**9/27/2007**	**TO15**	**IA**	**Benzene**	**0.95**	**PPBV**	**X**	**X**
Indoor Air 2	9/27/2007	TO15	IA	Toluene	5.8	PPBV		
Indoor Air 2	9/27/2007	TO15	IA	Ethylbenzene	2.2	PPBV		
Indoor Air 2	9/27/2007	TO15	IA	m,p-Xylene	8.5	PPBV		
Indoor Air 2	9/27/2007	TO15	IA	o-Xylene	2.8	PPBV		
Ambient Air	**9/27/2007**	**TO15**	**AA**	**Chloroform**	**0.077**	**PPBV**	**X**	**X**
Ambient Air	9/27/2007	TO15	AA	Toluene	1.9	PPBV		
Ambient Air	9/27/2007	TO15	AA	m,p-Xylene	0.83	PPBV		

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TABLE D4-1

Reported Analytes and Metals Above Combined Background at CS S-049

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
CS49SB001	8/28/2007	SW6010B	SO	0.5	Beryllium	0.72	mg/kg	J	N				
CS49SB001	8/28/2007	SW6020	SO	0.5	Cadmium	0.61	mg/kg		N				
CS49SB001	8/28/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	11	mg/kg		N				
CS49SB001	8/28/2007	SW8081	SO	0.5	4,4'-DDD	0.014	mg/kg		N				
CS49SB001	**8/28/2007**	**SW8081**	**SO**	**0.5**	**4,4'-DDE**	**0.034**	**mg/kg**		**N**				**X**
CS49SB001	**8/28/2007**	**SW8081**	**SO**	**0.5**	**4,4'-DDT**	**0.13**	**mg/kg**		**N**				**X**
CS49SB001	8/28/2007	SW8081	SO	0.5	alpha-Chlordane	0.0043	mg/kg		N				
CS49SB001	8/28/2007	SW8081	SO	0.5	gamma-BHC (Lindane)	0.00025	mg/kg	J	N				
CS49SB001	8/28/2007	SW8081	SO	0.5	gamma-Chlordane	0.0035	mg/kg	J	N				
CS49SB001	8/28/2007	SW8141	SO	0.5	ND								
CS49SB001	8/28/2007	SW8151	SO	0.5	Dinoseb	0.0029	mg/kg	J	N				
CS49SB001	8/28/2007	SW8151	SO	0.5	MCPP	2.5	mg/kg	J	N				
CS49SB001	8/28/2007	SW8270C	SO	0.5	Bis (2-ethylhexyl) phthalate	0.11	mg/kg	J	N				
CS49SB001	8/28/2007	SW8310	SO	0.5	ND								
CS49SB001	8/28/2007	SW6010B	SO	3	< BKGD								
CS49SB001	8/28/2007	SW6020	SO	3	< BKGD								
CS49SB001	8/28/2007	SW8015-E	SO	3	ND								
CS49SB001	8/28/2007	SW8081	SO	3	4,4'-DDE	0.00047	mg/kg	J	N				
CS49SB001	8/28/2007	SW8081	SO	3	4,4'-DDT	0.00097	mg/kg	J	N				
CS49SB001	8/28/2007	SW8141	SO	3	ND								
CS49SB001	8/28/2007	SW8151	SO	3	ND								
CS49SB001	8/28/2007	SW8270C	SO	3	ND								
CS49SB001	8/28/2007	SW8310	SO	3	ND								
CS49SB002	8/28/2007	SW6010B	SO	0.5	< BKGD								
CS49SB002	8/28/2007	SW6020	SO	0.5	Cadmium	1.3	mg/kg		FD				
CS49SB002	**8/28/2007**	**SW6020**	**SO**	**0.5**	**Lead**	**120**	**mg/kg**	**J**	**FD**				**X**
CS49SB002	8/28/2007	SW6020	SO	0.5	Silver	1.7	mg/kg	J	FD				
CS49SB002	8/28/2007	SW6020	SO	0.5	Cadmium	1.2	mg/kg		N				
CS49SB002	8/28/2007	SW6020	SO	0.5	Silver	1.4	mg/kg	J	N				
CS49SB002	8/28/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	22	mg/kg		FD				
CS49SB002	8/28/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	14	mg/kg		N				
CS49SB002	8/28/2007	SW8081	SO	0.5	4,4'-DDE	0.0031	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8081	SO	0.5	4,4'-DDT	0.014	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8081	SO	0.5	alpha-Chlordane	0.0048	mg/kg		FD				
CS49SB002	8/28/2007	SW8081	SO	0.5	delta-BHC	0.00036	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8081	SO	0.5	Dieldrin	0.0023	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8081	SO	0.5	gamma-Chlordane	0.0056	mg/kg		FD				
CS49SB002	8/28/2007	SW8081	SO	0.5	Heptachlor epoxide	0.00068	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8081	SO	0.5	4,4'-DDE	0.0076	mg/kg		N				
CS49SB002	**8/28/2007**	**SW8081**	**SO**	**0.5**	**4,4'-DDT**	**0.028**	**mg/kg**		**N**				**X**
CS49SB002	8/28/2007	SW8081	SO	0.5	alpha-Chlordane	0.0077	mg/kg		N				
CS49SB002	8/28/2007	SW8081	SO	0.5	delta-BHC	0.00093	mg/kg	J	N				
CS49SB002	**8/28/2007**	**SW8081**	**SO**	**0.5**	**Dieldrin**	**0.0092**	**mg/kg**		**N**	**X**			**X**

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TABLE D4-1

Reported Analytes and Metals Above Combined Background at CS S-049

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
CS49SB002	8/28/2007	SW8081	SO	0.5	gamma-Chlordane	0.0091	mg/kg		N				
CS49SB002	8/28/2007	SW8081	SO	0.5	Heptachlor epoxide	0.0014	mg/kg	J	N				
CS49SB002	8/28/2007	SW8141	SO	0.5	ND								
CS49SB002	8/28/2007	SW8151	SO	0.5	MCPP	2.8	mg/kg	J	FD				
CS49SB002	**8/28/2007**	**SW8270C**	**SO**	**0.5**	**Benzo (a) pyrene**	**0.035**	**mg/kg**	**J**	**FD**	**X**			
CS49SB002	8/28/2007	SW8270C	SO	0.5	Benzo (b) fluoranthene	0.058	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8270C	SO	0.5	Benzo (g,h,i) perylene	0.052	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8270C	SO	0.5	Bis (2-ethylhexyl) phthalate	0.37	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8270C	SO	0.5	Chrysene	0.049	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8270C	SO	0.5	Fluoranthene	0.086	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8270C	SO	0.5	Phenanthrene	0.068	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8270C	SO	0.5	Pyrene	0.084	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8270C	SO	0.5	Benzo (b) fluoranthene	0.038	mg/kg	J	N				
CS49SB002	8/28/2007	SW8270C	SO	0.5	Bis (2-ethylhexyl) phthalate	0.22	mg/kg	J	N				
CS49SB002	8/28/2007	SW8310	SO	0.5	Benzo (a) anthracene	0.016	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.039	mg/kg		FD				
CS49SB002	8/28/2007	SW8310	SO	0.5	Benzo (g,h,i) perylene	0.027	mg/kg	J	FD				
CS49SB002	**8/28/2007**	**SW8310**	**SO**	**0.5**	**Dibenzo (a,h) anthracene**	**0.029**	**mg/kg**	**J**	**FD**	**X**			
CS49SB002	8/28/2007	SW8310	SO	0.5	Fluoranthene	0.037	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8310	SO	0.5	Indeno (1,2,3-c,d) pyrene	0.048	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8310	SO	0.5	Phenanthrene	0.018	mg/kg	J	FD				
CS49SB002	8/28/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.017	mg/kg	J	N				
CS49SB002	8/28/2007	SW8310	SO	0.5	Benzo (g,h,i) perylene	0.015	mg/kg	J	N				
CS49SB002	8/28/2007	SW8310	SO	0.5	Dibenzo (a,h) anthracene	0.0042	mg/kg	J	N				
CS49SB002	8/28/2007	SW8310	SO	0.5	Fluorene	0.0083	mg/kg	J	N				
CS49SB002	8/28/2007	SW6010B	SO	3	<BKGD								
CS49SB002	8/28/2007	SW6020	SO	3	<BKGD								
CS49SB002	8/28/2007	SW8015-E	SO	3	ND								
CS49SB002	8/28/2007	SW8081	SO	3	ND								
CS49SB002	8/28/2007	SW8141	SO	3	ND								
CS49SB002	8/28/2007	SW8151	SO	3	ND								
CS49SB002	8/28/2007	SW8270C	SO	3	ND								
CS49SB002	8/28/2007	SW8310	SO	3	ND								
CS49SB003	8/27/2007	SW6010B	SO	0.5	<BKGD								
CS49SB003	8/27/2007	SW6020	SO	0.5	<BKGD								
CS49SB003	8/27/2007	SW8141	SO	0.5	ND								
CS49SB003	8/27/2007	SW8270C	SO	0.5	ND								
CS49SB003	8/27/2007	SW8310	SO	0.5	ND								
CS49SB003	8/27/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	3.7	mg/kg	J	N				
CS49SB003	8/27/2007	SW8081	SO	0.5	4,4'-DDE	0.00049	mg/kg	J	N				
CS49SB003	8/27/2007	SW8081	SO	0.5	gamma-Chlordane	0.00044	mg/kg	J	N				
CS49SB003	8/27/2007	SW8151	SO	0.5	Dinoseb	0.0031	mg/kg	J	N				
CS49SB003	8/27/2007	SW8151	SO	0.5	MCPP	2.1	mg/kg	J	N				

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TABLE D4-1

Reported Analytes and Metals Above Combined Background at CS S-049

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
CS49SB003	8/27/2007	SW6010B	SO	3	Beryllium	0.99	mg/kg	J	N				
CS49SB003	**8/27/2007**	**SW6010B**	**SO**	**3**	**Vanadium**	**76**	**mg/kg**		**N**	**X**			
CS49SB003	8/27/2007	SW6020	SO	3	Selenium	0.42	mg/kg	J	N				
CS49SB004	**8/24/2007**	**SW6020**	**SO**	**0.5**	**Copper**	**240**	**mg/kg**		**N**				**X**
CS49SB004	8/24/2007	SW6020	SO	0.5	Silver	1.7	mg/kg	J	N				
CS49SB004	8/24/2007	SW6010B	SO	0.5	<BKGD								
CS49SB004	8/24/2007	SW8270C	SO	0.5	ND								
CS49SB004	8/24/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.0049	mg/kg	J	N				
CS49SB004	8/24/2007	SW8310	SO	0.5	Dibenzo (a,h) anthracene	0.019	mg/kg	J	N				
CS49SB004	8/24/2007	SW8310	SO	0.5	Indeno (1,2,3-c,d) pyrene	0.025	mg/kg	J	N				
CS49SB004	8/24/2007	SW6020	SO	3	Selenium	0.41	mg/kg	J-	N				
CS49SB004	8/24/2007	SW6010B	SO	3	<BKGD								
CS49SB004	8/24/2007	SW8015-E	SO	3	ND								
CS49SB004	8/24/2007	SW8081	SO	3	ND								
CS49SB004	8/24/2007	SW8310	SO	3	ND								
CS49SB004	8/24/2007	SW8141	SO	3	ND								
CS49SB004	8/24/2007	SW8151	SO	3	ND								
CS49SB004	8/24/2007	SW8270C	SO	3	ND								
CS49SB005	8/27/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	16	mg/kg		N				
CS49SB005	8/27/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.013	mg/kg	J	N				
CS49SB005	8/27/2007	SW8310	SO	0.5	Phenanthrene	0.0085	mg/kg	J	N				
CS49SB005	8/27/2007	SW6010B	SO	0.5	<BKGD								
CS49SB005	8/27/2007	SW6020	SO	0.5	<BKGD								
CS49SB005	8/27/2007	SW8081	SO	0.5	ND								
CS49SB005	8/27/2007	SW8141	SO	0.5	ND								
CS49SB005	8/27/2007	SW8151	SO	0.5	ND								
CS49SB005	8/27/2007	SW8270C	SO	0.5	ND								
CS49SB005	8/27/2007	SW6010B	SO	3	Beryllium	0.96	mg/kg	J	FD				
CS49SB005	8/27/2007	SW6010B	SO	3	Beryllium	0.98	mg/kg	J	N				
CS49SB005	8/27/2007	SW6020	SO	3	Selenium	0.53	mg/kg	J	FD				
CS49SB005	8/27/2007	SW8141	SO	3	FENSULFOTHION	0.013	mg/kg	J+	N				
CS49SB005	8/27/2007	SW8270C	SO	3	Bis (2-ethylhexyl) phthalate	0.21	mg/kg	J	FD				
CS49SB005	8/27/2007	SW8270C	SO	3	Bis (2-ethylhexyl) phthalate	0.11	mg/kg	J	N				
CS49SB005	8/27/2007	SW8015-E	SO	3	ND								
CS49SB005	8/27/2007	SW8081	SO	3	ND								
CS49SB005	8/27/2007	SW8151	SO	3	ND								
CS49SB005	8/27/2007	SW8310	SO	3	ND								
CS49SB006	8/24/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	63	mg/kg		N				
CS49SB006	8/24/2007	SW8270C	SO	0.5	2-Methylnaphthalene	0.045	mg/kg	J	N				
CS49SB006	8/24/2007	SW8270C	SO	0.5	Chrysene	0.053	mg/kg	J	N				
CS49SB006	8/24/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.045	mg/kg	J	N				
CS49SB006	8/24/2007	SW8310	SO	0.5	Fluorene	0.014	mg/kg	J	N				
CS49SB006	8/24/2007	SW8310	SO	0.5	Phenanthrene	0.034	mg/kg	J	N				

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TABLE D4-1

Reported Analytes and Metals Above Combined Background at CS S-049

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
CS49SB006	8/24/2007	SW6010B	SO	0.5	<BKGD								
CS49SB006	8/24/2007	SW6020	SO	0.5	<BKGD								
CS49SB006	8/24/2007	SW8081	SO	0.5	ND								
CS49SB006	8/24/2007	SW8141	SO	0.5	ND								
CS49SB006	8/24/2007	SW8151	SO	0.5	ND								
CS49SB006	8/24/2007	SW8015-E	SO	3	Diesel Range Organics (C10-C24)	2.9	mg/kg	J	N				
CS49SB006	8/24/2007	SW8151	SO	3	MCPP	3.5	mg/kg	J	N				
CS49SB006	8/24/2007	SW8310	SO	3	Anthracene	0.0076	mg/kg	J	N				
CS49SB006	8/24/2007	SW8310	SO	3	Benzo (a) anthracene	0.0066	mg/kg	J	N				
CS49SB006	8/24/2007	SW8310	SO	3	Benzo (b) fluoranthene	0.0099	mg/kg	J	N				
CS49SB006	8/24/2007	SW8310	SO	3	Dibenzo (a,h) anthracene	0.0061	mg/kg	J	N				
CS49SB006	8/24/2007	SW8310	SO	3	Phenanthrene	0.0074	mg/kg	J	N				
CS49SB006	8/24/2007	SW6010B	SO	3	<BKGD								
CS49SB006	8/24/2007	SW6020	SO	3	<BKGD								
CS49SB006	8/24/2007	SW8270C	SO	3	ND								
CS49SB006	8/24/2007	SW8081	SO	3	ND								
CS49SB006	8/24/2007	SW8141	SO	3	ND								
CS49SB007	8/27/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	49	mg/kg		N				
CS49SB007	8/27/2007	SW8270C	SO	0.5	Bis (2-ethylhexyl) phthalate	0.053	mg/kg	J	N				
CS49SB007	8/27/2007	SW8270C	SO	0.5	Chrysene	0.04	mg/kg	J	N				
CS49SB007	8/27/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.028	mg/kg	J	N				
CS49SB007	8/27/2007	SW8310	SO	0.5	Fluorene	0.015	mg/kg	J	N				
CS49SB007	8/27/2007	SW6010B	SO	0.5	<BKGD								
CS49SB007	8/27/2007	SW6020	SO	0.5	<BKGD								
CS49SB007	8/27/2007	SW8081	SO	0.5	ND								
CS49SB007	8/27/2007	SW8141	SO	0.5	ND								
CS49SB007	8/27/2007	SW8151	SO	0.5	ND								
CS49SB007	8/27/2007	SW6010B	SO	3	Beryllium	0.97	mg/kg	J	N				
CS49SB007	8/27/2007	SW6020	SO	3	<BKGD								
CS49SB007	8/27/2007	SW8015-E	SO	3	ND								
CS49SB007	8/27/2007	SW8081	SO	3	ND								
CS49SB007	8/27/2007	SW8141	SO	3	ND								
CS49SB007	8/27/2007	SW8151	SO	3	ND								
CS49SB007	8/27/2007	SW8270C	SO	3	ND								
CS49SB007	8/27/2007	SW8310	SO	3	ND								
CS49SB008	8/27/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	22	mg/kg		N				
CS49SB008	8/27/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.025	mg/kg	J	N				
CS49SB008	8/27/2007	SW8310	SO	0.5	Fluorene	0.0085	mg/kg	J	N				
CS49SB009	8/24/2007	SW6020	SO	0.5	Silver	1.9	mg/kg	J	N				
CS49SB009	8/24/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	12	mg/kg		FD				
CS49SB009	8/24/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	22	mg/kg		N				
CS49SB009	8/24/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.017	mg/kg	J	N				
CS49SB009	8/24/2007	SW8310	SO	0.5	Phenanthrene	0.018	mg/kg	J	N				

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TABLE D4-1

Reported Analytes and Metals Above Combined Background at CS S-049

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
CS49SB010	8/27/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	28	mg/kg		N				
CS49SB010	8/27/2007	SW8270C	SO	0.5	Bis (2-ethylhexyl) phthalate	0.26	mg/kg	J	N				
CS49SB010	8/27/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.03	mg/kg	J	N				
CS49SB010	**8/27/2007**	**SW8310**	**SO**	**0.5**	**Dibenzo (a,h) anthracene**	**0.027**	**mg/kg**	**J**	**N**	**X**			
CS49SB010	8/27/2007	SW8310	SO	0.5	Fluorene	0.014	mg/kg	J	N				
CS49SB010	8/27/2007	SW8310	SO	0.5	Phenanthrene	0.011	mg/kg	J	N				
CS49SB010	8/27/2007	SW6010B	SO	0.5	<BKGD								
CS49SB010	8/27/2007	SW8081	SO	0.5	ND								
CS49SB010	8/27/2007	SW8141	SO	0.5	ND								
CS49SB010	8/27/2007	SW8151	SO	0.5	ND								
CS49SB010	8/27/2007	SW6010B	SO	3	Beryllium	1	mg/kg	J	N				
CS49SB010	8/27/2007	SW8310	SO	3	Benzo (g,h,i) perylene	0.0051	mg/kg	J	N				
CS49SB010	8/27/2007	SW8310	SO	3	Dibenzo (a,h) anthracene	0.0078	mg/kg	J	N				
CS49SB010	8/27/2007	SW8310	SO	3	Indeno (1,2,3-c,d) pyrene	0.0072	mg/kg	J	N				
CS49SB010	8/27/2007	SW6020	SO	3	<BKGD								
CS49SB010	8/27/2007	SW8015-E	SO	3	ND								
CS49SB010	8/27/2007	SW8081	SO	3	ND								
CS49SB010	8/27/2007	SW8141	SO	3	ND								
CS49SB010	8/27/2007	SW8151	SO	3	ND								
CS49SB010	8/27/2007	SW8270C	SO	3	ND								
CS49SB011	8/27/2007	SW6010B	SO	0.5	Beryllium	0.79	mg/kg	J	FD				
CS49SB011	8/27/2007	SW6010B	SO	0.5	Beryllium	0.77	mg/kg	J	N				
CS49SB011	8/27/2007	SW6020	SO	0.5	Cadmium	1.1	mg/kg	J	FD				
CS49SB011	8/27/2007	SW6020	SO	0.5	Selenium	0.43	mg/kg	J	FD				
CS49SB011	8/27/2007	SW6020	SO	0.5	Silver	1.4	mg/kg	J	FD				
CS49SB011	**8/27/2007**	**SW6020**	**SO**	**0.5**	**Arsenic**	**5.1**	**mg/kg**		**N**	**X**	**X**	**X**	**X**
CS49SB011	8/27/2007	SW6020	SO	0.5	Selenium	0.55	mg/kg	J	N				
CS49SB011	8/27/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	23	mg/kg		FD				
CS49SB011	8/27/2007	SW8081	SO	0.5	4,4'-DDD	0.0079	mg/kg		FD				
CS49SB011	**8/27/2007**	**SW8081**	**SO**	**0.5**	**4,4'-DDE**	**0.034**	**mg/kg**	**J**	**FD**				**X**
CS49SB011	8/27/2007	SW8081	SO	0.5	4,4'-DDT	0.012	mg/kg	J	FD				
CS49SB011	8/27/2007	SW8081	SO	0.5	alpha-Chlordane	0.014	mg/kg	J	FD				
CS49SB011	8/27/2007	SW8081	SO	0.5	gamma-BHC (Lindane)	0.00031	mg/kg	J	FD				
CS49SB011	8/27/2007	SW8081	SO	0.5	gamma-Chlordane	0.0084	mg/kg	J	FD				
CS49SB011	8/27/2007	SW8081	SO	0.5	Heptachlor epoxide	0.0023	mg/kg	J	FD				
CS49SB011	8/27/2007	SW8081	SO	0.5	4,4'-DDD	0.0017	mg/kg	J+	N				
CS49SB011	8/27/2007	SW8081	SO	0.5	4,4'-DDE	0.017	mg/kg	J+	N				
CS49SB011	8/27/2007	SW8081	SO	0.5	4,4'-DDT	0.013	mg/kg	J+	N				
CS49SB011	8/27/2007	SW8081	SO	0.5	alpha-Chlordane	0.0033	mg/kg	J+	N				
CS49SB011	8/27/2007	SW8081	SO	0.5	gamma-Chlordane	0.002	mg/kg	J+	N				
CS49SB011	8/27/2007	SW8141	SO	0.5	Azinphos-methyl (guthion)	0.032	mg/kg	J	FD				
CS49SB011	8/27/2007	SW8141	SO	0.5	Azinphos-methyl (guthion)	0.033	mg/kg	J	N				
CS49SB011	8/27/2007	SW8151	SO	0.5	MCPA	1.5	mg/kg	J	FD				

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TABLE D4-1

Reported Analytes and Metals Above Combined Background at CS S-049

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
CS49SB011	8/27/2007	SW8151	SO	0.5	MCPP	3.7	mg/kg	J	FD				
CS49SB011	8/27/2007	SW8151	SO	0.5	MCPP	2.7	mg/kg	J	N				
CS49SB011	8/27/2007	SW8270C	SO	0.5	Bis (2-ethylhexyl) phthalate	0.084	mg/kg	J	FD				
CS49SB011	8/27/2007	SW8310	SO	0.5	Acenaphthene	0.022	mg/kg	J	FD				
CS49SB011	8/27/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.0096	mg/kg	J	FD				
CS49SB011	8/27/2007	SW8310	SO	0.5	Dibenzo (a,h) anthracene	0.0037	mg/kg	J	FD				
CS49SB011	8/27/2007	SW8310	SO	0.5	Indeno (1,2,3-c,d) pyrene	0.0043	mg/kg	J	FD				
CS49SB011	8/27/2007	SW8310	SO	0.5	Acenaphthene	0.0073	mg/kg	J	N				
CS49SB011	8/27/2007	SW6010B	SO	3	Beryllium	1.1	mg/kg	J	N				
CS49SB011	8/27/2007	SW8270C	SO	3	2,4-Dinitrophenol	0.46	mg/kg	J	N				
CS49SB011	8/27/2007	SW8270C	SO	3	4-Nitrophenol	0.066	mg/kg	J	N				
CS49SB011	8/27/2007	SW8270C	SO	3	Benzo (a) anthracene	0.069	mg/kg	J	N				
CS49SB011	8/27/2007	SW8270C	SO	3	Benzo(k)fluoranthene	0.049	mg/kg	J	N				
CS49SB011	8/27/2007	SW8270C	SO	3	Benzoic acid	0.28	mg/kg	J	N				
CS49SB011	8/27/2007	SW8270C	SO	3	Chrysene	0.074	mg/kg	J	N				
CS49SB011	8/27/2007	SW8270C	SO	3	Fluoranthene	0.049	mg/kg	J	N				
CS49SB011	8/27/2007	SW8270C	SO	3	Pyrene	0.05	mg/kg	J	N				
CS49SB011	8/27/2007	SW6020	SO	3	<BKGD								
CS49SB011	8/27/2007	SW8081	SO	3	ND								
CS49SB011	8/27/2007	SW8141	SO	3	ND								
CS49SB011	8/27/2007	SW8151	SO	3	ND								
CS49SB011	8/27/2007	SW8310	SO	3	ND								
CS49SB011	8/27/2007	SW8015-E	SO	3	ND								
CS49SB012	8/27/2007	SW6010B	SO	0.5	Beryllium	0.71	mg/kg	J	N				
CS49SB012	8/27/2007	SW6020	SO	0.5	Cadmium	1.5	mg/kg		N				
CS49SB012	8/27/2007	SW6020	SO	0.5	Chromium	52	mg/kg		N				
CS49SB012	8/27/2007	SW6020	SO	0.5	Selenium	0.41	mg/kg	J	N				
CS49SB012	8/27/2007	SW6020	SO	0.5	Silver	5.8	mg/kg		N				
CS49SB012	8/27/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	4.6	mg/kg	J	N				
CS49SB012	8/27/2007	SW8081	SO	0.5	4,4'-DDE	0.018	mg/kg		N				
CS49SB012	8/27/2007	SW8081	SO	0.5	4,4'-DDT	0.004	mg/kg	J	N				
CS49SB012	8/27/2007	SW8081	SO	0.5	alpha-Chlordane	0.0058	mg/kg		N				
CS49SB012	**8/27/2007**	**SW8081**	**SO**	**0.5**	**Dieldrin**	**0.012**	**mg/kg**		**N**	**X**			**X**
CS49SB012	8/27/2007	SW8081	SO	0.5	gamma-Chlordane	0.0026	mg/kg	J	N				
CS49SB012	8/27/2007	SW8081	SO	0.5	Heptachlor epoxide	0.0011	mg/kg	J	N				
CS49SB012	8/27/2007	SW8141	SO	0.5	Azinphos-methyl (guthion)	0.031	mg/kg	J	N				
CS49SB012	8/27/2007	SW8151	SO	0.5	MCPA	1.9	mg/kg	J	N				
CS49SB012	8/27/2007	SW8151	SO	0.5	MCPP	3.7	mg/kg	J	N				
CS49SB012	8/27/2007	SW8270C	SO	0.5	Bis (2-ethylhexyl) phthalate	0.073	mg/kg	J	N				
CS49SB012	8/27/2007	SW8310	SO	0.5	Benzo (b) fluoranthene	0.012	mg/kg		N				
CS49SB012	8/27/2007	SW8310	SO	0.5	Indeno (1,2,3-c,d) pyrene	0.0085	mg/kg	J	N				
CS49SB012	8/27/2007	SW6010B	SO	3	Beryllium	1	mg/kg	J	N				
CS49SB012	8/27/2007	SW8151	SO	3	MCPA	1.7	mg/kg	J	N				

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TABLE D4-1

Reported Analytes and Metals Above Combined Background at CS S-049

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
CS49SB012	8/27/2007	SW6020	SO	3	<BKGD								
CS49SB012	8/27/2007	SW8081	SO	3	ND								
CS49SB012	8/27/2007	SW8141	SO	3	ND								
CS49SB012	8/27/2007	SW8151	SO	3	ND								
CS49SB012	8/27/2007	SW8310	SO	3	ND								
CS49SB012	8/27/2007	SW8015-E	SO	3	ND								
CS49SB013	8/27/2007	SW6010B	SO	0.5	Beryllium	1.1	mg/kg		N				
CS49SB013	**8/27/2007**	**SW6020**	**SO**	**0.5**	**Arsenic**	**5.6**	**mg/kg**	**J-**	**N**	**X**	**X**	**X**	**X**
CS49SB013	8/27/2007	SW6020	SO	0.5	Cadmium	1.1	mg/kg		N				
CS49SB013	8/27/2007	SW6020	SO	0.5	Chromium	52	mg/kg		N				
CS49SB013	8/27/2007	SW6020	SO	0.5	Silver	1.8	mg/kg	J-	N				
CS49SB013	8/27/2007	SW8015-E	SO	0.5	Diesel Range Organics (C10-C24)	4.3	mg/kg	J	N				
CS49SB013	8/27/2007	SW8081	SO	0.5	4,4'-DDE	0.0028	mg/kg	J	N				
CS49SB013	8/27/2007	SW8081	SO	0.5	4,4'-DDT	0.0041	mg/kg	J	N				
CS49SB013	8/27/2007	SW8081	SO	0.5	alpha-Chlordane	0.00062	mg/kg	J	N				
CS49SB013	8/27/2007	SW8081	SO	0.5	gamma-Chlordane	0.0004	mg/kg	J	N				
CS49SB013	8/27/2007	SW8151	SO	0.5	2,4-DB	0.017	mg/kg	J	N				
CS49SB013	8/27/2007	SW8151	SO	0.5	MCPP	3.6	mg/kg	J-	N				
CS49SB013	8/27/2007	SW8141	SO	0.5	ND								
CS49SB013	8/27/2007	SW8310	SO	0.5	ND								
CS49SB013	8/27/2007	SW8270C	SO	0.5	ND								
CS49SB013	8/27/2007	SW8081	SO	3	4,4'-DDE	0.00046	mg/kg	J	N				
CS49SB013	8/27/2007	SW8151	SO	3	2,4-DB	0.023	mg/kg	J	N				
CS49SB013	8/27/2007	SW8151	SO	3	MCPP	3.2	mg/kg	J	N				
CS49SB013	8/27/2007	SW8270C	SO	3	Bis (2-ethylhexyl) phthalate	0.076	mg/kg	J	FD				
CS49SB013	8/27/2007	SW6010B	SO	3	<BKDG								
CS49SB013	8/27/2007	SW6020	SO	3	<BKGD								
CS49SB013	8/27/2007	SW8141	SO	3	ND								
CS49SB013	8/27/2007	SW8310	SO	3	ND								
CS49SB013	8/27/2007	SW8015-E	SO	3	ND								

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TABLE D4-2

Analytes Greater Than Screening Levels at CS S-049

Initial Parcel ROD #2 Pre-Decision Sampling

Sample Location	Sample Date	Method	Matrix	Sample Depth	Analyte	Result	Units	EPA Flag	Sample Type	Exceeds Unrestricted	Exceeds Industrial	Exceeds GW	Exceeds SW
CS49SB001	8/28/2007	SW8081	SO	0.5	4,4'-DDE	0.034	mg/kg		N				X
CS49SB001	8/28/2007	SW8081	SO	0.5	4,4'-DDT	0.13	mg/kg		N				X
CS49SB002	8/28/2007	SW6020	SO	0.5	Lead	120	mg/kg	J	FD				X
CS49SB002	8/28/2007	SW8081	SO	0.5	4,4'-DDT	0.028	mg/kg		N				X
CS49SB002	8/28/2007	SW8081	SO	0.5	Dieldrin	0.0092	mg/kg		N	X			X
CS49SB002	8/28/2007	SW8270C	SO	0.5	Benzo (a) pyrene	0.035	mg/kg	J	FD	X			
CS49SB002	8/28/2007	SW8310	SO	0.5	Dibenzo (a,h) anthracene	0.029	mg/kg	J	FD	X			
CS49SB003	8/27/2007	SW6010B	SO	3	Vanadium	76	mg/kg		N	X			
CS49SB004	8/24/2007	SW6020	SO	0.5	Copper	240	mg/kg		N				X
CS49SB010	8/27/2007	SW8310	SO	0.5	Dibenzo (a,h) anthracene	0.027	mg/kg	J	N	X			
CS49SB011	8/27/2007	SW6020	SO	0.5	Arsenic	5.1	mg/kg		N	X	X	X	X
CS49SB011	8/27/2007	SW8081	SO	0.5	4,4'-DDE	0.034	mg/kg	J	FD				X
CS49SB012	8/27/2007	SW8081	SO	0.5	Dieldrin	0.012	mg/kg		N	X			X
CS49SB013	8/27/2007	SW6020	SO	0.5	Arsenic	5.6	mg/kg	J-	N	X	X	X	X

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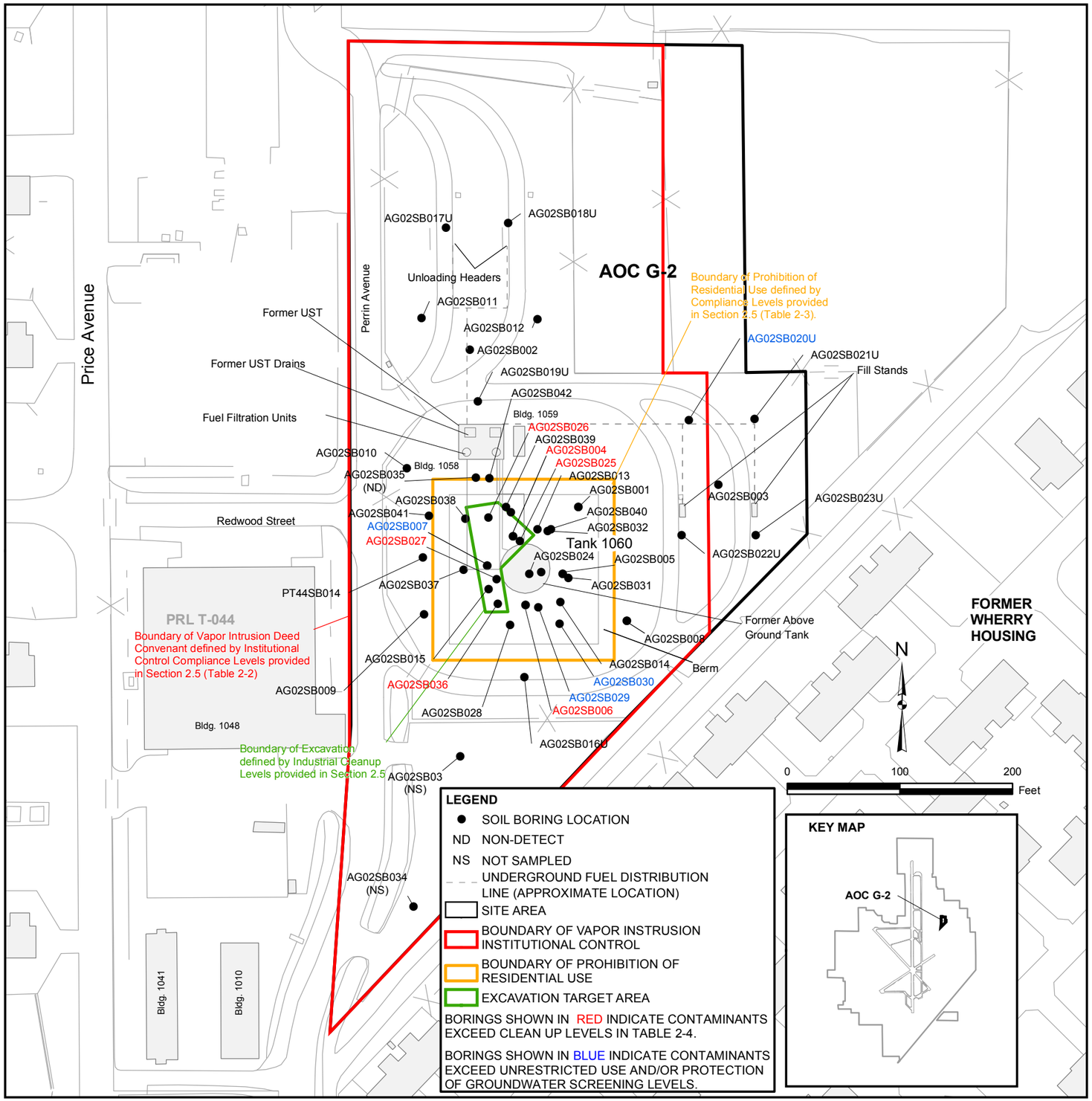

Boring	Depth (feet bgs)	Contaminant	Concentration (mg/kg)
AG02SB004	0.25	TPH-D	260
		TPH-G	**1,400J (FD)**
	6	TPH-D	250
		TPH-G	**270**
AG02SB006	0.5	**TPH-G**	**540**
	6	TPH-D	2300
		TPH-G	**1900**
AG02SB007	0.5	TPH-G	26
	5	TPH-G	15J
AG02SB020U	5	Benzo(a)pyrene	0.021J (FD)
AG02SB025*	0.5	TPH-D	510
	5	TPH-D	110J (FD)
		TPH-G	**570J (FD)**
		TPH-G	130J
		Naphthalene	0.37 (FD)
		Naphthalene	0.35
	10	**TPH-G**	**1,300**
AG02SB026*	10	TPH-D	1,900
		TPH-G	**15,000**
		Benzo (a) anthracene	**2.3J+**
		Benzo (a) pyrene	**1.4J+**
		Benzo (b) fluoranthene	**1.2J+**
		Benzo(k)fluoranthene	0.32J+
		Dibenzo (a,h) anthracene	0.099J+
		Indeno (1,2,3-c,d) pyrene	0.54J+
		Naphthalene	1J+
AG02SB027*	0.5	TPH-D	1,000 (FD)
		TPH-D	920
		TPH-G	**900J (FD)**
		TPH-G	450J
		Naphthalene	1.9 (FD)
		Naphthalene	1.5
	5	TPH-G	120J+
		Benzo (a) anthracene	**1.6J-**
		Naphthalene	0.48
	10	TPH-D	3,000
		TPH-G	100
		Naphthalene	**9.2**
AG02SB029*	5	TPH-G	69
AG02SB030*	0.5	Benzo (b) fluoranthene	0.076
		Dibenzo (a,h) anthracene	0.031J
AG02SB036*	5	**TPH-G**	**260**

* = Pre-decision sample location
(FD) = Field duplicate
ND = Non-detect
NA = Not analyzed
J = Estimated
J- = Estimated, biased low
J+ = Estimated, biased high

All contaminants shown exceed unrestricted use and/or protection of groundwater screening levels.
Bold text = exceeds clean up levels in Table 2-4

Borings with concentrations less than screening levels are shown on figure.
Borings not sampled for non-VOCs indicated with NS.

FIGURE D-1a
AOC G-2 NON-VOC CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA
CH2MHILL

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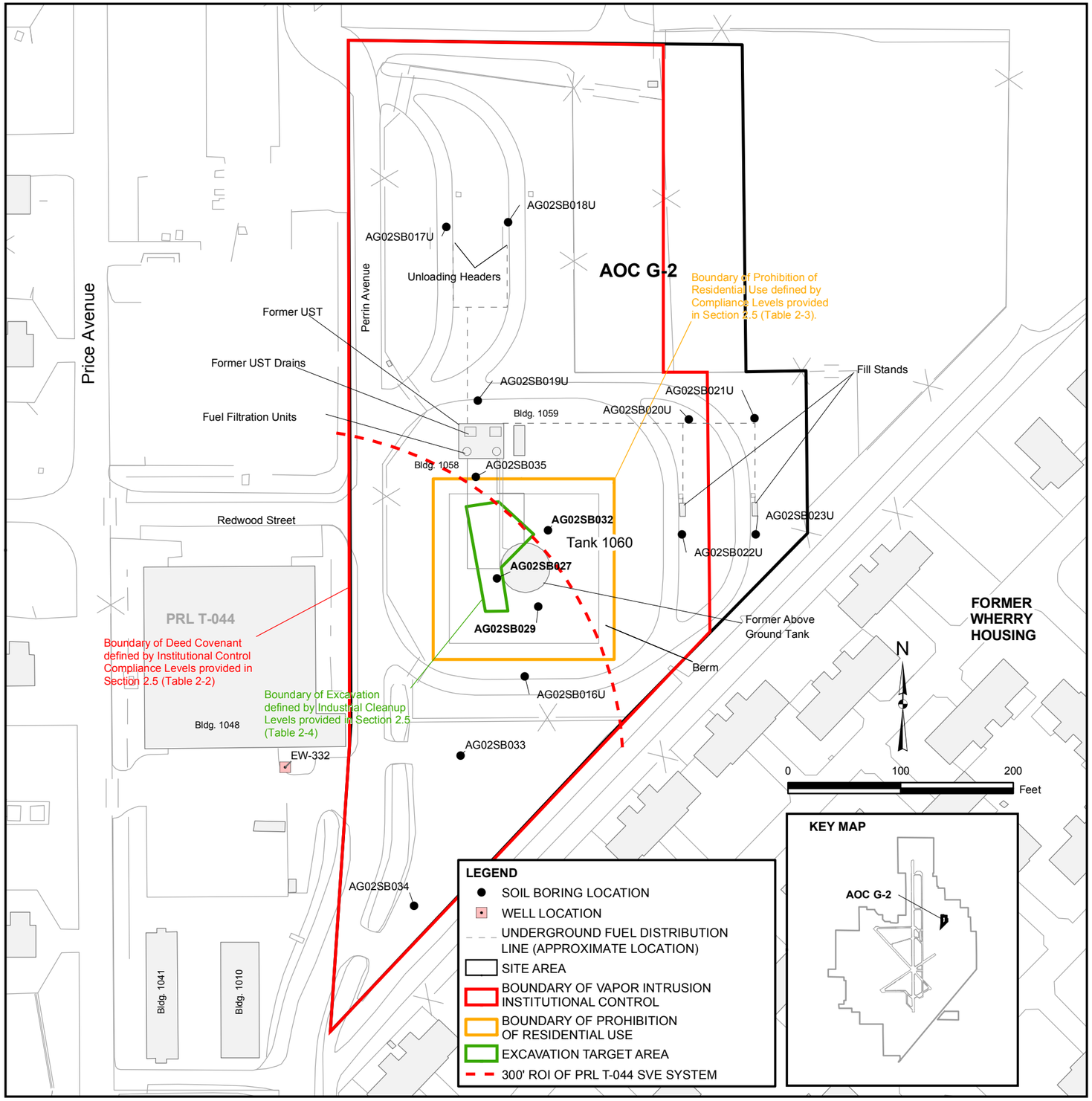

VOCs in Soil Gas

Boring	Depth (ft bgs)	Contaminant	Concentration (ppbv)
AG02SB018U	5	Benzene	13
AG02SB022U	15	Benzene	12
		Benzene	13 (FD)
AG02SB027*	5	**1,2,4-Trimethylbenzene**	**3200**
		1,3,5-Trimethylbenzene	644
AG02SB027*	15	**1,2,4-Trimethylbenzene**	**12500 J**
		1,3,5-Trimethylbenzene	**5270 J**
		Ethylbenzene	56200
		Hexane	**1380000**
		m,p-Xylene	**271000**
		n-Propylbenzene	7900 J-
		o-Xylene	**59500**
		Toluene	84500
AG02SB029*	5	1,2,4-Trimethylbenzene	1300 J
		1,3,5-Trimethylbenzene	744 J
		Hexane	32300
		m,p-Xylene	7870
AG02SB029*	15	**1,1,2,2-Tetrachloroethane**	**323**
		1,2,4-Trimethylbenzene	1180
		1,3,5-Trimethylbenzene	589
		m,p-Xylene	4360
		Tetrachloroethylene	47.8 J
AG02SB032*	5	Methylene Chloride	329 J
AG02SB032*	15	**1,1,2,2-Tetrachloroethane**	**1340**
AG02SB033*	15	Benzene	10.3 J
AG02SB034*	15	Benzene	19.7J

Notes:
* = Pre-decision sample location
(FD) = Field duplicate
J = Estimated
J- = Estimated, biased low

All contaminants shown exceed unrestricted use screening levels.
Bold text = exceeds industrial screening levels

Data from boring AG02SB016U is not included because it is within the ROI of the PRL T-044 SVE system and the system was operating when the data was collected.

Only borings where shallow soil gas data were collected are shown on this figure. Results for borings without data listed are less than screening levels.

FIGURE D-1b
AOC G-2 VOC CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA
CH2MHILL

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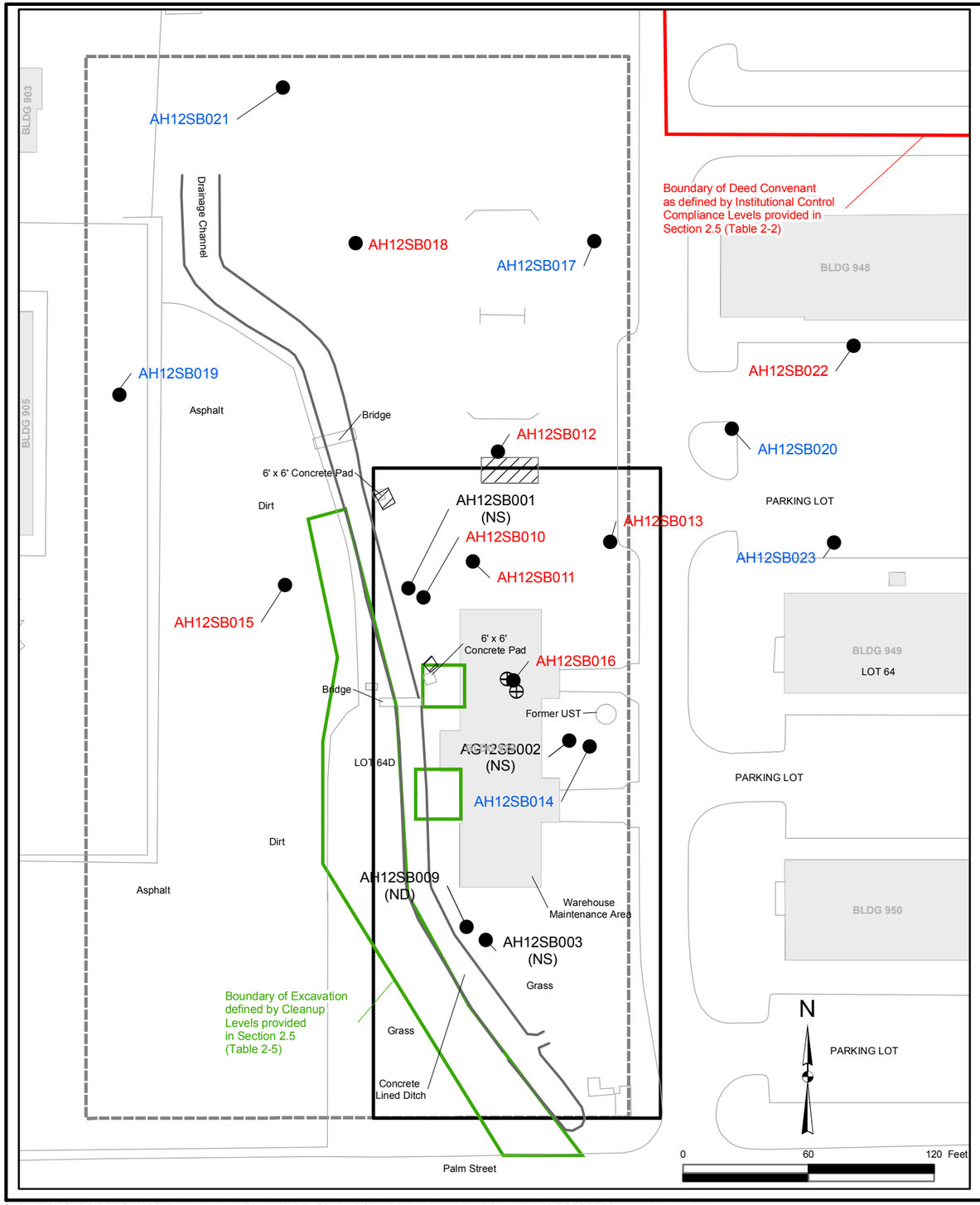
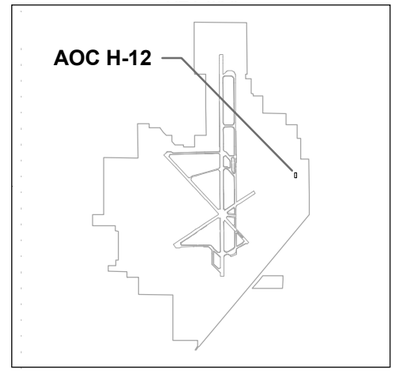


VOCs IN SOIL GAS

Boring	Depth (feet bgs)	Contaminant	Concentration (ppbv)
AH12SB010*	15	Carbon Tetrachloride	9.75 (FD)
		Chloroform	**59.9 (FD)**
		Carbon Tetrachloride	8.85
		Chloroform	**51.4**
AH12SB011*	5	Carbon Tetrachloride	3.66J
		Chloroform	**50.4**
		Tetrachloroethylene	6.41J
	15	Carbon Tetrachloride	3.97J
		Chloroform	**690**
		Tetrachloroethylene	6.58J
AH12SB012*	15	Benzene	12.6J
		Carbon Tetrachloride	**92.2**
		Chloroform	**892**
		Naphthalene	37.1J
		TCE	56.3
		Tetrachloroethylene	43.6
		Benzene	18.3J (FD)
		Carbon Tetrachloride	**124 (FD)**
		Chloroform	**1,160 (FD)**
		Naphthalene	191(FD)
		TCE	77.8 (FD)
		Tetrachloroethylene	57.4 (FD)
AH12SB013*	5	Benzene	10.3J
		Naphthalene	197
	15	1,2-DCA	8.39J
		Carbon Tetrachloride	212
		Chloroform	**40**
		Naphthalene	20.4J
		TCE	34
		Tetrachloroethylene	18.1
AH12SB014*	5	Chloroform	2.65J
	15	Benzene	28.3J
		Methylene Chloride	405
AH12SB015*	7	Carbon Tetrachloride	7.26J
		Chloroform	318
	15	Carbon Tetrachloride	12.9
		Chloroform	**56.1**
AH12SB016*	7	Benzene	10.6
		Carbon Tetrachloride	6.43J
		Chloroform	36
	15	1,4-DCB	6.39J
		Carbon Tetrachloride	416
		Chloroform	**293**
		Tetrachloroethylene	7.69J
AH12SB017*	5	Chloroform	4.64J
		Naphthalene	18.8
	15	Carbon Tetrachloride	11.7J
		Chloroform	23.7
		TCE	29.8
		Tetrachloroethylene	24.2
AH12SB018*	**5**	Naphthalene	29.8
	15	Carbon Tetrachloride	9.01
		Chloroform	**84**
		Naphthalene	4.16J
		Tetrachloroethylene	6.42J
AH12SB019*	15	Carbon Tetrachloride	7.34
		Chloroform	10.5
AH12SB020*	**5**	Naphthalene	234
	15	Carbon Tetrachloride	6.93J
		Chloroform	10.3J
		TCE	81.7
		Tetrachloroethylene	23.9J
AH12SB021*	**5**	Naphthalene	37.9
	15	Chloroform	2.94J
AH12SB022*	6	Naphthalene	7.53J
	15	Benzene	30.5J
		Carbon Tetrachloride	35.7J
		Chloroform	**51.8J**
		TCE	126
		Tetrachloroethylene	76.1J
AH12SB023*	7	Naphthalene	6.23J
	15	Carbon Tetrachloride	4.89J
		Chloroform	12.2J
		TCE	65.4
		Tetrachloroethylene	13.8J

KEY MAP



LEGEND

- ⊕ DRAINS
- ● SOIL BORING
- ND NON-DETECT
- NS NOT SAMPLED
- SITE AREA
- BOUNDARY OF INSTITUTIONAL CONTROLS
- TARGET AREA FOR EXCAVATION
- HHRA EXPOSURE AREA
- CONCRETE PAD

BORINGS SHOWN IN RED INDICATE CONTAMINANTS EXCEED INDUSTRIAL USE SCREENING LEVELS.

BORINGS SHOWN IN BLUE INDICATE CONTAMINANTS EXCEED UNRESTRICTED USE COMPLIANCE LEVELS (TABLE C2-2).

* Pre-Decision sample location
bgs = below ground surface
FD = field duplicate sample
J = estimated concentration
All concentrations shown exceed unrestricted use screening levels
Concentrations in BOLD exceed industrial use screening levels.
Value for naphthalene based on non-carcinogenic risk.

FIGURE D-2
AOC H-12 VOC CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION # 2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

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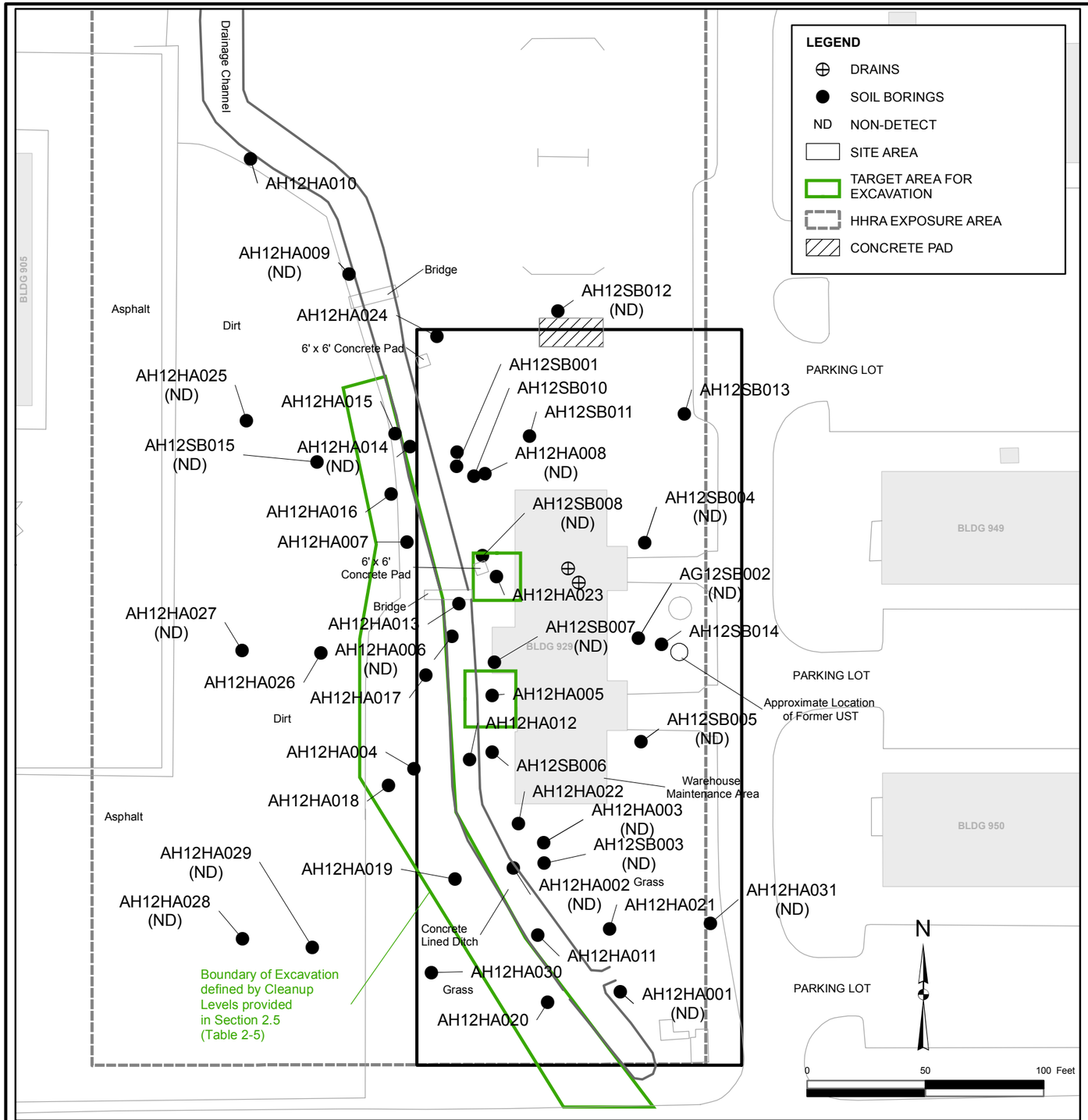
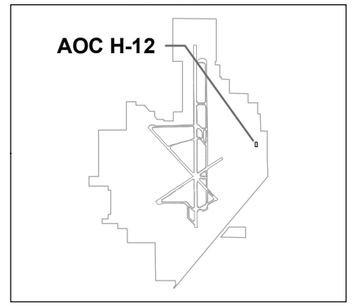


KEY MAP



CONCENTRATIONS OF PCB-1260

Boring	Depth (feet bgs)	Concentration (mg/kg)
AH12HA004	0.25	0.0472
AH12HA007	0.25	0.13
AH12HA011*	0.5	0.0119
AH12HA012*	0.5	0.0114
AH12HA013*	0.5	0.0139
AH12HA014*	0.5	0.00897
AH12HA015*	0.5	0.0341
AH12HA016*	0.5	0.0121
AH12HA017*	0.5	**0.0723**
AH12HA018*	0.5	0.0205 (FD)
	0.5	0.0274
AH12HA019*	0.5	0.0242
AH12HA020*	0.5	0.0356
AH12HA021*	0.5	0.0199
AH12HA022*	0.5	0.0198 (FD)
	0.5	0.0189
AH12HA023*	0.5	0.0316
AH12HA024*	0.5	0.0224
AH12HA026*	0.5	0.0102
AH12HA030*	0.5	0.00901
AH12SB010*	0.5	0.0113 (FD)
	0.5	0.0103
AH12SB011*	0.5	0.00977
	0.5	0.0118
AH12SB013*	0.5	0.00792 (FD)

All concentrations shown exceed the screening level for the protection of surface water. Concentrations in **BOLD** exceed unrestricted use screening levels.

CONCENTRATIONS OF MERCURY

Boring	Depth (feet bgs)	Concentration (mg/kg)
AH12HA004	0.25	0.2
AH12HA005	**0.25**	**6.97**
AH12HA007	**0.25**	**11.9**
AH12HA013*	0.5	0.19J
AH12HA015*	0.5	0.2J
AH12HA017*	0.5	0.22J
AH12HA019*	0.5	0.11J
AH12HA020*	0.5	0.16J
AH12HA023*	0.5	0.13J
AH12SB006	0	0.11J

Note: Concentrations in **BOLD** exceed screening levels for unrestricted use and the protection of surface water. Samples with concentrations less than background are not shown.

Note: Only sample locations where soil samples were analyzed for PCBs and/or mercury are shown.
* = Pre-Decision sample location
bgs = below ground surface
FD = field duplicate sample
J = estimated concentration
mg/kg = milligrams per kilogram

FIGURE D-3
AOC H-12 PCB-1260 AND MERCURY CONTAMINANTS MAP
LRA INITIAL PARCEL RECORD OF DECISION #2
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

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Select Shallow Soil Gas and TPH Contaminant Concentrations

Location	Depth (ft bgs)	1,1-DCE (ppbv)	1,1,1-Trichlorethane (ppbv)	cis-1,2-DCE (ppbv)	Chloroform (ppbv)	PCE (ppbv)	TCE (ppbv)	Vinyl Chloride (ppbv)	TPH-D (mg/Kg)
IC03B001	20	14	11	29	21	290	340	ND	16 (2.1 ft bgs)[B]
IC03B002	21	ND	ND	ND	ND	210[A]	220[A]	ND	-[B]
IC03B003	21	ND	ND	ND	ND	60	140	550	-[B]
IC03B004	21	ND	ND	ND	ND	22	180	ND	-[B]
IC03B005	21	ND	ND	10	ND	38	240	ND	-[B]
IC03B006	21	ND	ND	ND	ND	17	160	ND	-[B]
IC03B007	21	ND	ND	ND	ND	ND	150	ND	-[B]
IC03B008	21	ND	ND	23	ND	14	330	ND	**400** (12 ft bgs)[B]
IC03B009	21	ND	ND	10	ND	15	130	ND	-[B]
IC03B010	21	ND	ND	37	15	90	220	ND	-[B]
IC03B032	22	ND	ND	47	30	280	460	ND	-[B]

Note: Unless noted, VOCs were detected using Method FECD or FPID.
[A] Method TO14
[B] TPH-D samples were collected from each boring at three depths: approximately 2-5, 7-9, 16-25 ft bgs, only detections are shown.
Bold text - exceeds unrestricted use screening levels

Pre-Decision Sample Results

Boring	Analytical Method	Depth (feet bgs)	Contaminant	Concentration (mg/kg)	Exceeds SL for the protection of surface water	Exceeds SL for unrestricted use
CS49SB001	SW8081	0.5	4,4'-DDE	0.034	Yes	
			4,4'-DDT	0.13	Yes	
CS49SB002	SW8081	0.5	4,4'-DDT	0.028	Yes	
			Dieldrin	0.0092	Yes	Yes
	SW8270C		Benzo (a) pyrene	0.035J (FD)		Yes
	SW8310		Dibenzo (a,h) anthracene	0.029J (FD)		Yes
CS49SB003	SW6010B	3	Vanadium	76		Yes
CS49SB004	SW6020	0.5	Copper	240	Yes	
CS49SB010	SW8310	0.5	Dibenzo (a,h) anthracene	0.027J		Yes
CS49SB011	SW8081	0.5	4,4'-DDE	0.034J	Yes	
CS49SB012	SW8081	0.5	Dieldrin	0.012	Yes	Yes

Note:
(FD) = field duplicate sample
SL = screening level

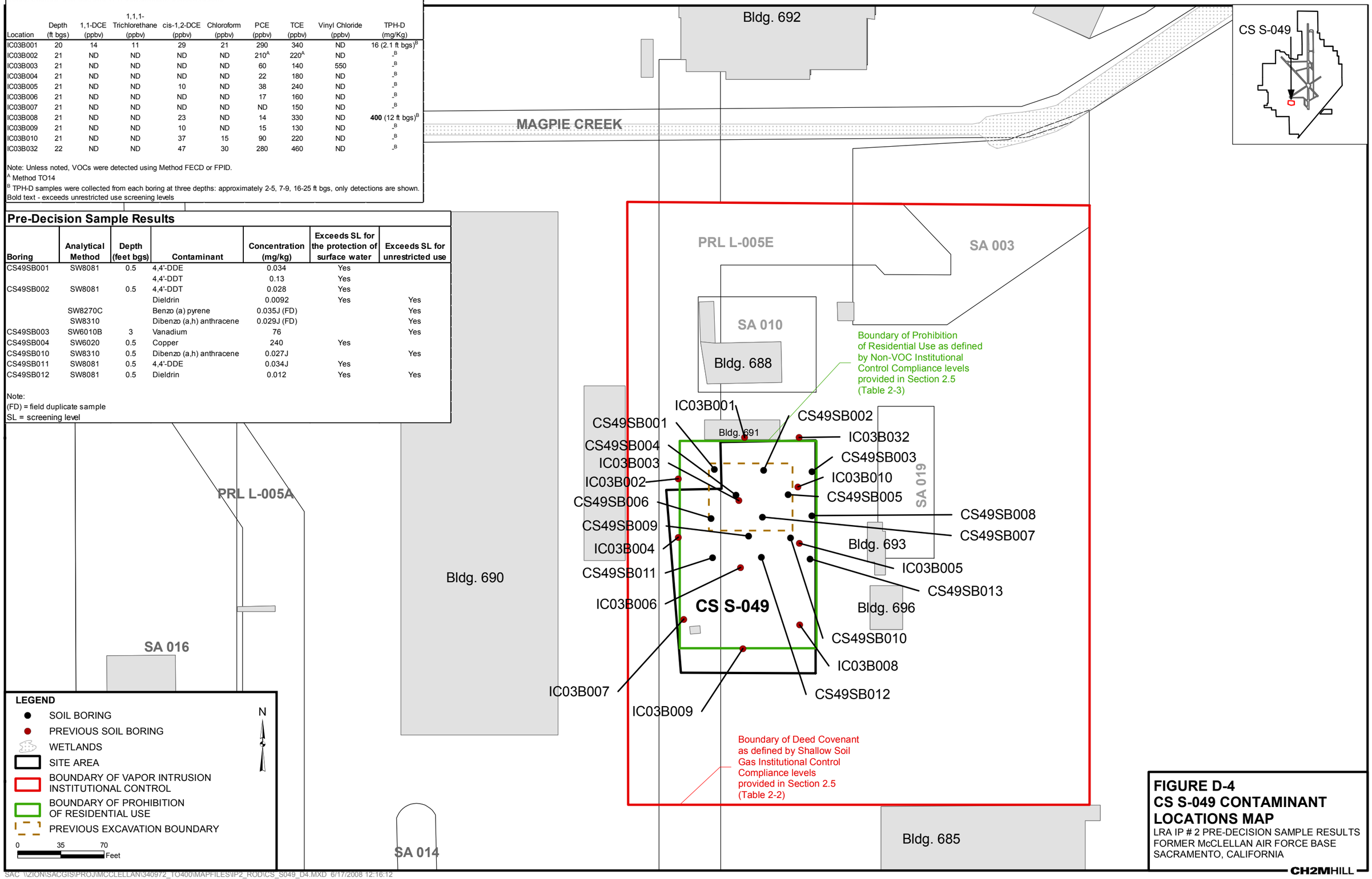

FIGURE D-4
CS S-049 CONTAMINANT LOCATIONS MAP
LRA IP # 2 PRE-DECISION SAMPLE RESULTS
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

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Attachment D1
Documentation for Proposed Step-out Sampling

TABLE 2-3
Proposed Sampling for AOC G-2
Phase 1 LRA Initial Parcel #2 Pre-Decision Work Plan

Proposed Borings	Rationale	Sample Depth (feet bgs)	Media	Analyses
AG02SB024, AG02SB026, AG02SB028, AG02SB030	Determine the extent of TPH contamination detected above unrestricted use screening levels at previous borings AG02SB004, AG02SB006, and AG02SB007. Determine if PAHs were released inside the berm because previous samples were not analyzed for PAHs.	0.5, 5, 10, and 15	Soil	M8015E (TPH-D) M8015V (TPH-G) SW8310 (PAHs)
AG02SB025[a]	Determine current TPH concentrations near previous boring AG02SB004, where TPH was previously detected above unrestricted use screening levels. Determine if PAHs were released inside the berm.	0.5, 5, 10, and 15	Soil	M8015E (TPH-D) M8015V (TPH-G) SW8260B (VOCs w/TICs) SW8310 (PAHs)
AG02SB027[a]	Determine current TPH concentrations near previous boring AG02SB007, where TPH was previously detected above unrestricted use screening levels. Determine if PAHs were released inside the berm. Evaluate protectiveness of proposed remedy to address potential VOC intrusion into indoor air. Support the STOP analysis for PRL T-044 and a RWQCB no further action request.	0.5, 5, 10, and 15	Soil	M8015E (TPH-D) M8015V (TPH-G) SW8310 (PAHs) SW8260B (VOCs w/TICs)
		5, 15, 40, 60, 80, and 100	Soil gas	TO-15 (VOCs)
		110[b]	Groundwater	M8015E (TPH-D) M8015V (TPH-G) SW8260 (VOCs w/TICs)
AG02SB029[a]	Determine current TPH concentrations near boring AG02SB006, where TPH was previously detected above unrestricted use screening levels. Determine if PAHs were released inside the berm. Evaluate protectiveness of proposed remedy to address potential VOC intrusion into indoor air. Support a RWQCB no further action request.	0.5, 5, 10, and 15	Soil	M8015E (TPH-D) M8015V (TPH-G) SW8260B (VOCs w/TICs) SW8310 (PAHs)
		5 and 15	Soil gas	TO-15 (VOCs)

TABLE 2-3
Proposed Sampling for AOC G-2
Phase 1 LRA Initial Parcel #2 Pre-Decision Work Plan

Proposed Borings	Rationale	Sample Depth (feet bgs)	Media	Analyses
AG02SB031	Determine if PAHs were released inside the berm.	0.5, 5, 10, and 15	Soil	SW8310 (PAHs)
AG02SB032	Determine if PAHs were released inside the berm. Evaluate protectiveness of proposed remedy to address potential VOC intrusion into indoor air.	0.5, 5, 10, and 15	Soil	SW8310 (PAHs)
		5 and 15	Soil gas	TO-15 (VOCs)
AG02SB033	Evaluate protectiveness of proposed remedy to address potential VOC intrusion into indoor air.	5 and 15	Soil gas	TO-15 (VOCs)
AG02SB034	Evaluate protectiveness of proposed remedy to address potential VOC intrusion into indoor air.	5 and 15	Soil gas	TO-15 (VOCs)
AG02SB035	Evaluate protectiveness of proposed remedy to address potential VOC intrusion into indoor air. Support the STOP analysis for PRL T-044.	5, 15, 40, 60, 80, and 100	Soil gas	TO-15 (VOCs)

Notes:

[a] Selected soil samples collected from these three borings AG02SB025, AG02SB027, and AG02SB029 will also be analyzed for oxygenates, including MTBE and BTEX, using Method 8260B with tentatively identified compounds (TICS).

[b] A HydroPunch groundwater sample will be collected at first accessible depth.

Field duplicates (FDs) and matrix spike/matrix spike duplicates (MS/MSDs) will be collected from soil borings at this site in the following numbers: 3 FDs and 2 MS/MSDs each for M8015E and M8015V soils; 4 FDs and 2 MS/MSDs for SW8310 soils; 1 FD and 1MS/MSD for M8015E, M8015V and SW8260 groundwater, and 3 FDs for TO-15.

Additional step-out and step-down samples may be collected based on sampling results, as discussed in Section 2.1.6.

TABLE 1
Proposed Step-Out Sampling for AOC G-2

Proposed Borings	Rationale	Sample Depth (feet bgs)	Media	Analyses
AG02SB036 to AG02SB040	Estimate target volume for excavation.	0.5 and 10[a]	Soil	SW8015B (TPH-G)
AG02SB041[b], AG02SB042[c]	Estimate target volume for excavation. Determine if contamination extends outside the berm.	0.5 and 10[a]	Soil	SW8015B (TPH-G)

Notes:
[a] For each boring, if soil at 5 feet bgs is stained or OVM reading exceeds 5 ppm, collect an additional sample at 5 feet bgs. Similarly, if soil at 10 feet bgs is stained or OVM reading exceeds 5 ppm, continue drilling and collect an additional sample at 15 feet.
[b] Drill boring AG02SB041 only if soil is stained or OVM reading exceeds 5 ppm at any depth in borings AG02SB037 or AG02SB038.
[c] Drill boring AG02SB042 only if soil is stained or OVM reading exceeds 5 ppm at any depth in borings AG02SB038 or AG02SB039.

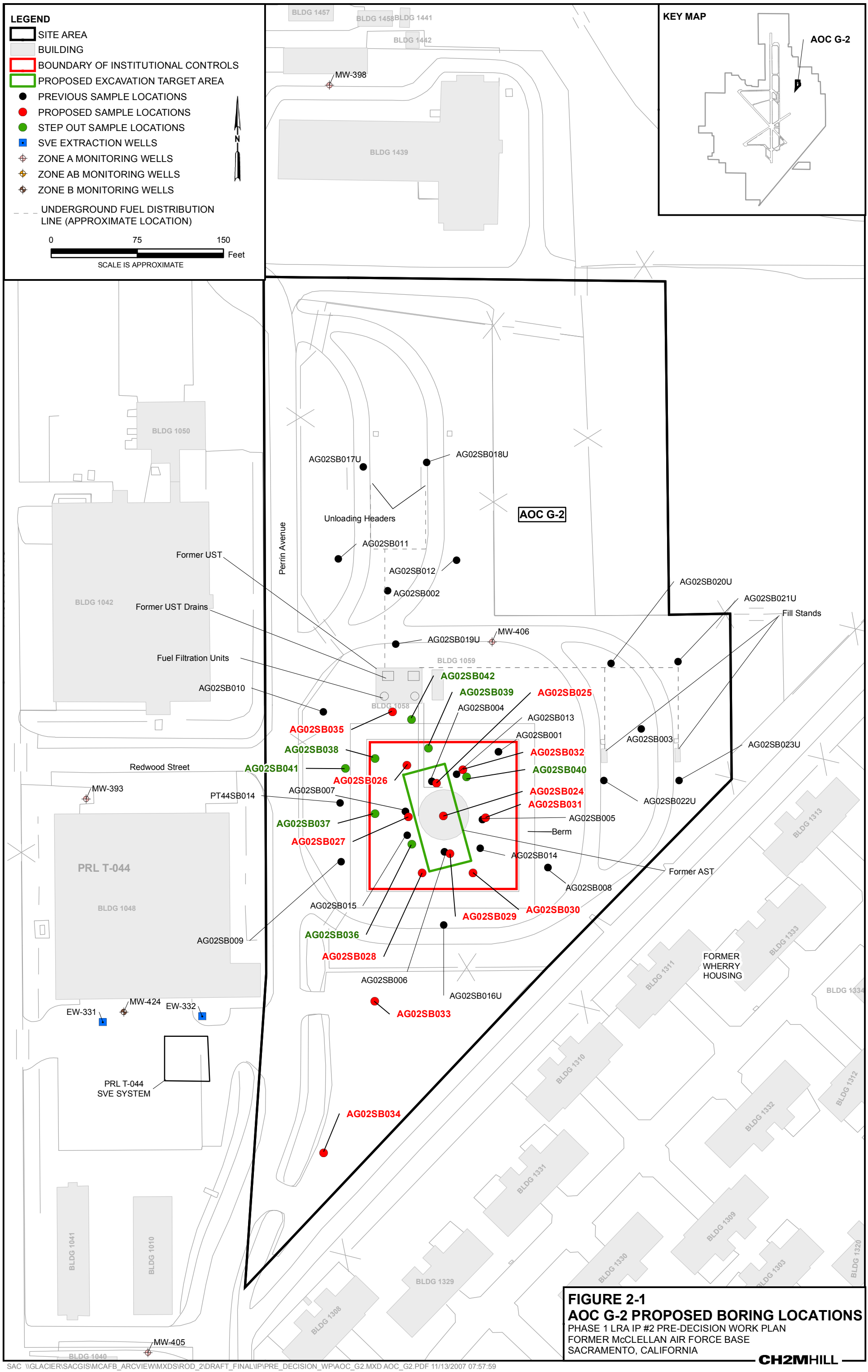

FIGURE 2-1
AOC G-2 PROPOSED BORING LOCATIONS
PHASE 1 LRA IP #2 PRE-DECISION WORK PLAN
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

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TABLE 2-6
Proposed Sampling for AOC H-12
Phase 1 LRA Initial Parcel Remedial Action Work Plan #2

Proposed Borings	Rationale	Sample Depth* (feet bgs)	Media	Analyses
AH12SB010	Determine if SSG is contaminated with VOCs near previous boring AH12SB001, where chloroform was previously detected at 20 feet bgs at a concentration above the industrial use screening level. Collect data to support a START analysis. Determine the extent of mercury and PCB soil contamination along the ditch.	0.5 and 2	Soil	SW7471 (Mercury) SW8082 (PCBs)
		5, 15, 40, 60, 80, and 100	Soil gas	TO-15 (VOCs)
AH12SB011	Determine if SSG is contaminated with VOCs east of previous boring AH12SB001.	5 and 15	Soil gas	TO-15 (VOCs)
AH12HA011 to AH12HA024	Determine the extent of mercury and PCB soil contamination along and beneath the ditch. AH12HA016 and AH12HA018 are lateral step-outs from previous hand augers AH12HA004 and AH12HA007, where mercury and/or PCBs were detected in samples at concentrations exceeding cleanup levels. The remaining hand auger borings are evenly dispersed along the ditch.	0.5* and 2	Soil	SW7471 (Mercury) SW8082 (PCBs)

Notes:

* For samples collected beneath concrete or asphalt, sample depths will be measured from the top of first soil.

FDs and MS/MSDs will be collected from soil borings at this site in the following numbers: 1 FDs and 1 MS/MSDs each for SW7471 and SW8082; and 1 FD for TO-15.

Additional step-out and step-down samples may be collected based on sampling results, as discussed in Section 2.2.6.

TABLE 1
Proposed Step-Out Sampling for AOC H-12

Proposed Borings	Rationale	Sample Depth[a] (feet bgs)	Media	Analyses
AH12SB012 to AH12SB015	Define the extent of chloroform contamination found in SSG at AH12SB010 and AH12SB011.	0.5	Soil	SW8082B (PCBs)
	Define the extent of PCB contamination in shallow soil.	5 and 15	Soil gas	TO-15 (VOCs)
AH12SB016	Determine if SSG is contaminated below Building 929.	5 and 15	Soil gas	TO-15 (VOCs)
AH12HA025 to AH12HA031	Define the extent of PCB contamination in shallow soil.	0.5	Soil	SW8082B (PCBs)

Notes:
[a] For samples collected beneath concrete or asphalt, sample depths will be measured from the top of first soil.

TABLE 1
Second Round of Proposed Step-Out Sampling for AOC H-12

Proposed Borings	Rationale	Sample Depth[a] (feet bgs)	Media	Analyses
AH12SB017 to AH12SB020	Determine extent of VOC contamination in shallow soil gas.	5 and 15	Soil gas	TO-15 (VOCs)

TABLE 1
Third Round of Proposed Step-Out Sampling for AOC H-12

Proposed Borings	Rationale	Sample Depth[a] (feet bgs)	Media	Analyses
AH12SB021 to AH12SB023	Determine extent of VOC contamination in shallow soil gas.	5 and 15	Soil gas	TO-15 (VOCs)

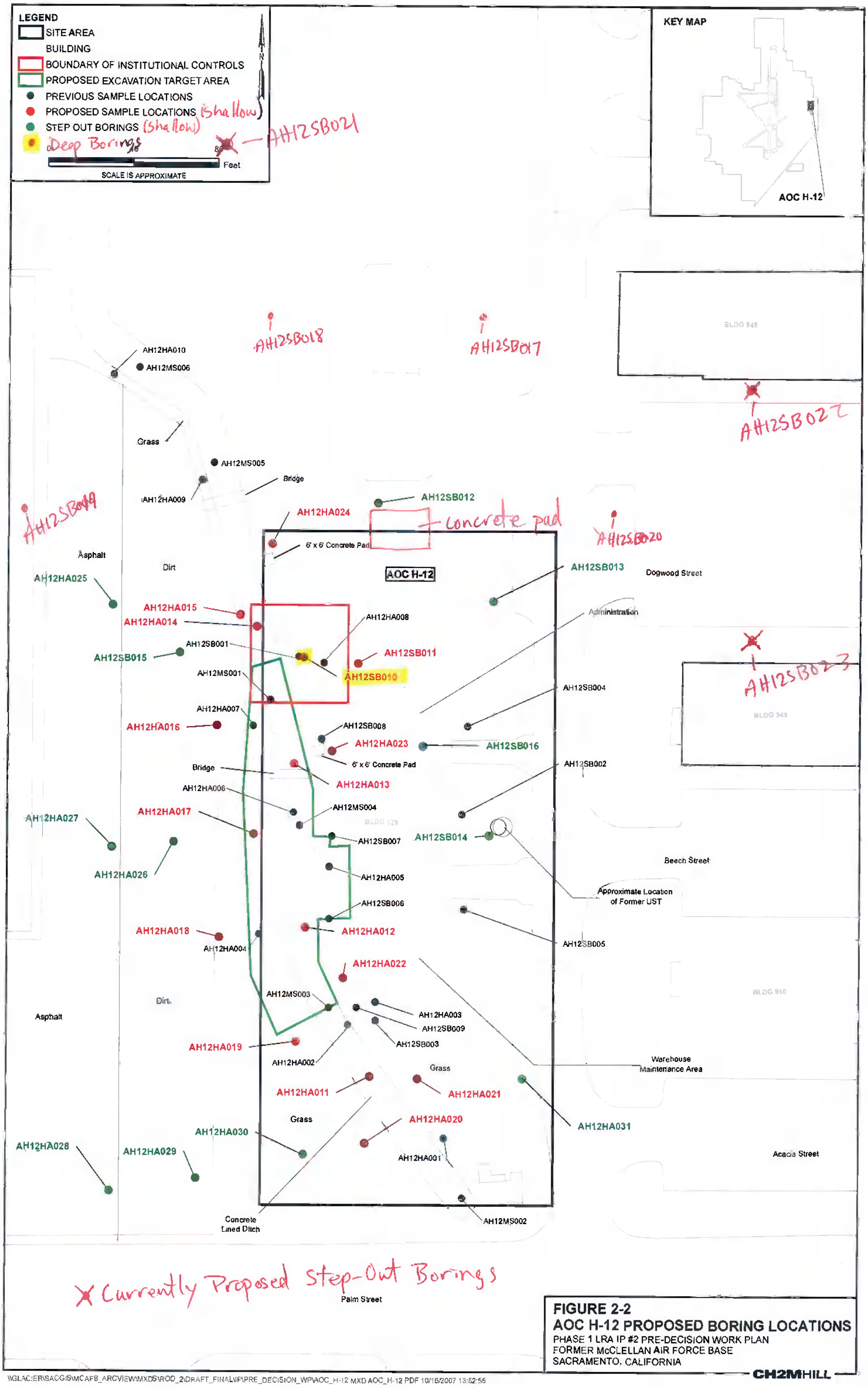

FIGURE 2-2
AOC H-12 PROPOSED BORING LOCATIONS
PHASE 1 LRA IP #2 PRE-DECISION WORK PLAN
FORMER McCLELLAN AIR FORCE BASE
SACRAMENTO, CALIFORNIA

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TABLE 2-9
Proposed Sampling for CS S-049
Phase 1 LRA Initial Parcel #2 Pre-Decision Work Plan

Proposed Borings	Rationale	Sample Depth* (feet bgs)	Media	Analyses
CSS49SB001 to CSS49SB013	Determine if previous excavation removed all of the contaminated soil.	0.5, 3, and 8	Soil	M8015E (TPH-D) SW6020 (Metals) SW8081 (Pesticides) SW8141 (Pesticides) SW8151 (Herbicides) SW8270 (SVOCs) SW8310 (PAHs)

Notes:

* For samples collected beneath concrete or asphalt, sample depths will be measured from the top of first soil.

FDs and MS/MSDs will be collected from soil borings at this site in the following numbers: 5 FDs and 3 MS/MSDs each for M8015E, SW6020, SW8081, SW8141, SW8151, SW8270; and SW8310.

Additional step-out and step-down samples may be collected based on sampling results, as discussed in Section 2.3.6.

Attachment D2
Validated Analytical Data (on CD)

Attachment D3
Boring Logs

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB024**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-02 Tank Farm

ELEVATION: 75.57 NORTHING: 366360.013 EASTING: 2174056.313 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/23/2007 END: 8/23/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0						Bare soil core.
	0.5-1.0		HA		SILTY SAND with GRAVEL (SM). Very dark grayish brown (10YR	Collect AG02SB024-S0.5 at 8:22. OVM = 0.4 - 0.8
1					3/2), damp, medium, dense, fine lithic sand with ~20% silty	ppm in soil, 0.0 ppm in breathing zone.
					fines and 15% fine gravel.	Hand auger to 4.5 ft.
2						Petroleum odor at 2 ft.
						Visibly stained soil 1 to 4 ft.
3						
4						
	4.5-10.0	100%	CC		CLAYEY SAND (SC). Very dark grayish brown (10YR 3/2), damp,	Collect AG02SB024-S05 at 8:44. OVM = 0.0 ppm in
5					loose, fine lithic sand with 25-30% fines.	soil, 0.0 ppm in breathing zone.
6						
7						
8						
					SILT (ML). Grayish brown (10YR 5/2), damp, medium dense,	
9					non-plastic, no dilatancy, massive, trace sand, mottled	
					rusty color.	
10	10.0-15.0	100%	CC		(ML) as above, but very stiff and brown (7.5YR 4/4).	Collect AG02SB024-S10 at 8:48. OVM = 0.5 ppm in
						soil, 0.0 ppm in breathing zone.
11						Petroleum odor 10 to 15 ft.
12						
13						
14						
15						Collect AG02SB024-S15 at 8:55. OVM = 0.0 ppm in
						soil, 0.0 ppm in breathing zone.
16						End of boring at 15 ft. Backfill with grout.
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB025** Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-02 Tank Farm

ELEVATION: 74.86 NORTHING: 366389.018 EASTING: 2174047.948 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/23/2007 END: 8/23/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0						Bare soil surface.
	0.5-1.0		HA		WELL GRADED SAND with SILT and GRAVEL (SW-SM). Brown (7.5YR 5/2), dry, dense, fine to coarse lithic sand, with 15% silty fines and 10-25% well graded gravel.	Collect AG02SB025-S0.5 at 9:16. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone. Hand auger to 5 ft.
1						
2						
3						
4						Petroleum odor during hand auger. OVM = 9.9 - 3.3 ppm in soil, 0.3 ppm in breathing zone.
5	5.0-10.0	100%	CC		SILTY SAND (SM). Brown (7.5YR 5/2), damp, loose, fine sand, ~30% fines, petroleum odor.	Collect AG02SB025-S05 at 9:40. OVM = 26.9 - 31.1 ppm in soil, 0.1 ppm in breathing zone.
6						
7						Visibly stained soil 3 to 9 ft.
					SANDY SILT (ML). Dark gray (7.5YR 4/1), damp, stiff, non-plastic, ~25% fine sand.	Petroleum odor 3 to 15 ft.
8						
9						
10	10.0-15.0	100%	CC		POORLY GRADED SAND with SILT (SP-SM). Brown (7.5YR 4/4), dry, loose, fine subrounded quartz and lithic sand with ~10% silty fines.	Collect AG02SB025-S10 at 9:45. OVM = 23.4 - 30.6 ppm in soil, 0.1 ppm in breathing zone. Drager tube = ND.
11						
12						
13						
14						
15	15.0-17.5	100%	CC		(SP-SM) as above, with ~10-15% fines.	Collect AG02SB025-S15 at 9:50. OVM = 66 - 343 ppm in soil, 0.2 ppm in breathing zone.
16						
17						
	17.5-20.0	100%	CC		POORLY GRADED SAND (SP). Brown (7.5YR 5/2), damp, medium dense, fine quartz and lithic sand, 5-10% fines.	OVM = 16.8 - 34 ppm in soil, 0.0 ppm in breathing zone.
18						
19						
20						Collect AG02SB025-S20 at 14:36. OVM = 0.4 - 3.1 ppm in soil, 0.0 ppm in breathing zone.
21						End of boring at 20 ft. Backfill with gravel.
22						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB026** Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-02 Tank Farm

ELEVATION: 75.08 NORTHING: 366409.449 EASTING: 2174020.005 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/23/2007 END: 8/23/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0						Bare soil surface.
1	1.0-1.5		HA		WELL GRADED SAND with GRAVEL (SM). Brown (7.5YR 5/3), dry, dense, fine to coarse subrounded lithic sand with 20% fine to medium gravel.	Collect AG02SB026-S0.5 at 9:30. OVM = 0 - 1.1 ppm in soil, 0.0 ppm in breathing zone.
2						
3						
4						
5	5.0-10.0	100%	CC		SILT (ML). Brown (7.5YR 5/3), dry to damp, stiff, non-plastic, slow dilatancy, trace sand.	Collect AG02SB026-S05 at 10:03. OVM = 0 - 1 ppm in soil, 0.0 ppm in breathing zone.
6						Visibly stained soil 3 to 10 ft.
7						Petroleum odor 7 to 15 ft.
8						
9						
10	10.0-15.0	100%	CC		(ML) as above, but with odor and very dark gray (7.5YR 3/1) in color.	Collect AG02SB026-S10 at 10:08. OVM = 7.9 - 8.6 ppm in soil, 0.1 ppm in breathing zone.
11						
12					CLAYEY SAND (SC). Brown (7.5YR 5/3), dry, medium to dense, fine to medium lithic sand with 15-25% clayey fines.	
13						
14						
15	15.0-17.5	100%	CC		SILTY SAND (SM). Brown (7.5YR 4/4), damp, medium dense, fine sand.	Collect AG02SB026-S15 at 10:12. OVM = 5.6 - 7.7 ppm in soil.
16						
17						
	17.5-20.0	100%	CC		POORLY GRADED SAND (SP). Brown (7.5 5/3), damp, loose, fine	OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
18					quartz sand, with trace fines.	OVM = 0.5 - 1.1 ppm in soil.
19						OVM = 5.5 - 8.6 ppm in soil.
20	20.0-22.5	100%	CC			
21					SANDY SILT (ML). Brown (7.5YR 4/2), damp, stiff, non-plastic.	
22						Collect AG02SB026-S22.5 at 14:10. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone. End of boring at 22 ft. Backfill with grout.
23						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB027**

Sheet 1 of 5

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: North of intersection at Perrin and Redwood

ELEVATION: 74.94 NORTHING: 366355.149 EASTING: 2174027.367 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/23/2007 END: 8/23/2007 LOGGER: Rob Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0						Collect AG02SB027-S0.5 and duplicate at 9:55. OVM = 315 ppm in soil.
1			HA		SANDY SILT (ML). Greenish gray (10B 6/1), moist silt with ~30-40% very fine sand.	Green stained soil.
2						Visibly stained soil 1 to 13 ft.
3						
4						
5	5.0-6.5	1.5	SS	2-6-8	SILT with SAND (ML). Greenish gray (10B 6/1), moist, firm silt with very fine sand.	Stop drilling frequently to let fumes dissipate when breathing zone reaches OVM = 4 - 9 ppm. Collect AG02SB027-S05 and QC samples at 11:02. Collect AG02SB027-G05 at 10:45.
6						
7						
8						
9						
10	10.0-11.5	1.5	SS	4-8-20	SILT with SAND (ML). Greenish gray (10B 6/1), moist, stiff silt with very fine sand.	Collect AG02SB027-S10 at 11:19. OVM = 20 ppm at auger opening. Appears to be gray hardpan in sample at bottom - 11.5 ft. Drager tube = ND for Benzene.
11						
12						
13						
14						
15	15.0-16.5	1.5	SS	8-11-12	SANDY SILT (ML). Yellowish brown (10YR 5/4), dry, firm silt with ~30% very fine sand.	OVM = 14 ppm at auger opening. Red soil in sample. Collect AG02SB027-G15 at 11:13. Collect AG02SB027-S15 at 12:00.
16						
17						
18						
19						
20	20.0-21.5	1.5	SS	4-10-12	SANDY SILT (ML). Light olive brown (2.5Y 5/4), dry, firm silt with ~40-50% very fine sand.	OVM = 10 ppm at auger opening.
21						
22						
23						
24						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB027**

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: North of intersection at Perrin and Redwood

ELEVATION: 74.94 NORTHING: 366355.149 EASTING: 2174027.367 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/23/2007 END: 8/23/2007 LOGGER: Rob Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
25	25.0-26.5	1.5	SS	6-11-14	(ML) as above, but laminated with iron staining.	OVM = 2 - 4 ppm on fresh cuttings, 2.0 ppm in breathing zone.
26						
27						
28						
29						
30	30.0-31.5	1.5	SS	3-9-13	SANDY SILT (ML). Light yellowish brown (2.5Y 6/4), dry, firm to stiff silt with ~30% with fine sand.	OVM = 2 - 3 ppm on fresh cuttings, OVM = 2 - 3 in breathing zone.
31						
32						
33						
34						
35	35.0-36.5	1.5	SS	5-7-12	SILTY SAND (SM). Light yellow brown (2.5Y 6/4), dry, medium dense, fine sand with ~30% silt.	
36						
37						
38						
39						
40	40.0-41.5	1.5	SS	5-7-10	SILTY SAND (SM). Light yellowish brown (2.5Y 6/4), dry, medium dense, fine sand with ~15-20% silt.	Collect AG02SB027-G40 and duplicate at 12:54 and 12:55. OVM = 0.0 ppm on fresh sample, 0.0 ppm in breathing zone.
41						
42						
43						
44						
45	45.0-46.5	1.0	SS	7-11-12	SANDY SILT (ML). Light yellowish brown (10YR 6/4), dry, stiff silt.	OVM = 0.0 ppm on fresh sample, 0.0 ppm in breathing zone.
46						
47						
48						
49						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB027**

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: North of intersection at Perrin and Redwood

ELEVATION: 74.94 NORTHING: 366355.149 EASTING: 2174027.367 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/23/2007 END: 8/23/2007 LOGGER: Rob Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
50	50.0-51.5	1.5	SS	3-6-9	(ML) as above, SANDY SILT.	OVM = 0.0 ppm on fresh sample, 0.0 ppm in breathing zone.
51						
52						
53						
54						
55	55.0-56.5	1.5	SS	6-10-12	SILT (ML). Light yellowish brown (10YR 6/4), dry. SILTY SAND (SM). Light yellowish brown (2.5Y 6/4), dry, medium dense fine sand with silt.	
56						
57						
58						
59						
60	60.0-61.5	1.5	SS	6-8-9	SANDY SILT (ML). Light yellowish brown (10YR 6/4), dry, firm silt with ~30-40% very fine sand.	Collect AG02SB027-G60 at 13:27.
61						
62						
63						
64						
65	65.0-66.5	1.5	SS	5-10-14	SANDY SILT (ML). Pale olive (5Y 6/3), dry, stiff silt with ~30-40% very fine sand, root marked.	OVM = 0.0 ppm on greenish sample, 0.0 ppm in breathing zone.
66						
67						
68						
69						
70	70.0-71.5	1.5	SS	6-11-13	(ML) as above, SANDY SILT.	
71						
72						
73						
74						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB027**

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: North of intersection at Perrin and Redwood

ELEVATION: 74.94 NORTHING: 366355.149 EASTING: 2174027.367 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/23/2007 END: 8/23/2007 LOGGER: Rob Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
75	75.0-76.5	1.5	SS	3-9-12	(ML) as above, SANDY SILT.	OVM = 2 - 3 ppm in fresh cuttings, 0.0 ppm in breathing zone.
76						
77						
78						
79						
80	80.0-81.5	1.5	SS	7-12-12	SILT with SAND (ML). Olive gray (5Y 5/2), dry to moist silt with ~15-20% very fine sand.	OVM = 0.0 ppm on fresh sample, 0.0 ppm in breathing zone. Collect AG02SB027-G80 at 14:06.
81						
82						
83						
84						
85	85.0-86.5	1.5	SS	6-10-13	(ML) as above, SILT with SAND.	
86						
87						
88						
89						
90	90.0-91.5	1.5	SS	3-9-13	SANDY SILT (ML). Olive gray (5Y 5/2), moist to dry, stiff silt with ~30% very fine sand.	
91						
92						
93						
94						
95	95.0-96.5	1.5	SS	4-7-10	SANDY SILT (ML). Light olive brown (2.5Y 5/3), dry, stiff silt with very fine sand.	OVM = 0.0 ppm on fresh sample, 0.0 ppm in breathing zone.
96						
97						
98						
99						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB027**

Sheet 5 of 5

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: North of intersection at Perrin and Redwood

ELEVATION: 74.94 NORTHING: 366355.149 EASTING: 2174027.367 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/23/2007 END: 8/23/2007 LOGGER: Rob Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
100	100.0-101.	1.5	SS	6-4-15	SANDY SILT (ML). Yellowish brown (10YR 5/4), moist, stiff silt with ~30% very fine sand.	Collect AG02SB027-G100 at 14:43.
101						
102						
103						
104						
105	105.0-106.	1.5	SS	5-15-17	SANDY SILT (ML). Light yellowish brown (2.5Y 6/3), moist, stiff silt with ~30% very fine sand.	OVM = 0.0 ppm on fresh sample, 0.0 ppm in breathing zone.
106						
107						
108						
109						
110	110.0-111.	1.5	SS	3-8-14	SILTY SAND (SM). Light yellowish brown (10YR 6/4), moist to wet, fine to medium sand with silt and some clay.	
111						
112						
113						
114						
115	115.0-116.	1.5	SS	6-14-16	SANDY SILT (ML). Light yellowish brown (10YR 6/4), moist, stiff silt with 30-40% fine sand.	Collect AG02SB027-GW and QC samples at 15:30.
116						
117						
118						
119						
120						End of boring at 120 ft. Backfil with grout.
121						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB028** Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-02 Tank Farm

ELEVATION: 74.86 NORTHING: 366314.535 EASTING: 2174039.256 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/23/2007 END: 8/23/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Gravel surface.	Bare soil.
	0.5-1.0		HA			Collect AG02SB028-S0.5 at 10:30. OVM = 0.0 ppm in
1					WELL GRADED SAND with SILT (SW-SM). Brown (7.5YR 4/4),	soil, 0.0 ppm in breathing zone.
					moist, medium dense, fine to medium lithic sand, trace	
2					coarse sand and fine gravel, ~10% silty fines.	
3						
4						
5	5.0-10.0	100%	CC		SILTY SAND (SM). Brown (7.5YR 4/4), moist, medium dense,	Collect AG02SB028-S05 at 10:50. OVM = 0.0 ppm in
					fine sand.	soil, 0.0 ppm in breathing zone.
6						
7						
8						
					SILT (ML). Gray (7.5YR 5/1), moist to damp, stiff,	
9					non-plastic, massive, no to slow dilatancy, no dry	
					strength, no odor, no sand.	
10	10.0-14.0	0%	CC			
11						
12						
					No recovery.	
13						
14	14.0-18.0	100%	CC			Collect AG02SB028-S14 at 11:10. OVM = 0.0 ppm in
						soil, 0.0 ppm in breathing zone.
15					POORLY GRADED SAND (SP). Brown (7.5YR 4/4), damp, loose	
					fine subrounded quartz lithic sand, ~5%-10% fines.	
16						
17						
18						Collect AG02SB028-S18 hold at 11:24.
						End of boring at 18 ft. Backfill with grout.
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB028**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-02 Tank Farm

ELEVATION: 74.86 NORTHING: 366314.535 EASTING: 2174039.256 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/23/2007 END: 8/23/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Gravel surface.	
	0.5-1.0		HA			Collect AG02SB028-S0.5 at 10:30. OVM = 0.0 ppm in
1					WELL GRADED SAND with SILT (SW-SM). Brown (7.5YR 4/4),	soil, 0.0 ppm in breathing zone.
					moist, medium dense, fine to medium lithic sand, trace	
2					coarse sand and fine gravel, ~10% silty fines.	
3						
4						
5	5.0-10.0	100%	CC		SILTY SAND (SM). Brown (7.5YR 4/4), moist, medium dense,	Collect AG02SB028-S05 at 10:50. OVM = 0.0 ppm in
					fine sand.	soil, 0.0 ppm in breathing zone.
6						
7						
8						
					SILT (ML). Gray (7.5YR 5/1), moist to damp, stiff,	
9					non-plastic, massive, no to slow dilatancy, no dry	
					strength, no odor, no sand.	
10	10.0-14.0	0%	CC			
11						
12						
					No recovery.	
13						
14	14.0-18.0	100%	CC			Collect AG02SB028-S14 at 11:10. OVM = 0.0 ppm in
						soil, 0.0 ppm in breathing zone.
15					POORLY GRADED SAND (SP). Brown (7.5YR 4/4), damp, loose	
					fine subrounded quartz lithic sand, ~5%-10% fines.	
16						
17						
18						Collect AG02SB028-S18 hold at 11:24.
						End of boring at 18 ft. Backfill with grout.
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB029**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-2

ELEVATION: 74.73 NORTHING: 366330.139 EASTING: 2174064.222 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/28/2007 END: 8/28/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0						Bare soil and gravel surface.
	0.5-1.0		HA		WELL GRADED SAND with SILT and GRAVEL (SW-SM). Brown (7.5YR 4/3), damp, loose to medium, fine to coarse subrounded lithic sand with 10-15% fines and 15% fine medium gravel.	Collect AG02SB029-S0.5 at 10:00. OVM = 2.1 ppm in soil, 0.0 ppm in breathing zone.
1						
2						
3						
4						Hand auger to 3.5 ft.
						Drive soil gas probe to 5 ft.
5	5.0-7.5	100%	CC		SILTY SAND (SM). Gray to brown (7.5YR 5/1 to 5/2), damp to moist, fine to medium subrounded quartz sand with 10-25% fines, strong odor.	Collect gas sample, AG02SB029-G05 at 10:26, collect soil sample AG02SB029-S05 at 10:35. OVM = 388 ppm in soil gas, 0.0 ppm in breathing zone.
6						
7						
	7.5-10.0	100%	CC			
8						
9					SANDY SILT (ML). Grayish brown (10YR 5/2), damp, stiff, non-plastic, no dry strength, ~20-40% fine sand, moderate petrolum odor.	OVM = 10.6 ppm in soil, 0.1 ppm in breathing zone.
10	10.0-12.5	100%	CC			Collect AG02SB029-S10 at 10:40. OVM = 0.1 ppm in soil, 0.0 ppm in breathing zone.
11						
12						
					SILTY SAND (SM). Brown (7.5YR 4/3), damp, dense, fine quartz sand with 20-30% silty fines, no odor.	Drive soil gas probe 13 - 15 ft.
13						
14						
15	15.0-16.0	100%	CC			Collect gas sample, AG02SB029-G15 at 10:53, collect soil sample, AG02SB029-S15 at 11:07. OVM = 1.9 ppm in soil, 0.0 ppm in breathing zone.
16						End of boring at 16 ft. Backfill with grout.
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB030** Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-02 Tank Farm

ELEVATION: 75.14 NORTHING: 366315.099 EASTING: 2174083.269 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/23/2007 END: 8/23/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0						Gravel surface.
	0.5-1.0		HA		WELL GRADED GRAVEL with SILT (GW-GM). Gray (7.5YR 4/1),	Collect AG02SB030-S0.5 at 12:38. OVM = 0.2 - 0.5
1					dry, dense, with abundant sand and fines.	ppm in soil, 0.0 ppm in breathing zone.
2						
3						
					SILTY SAND (SM). Strong brown (7.5YR 5/6), damp, dense,	
4	4.0-7.5	100%	CC		fine to medium subrounded sand with ~20% fines.	
5						Collect AG02SB030-S05 at 12:45. OVM = 0.0 - 0.2
						ppm in soil, 0.0 ppm in breathing zone.
6						
7					SILT with SAND (ML). Gray (7.5YR 6/1), damp, stiff,	
	7.5-10.0	100%	CC		non-plastic, dry strength, ~15-25% fine sand.	
8						
9						
10	10.0-12.5	100%	CC		POORLY GRADED SAND (SP). Brown (7.5YR 5/3), dry, loose,	Collect AG02SB030-S10 at 12:55. OVM = 0.0 ppm in
					fine quartz sand, trace fines.	soil, 0.0 ppm in breathing zone.
11						
12						
	12.5-15.0	100%	CC		SILTY SAND (SM). Brown (7.5YR 4/3), moist, dense, fine	
13					quartz sand.	
14						
15						Collect AG02SB030-S15 at 13:10. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
						End of boring at 15 ft. Backfill with grout.
16						
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB031** Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-02 Tank Farm

ELEVATION: 74.96 NORTHING: 366356.165 EASTING: 2174090.821 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/23/2007 END: 8/23/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Gravel at surface.	Gravel soil cover.
1	1.0-1.5		HA		SILTY SAND (SM). Reddish brown (5YR 4/9), moist, dense, fine subrounded quartz sand, ~20-25% fines.	Collect AG02SB031-S0.5 at 13:30. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
2						
3						
4						
	4.5-7.5	100%	CC			Collect AG02SB031-S05 at 13:36. OVM = 0.0 ppm in
5					SILT with SAND (ML). Gray (7.5YR 5/1), damp, stiff, non-plastic, slow dilatency, ~25% fine sand.	soil, 0.0 ppm in breathing zone.
6						
7						
	7.5-10.0	100%	CC			
8						
9						
					Poorly graded fine sand layer at 9 to 10 ft.	
10	10.0-12.5	100%	CC		CLAYEY SAND (SC). Reddish brown (5YR 4/4), damp, dense, fine to medium subrounded lithic sand, trace coarse sand,	Collect AG02SB031-S10 at 13:40. OVM = 0.0 - 0.1 ppm in soil, 0.0 ppm in breathing zone
11					trace gravel, ~25-35% fines.	
12						
	12.5-15.0	100%	CC			
13					SILTY SAND (SM). Brown (7.5YR 5/3), damp, medium dense, fine quartz lithic sand, ~15-30 silty fines.	
14						
15						Collect AG02SB031-S15 at 13:46. OVM = 0.0 - 0.2 ppm in soil, 0.0 ppm in breathing zone.
						End of boring at 15 ft. Backfill with grout.
16						
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB032**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-2

ELEVATION: 74.74 NORTHING: 366397.683 EASTING: 2174072.646 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/28/2007 END: 8/28/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0						
	0.5-1.0		HA		WELL GRADED SAND with SILT and GRAVEL (SW-SM). Brown (7.5YR 4/3), dry, dense, fine to coarse subrounded lithic with ~15-25% fines, medium gravel, ~15% fines, petroleum odor below 2 ft.	Collect AG02SB032-S0.5 at 11:18. OVM = 0.0 ppm in soil.
1						
2						
3						
4						Hand auger to 3.5 ft. Push soil gas probe 3.5 - 5 ft.
5	5.0-7.5	100%	CC		CLAYEY SAND (SC). Dark brown (7.5YR 3/3), damp, loose, fine sand with 20-40% plastic fines, mild odor.	Collect gas sample, AG02SB032-G05 at 11:46. OVM = 783 ppm in soil gas, 0.0 ppm from hole = 8.3 ppm for soil..
6						
7						
	7.5-10.0	100%	CC		SILT (ML). Gray (7.5YR 5/1), damp, stiff, non-plastic, no dry strength, trace fine sand, no odor.	OVM = 11.3 ppm in soil.
8						
9						
10	10.0-13.0	100%	CC			Collect, AG02SB032-S10 and duplicate at 12:00. OVM = 4.2 - 4.7 ppm in soil, 0.0 ppm in breathing zone.
11					SILTY SAND (SM). Brown (7.5YR 4/4), damp, medium dense, fine quartz and lithic sand, ~10-20% fines, no odor.	
12						
13						Push soil gas probe 13 - 15 ft.
14						
15	15.0-15.5	100%	CC		(SM) as above, SILTY SAND.	Collect gas sample, AG02SB032-G15 at 12:13, collect soil sample, AG02SB032-S15 hold at 12:21. OVM = 83.9 ppm in soil gas, 0.8 ppm in soil, 0.0 ppm in breathing zone.
16						End of boring at 15.5 ft. Backfill with grout.
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB033**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-2

ELEVATION: 74.43 NORTHING: 366197.860 EASTING: 2173995.042 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/29/2007 END: 8/29/2007 LOGGER: Travis Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.3		HA		Surface cover a mixture of gravel and degraded asphalt.	
1					SILTY SAND with GRAVEL (SM). Yellowish brown (10YR 5/8), dry, fine to coarse, well graded, angular to subround,	OVM = 0.0 ppm in borehole, 0.0 ppm in breathing zone.
2					medium plastic fines, ~35% fines.	
3	3.0-5.0	90%	CC		SILTY SAND (SM). Strong brown (7.5YR 4/6), moist, fine to coarse, well graded, medium plastic fines, ~40% fines,	Push soil gas probe 3 - 5 ft.
4					medium density sand.	
5	5.0-7.5	100%	CC		SANDY SILT (ML). Pinkish gray (7.5YR 6/2), moist, fine to medium sand, low plasticity, rapid dilatancy, soft	Sample soil gas AG02SB033-G05 at 8:15. OVM = 77.6 ppm in soil gas.
6					consistency, iron oxide staining, ~40% sand.	
7						VOCs in cuttings = 0.0 ppm.
	7.5-10.0	100%	CC			VOCs in cuttings = 0.0 ppm.
8					SILTY SAND (SM). Brown (7.5YR 5/3), moist, fine to medium, poorly graded, non-plastic fines, weak cementation, ~30%	
9					fines.	
10	10.0-13.0	100%	CC		SILT with SAND (ML). Brown (7.5YR 5/3), damp, firm, fine grained sand, medium plasticity, rapid dilatancy, iron	VOCs in cuttings = 0.0 ppm.
11					oxide staining, ~25% fine sand.	
12						
13	13.0-15.0	0%				Push soil gas probe 13 - 15 ft.
14						
15					No core at 15 ft.	Soil gas smple AG02SB033-G15 and G15B at 9:34, 15 ft. bgs. OVM = 22.8 ppm in soil gas, 0.0 ppm in breathing zone. End of boring at 15 ft. Backfill with grout.
16						
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB034**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-2

ELEVATION: 73.90 NORTHING: 366064.375 EASTING: 2173953.673 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/28/2007 END: 8/28/2007 LOGGER: Travis Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-1.5	100%	HA		Gravel degraded, asphalt surface eroding.	
1						
	1.5-3.5	100%	HA		SILTY SAND with GRAVEL (SM). Yellowish red (5YR 5/6), dry,	
2					fine grain, poorly graded, rounded to subangular,	
					non-plastic fines, ~25% fines, ~15% gravel.	
3					SILTY SAND (SM). Brown (7.5YR 5/3), damp, medium to coarse, poorly graded, non-plastic fines, weak cementation, iron oxide staining, ~30% fines.	
	3.5-8.0	100%	CC		Color change to strong brown (7.5YR 4/4).	Push soil gas probe 3.5 - 5 ft.
4						
5						Soil gas sample AG02SB034-G05 at 14:12. OVM = 207 ppm in soil gas, 0.1 ppm in breathing zone.
6						
					Color change to brown (10YR 5/3), grain size decreasing to	OVM = 0.1 ppm in breathing zone.
7					fine, cementation increasing to moderate.	
8	8.0-10.0	100%	CC			
9					WELL GRADED SAND with SILT (SW-SM). Grayish brown (10YR	OVM = 0.0 ppm in breathing zone.
					5/2), damp, fine to coarse, medium density, weak	
10	10.0-13.0	100%	CC		cementation, ~10% fines.	
11					SILTY SAND (SM). Strong brown (7.5YR 4/6), moist, medium to	
					coarse, poorly graded, low plastic fines, moderate	
12					cementation, 45% fines.	
13	13.0-15.0	0%			No core at 15 ft.	Push soil gas probe 13 - 15 ft.
14						
15						Soil gas sample, AG02SB034-G15 at 14:59 and AG02SB034-G15B at 14:59. OVM = 75.6 ppm in soil gas, 0.1 - 0.5 ppm in breathing zone.
16						End of boring at 15 ft.
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB035**

Sheet 1 of 5

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: North of intersection at Perrin and Redwood

ELEVATION: 75.53 NORTHING: 366445.398 EASTING: 2174008.833 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/22/2007 END: 8/23/2007 LOGGER: T. Young & R. Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Grass and bare soil surface.	
0	0.0-0.5		HA		SILTY SAND with GRAVEL (SM). Yellowish red (5YR 4/6), dry, fine to coarse grained, subround to angular, low plasticity fines, weak cementation, ~30% gravel.	OVM = 1.1 ppm in breathing zone.
1						
2						
3						
4					SILTY SAND (SM). Dark reddish brown (5YR 3/2), damp, fine grained sand, poorly graded, loose, plastic fines, weak cementation, ~35% fines.	
5	5.0-6.5	1.5	SS	1-1-4	Sand grain size increasing to medium to coarse.	Soil gas sample, AG02SB035-G05 at 13:57 at 5 ft. bgs.
6						
7						
8						
9						
10	10.0-11.5	1.5	SS	40-10-13	SILT with SAND (ML). Brown (7.5YR 5/3), dry, fine grained sand, medium plasticity, rapid dilatancy, low toughness, iron oxide staining, 25% sand.	OVM = 1.4 ppm in breathing zone.
11						
12						
13						
14						
15	15.0-16.5	1.5	SS	5-9-15	SILTY SAND (SM). Yellowish brown (10YR 5/6), dry, fine to medium, poorly graded, medium dense, non-plastic fines, weak cementation, iron oxide staining.	Soil gas sample, AG02SB035-G15 at 14:20, 15 ft. bgs. OVM = 1.6 ppm at borehole, 1.6 ppm in breathing zone.
16						
17						
18						
19						
20	20.0-21.5	1.5	SS	5-10-13	POORLY GRADED SAND (SP). Brown (10YR 4/3), dry, medium dense, medium grained, subround to angular, weak cementation.	OVM = 1.6 ppm in breathing zone.
21						
22						
23						
24						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: AG02SB035

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: North of intersection at Perrin and Redwood

ELEVATION: 75.53 NORTHING: 366445.398 EASTING: 2174008.833 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/22/2007 END: 8/23/2007 LOGGER: T. Young & R. Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
25	25.0-26.5	1.5	SS	6-11-10	SILTY SAND (SM). Yellowish brown (10YR 5/4), dry, fine to medium, loose, poorly graded, low plastic fines, moderate cementation, iron oxide staining.	
26						
27						
28						
29						
30	30.0-31.5	1.5	SS	8-12-13	POORLY GRADED SAND (SP). Brown (7.5YR 4/3), damp, medium dense, medium to coarse grain, ~4% fines.	OVM = 2.0 ppm in breathing zone.
31						
32						
33						
34						
35	35.0-36.5	1.5	SS	11-13-17	SILTY SAND (SM). Brown (7.5YR 5/2), moist, fine to medium, medium dense, poorly graded, low plasticity fines, weak cementation, iron oxide staining, ~20% fines.	OVM = 2.1 ppm in breathing zone.
36						
37						
38						
39						
40	40.0-41.5	1.5	SS	6-13-15	Fine grained fines, increasing to 30-40%, medium dense sand.	Soil gas sample, AG02SB035-S40 at 13:08, 40 ft bgs.
41						
42						
43						
44						
45	45.0-46.5	1.5	SS	3-10-16	WELL GRADED SAND (SW). Dark brown (7.5YR 3/3), damp, medium dense, fine to coarse, weak cementation, black staining, medium density.	OVM = 2.0 ppm in breathing zone.
46						
47						
48						
49						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB035**

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: North of intersection at Perrin and Redwood

ELEVATION: 75.53 NORTHING: 366445.398 EASTING: 2174008.833 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/22/2007 END: 8/23/2007 LOGGER: T. Young & R. Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
50	50.0-51.5	1.6	SS	8-15-18	SILTY SAND (SM). Yellowish red (5YR 5/8), dry, medium dense, fine grained, poorly graded, medium density, low plasicity fines, ~25% fines.	
55	55.0-56.5	1.8	SS	3-9-10	POORLY GRADED SAND with SILT (SP-SM). Yellowish brown (10YR 5/4), damp, fine, medium dense, non-plastic fines, weak cementation, ~8-10% fines.	
60	60.0-61.5	1.8	SS	6-8-4	SILTY SAND (SM). Light olive brown (2.5Y 5/3), damp, fine to medium, poorly graded, loose sand, weak cementation, ~15% fines.	Soil gas sample, AG02SB035-G60 at 15:45, 60 ft. bgs. OVM = 2.1 ppm in breathing zone.
65	65.0-66.5	1.9	SS	3-7-16	SILT (ML). Light yellowish brown (2.5Y 6/3), dry, stiff silt.	
70	70.0-71.5	2.0	SS	6-5-12	POORLY GRADED SAND (SP). Brown (10YR 5/3), dry, medium dense, fine to medium sand.	

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB035**

Sheet 4 of 5

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: North of intersection at Perrin and Redwood

ELEVATION: 75.53 NORTHING: 366445.398 EASTING: 2174008.833 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/22/2007 END: 8/23/2007 LOGGER: T. Young & R. Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
75	75.0-76.5	2.0	SS	6-14-15	SILT (ML). Grayish brown (2.5Y 5/2), dry to moist, stiff silt with some sand.	
80	80.0-81.5	2.0	SS	3-10-10	SILT (ML). Grayish brown (2.5Y 5/2), dry to moist, firm silt with some sand massive.	Soil gas sample, AG02SB035-G80 at 16:26, 80 ft. bgs.
						Resume drilling 8/23/2007.
85	85.0-86.5	1.5	SS	4-8-13	SILT (ML). Grayish brown (2.5Y 5/2), dry, stiff silt, weakly cemented, root marked, some iron staining. SILTY SAND (SM). Light yellowish brown (10YR 6/4), dry, medium dense, fine sand with silt.	
90	90.0-91.5	1.5	SS	4-9-15	SILT (ML). Light olive brown (2.5Y 5/4), dry, firm silt. SILTY SAND (SM). Yellowish brown (10YR 5/4), dry to moist medium dense, fine sand with silt.	Interbedded silts on silty sands, silt root marked with iron staining.
95	95.0-96.5	1.5	SS	5-7-8	SANDY SILT (ML). Light yellowish brown (2.5Y 6/4), moist firm silt with ~30% very fine sand, some laminations.	

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB035**

Sheet 5 of 5

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: North of intersection at Perrin and Redwood

ELEVATION: 75.53 NORTHING: 366445.398 EASTING: 2174008.833 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/22/2007 END: 8/23/2007 LOGGER: T. Young & R. Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
100	100.0-101.	1.5	SS	4-6-10	LEAN CLAY with SAND (CL). Light olive brown (2.5Y 5/3), moist, firm clay with silt and sand, ~20% fine.	Soil gas sample, AG02SB035-G100 at 8:46.
101						End of boring at 101.5 ft.
102						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB036** Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-2

ELEVATION: 75.02 NORTHING: 366333.425 EASTING: 2174028.095 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/10/2007 END: 10/10/2007 LOGGER: E. Haas

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0						OVM = 0.0 ppm in breathing zone. Collect AG02SB036-S0.5 and S0.5B at 10:25.
1						
2						
3					LEAN CLAY (CL). Very dark brown (7.5YR 2.5/3), stiff, medium plasticity, no staining, slight petroleum odor.	
4						
5	5.0-9.0	100%	CC			OVM = 7.3 ppm in head space. Petroleum odor. Collect AG02SB036-S05 at 10:50.
6						
7					SILT (ML). Dark grayish brown (10YR 4/2), dry, medium stiff, non-plastic, petroleum staining and odor.	OVM = 0.0 ppm in breathing zone, 16.3 ppm in head space. Petroleum odor.
8						
9	9.0-14.0	100%	CC			
10						OVM = 0.0 ppm in breathing zone, 12.8 ppm in head space.
11						
12					SANDY SILT (SM). Yellowish brown (10YR 5/8), dry, soft, non-plastic, ~30% fine sand, no odor.	OVM = 0.0 ppm in breathing zone.
13						
14						Collect AG02SB036-S14 at 11:05.
15						End of boring at 14 ft.
16						
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB037**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-2

ELEVATION: 74.85 NORTHING: 366363.711 EASTING: 2173997.751 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/9/2007 END: 10/9/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-4.0	100%	HA		SILTY SAND with GRAVEL (SM). Brownish yellow (10YR 6/6), dry, loose, homogenous, fine to medium sand, poorly graded, non-plastic fines, angular to subround gravel up to 1/2". (20% gravel, 40% sand, 40% fines)	Surface covering is bare soil. Collect AG02SB037-S0.5 at 09:35. OVM = 0.0 ppm in breathing zone.
1						
2						
3					SILTY SAND (SM). Strong brown (7.5YR 4/6), damp, weak cementation, homogenous, fine to medium sand, poorly	OVM = 0.0 ppm in breathing zone.
4	4.0-5.0	100%	CC		graded, low plastic fines, layers of gray (7.5YR 5/1), stained silty sand up to 2/3" thick, at 4 ft. staining stops at 5 ft.	
5	5.0-10.0	100%	CC		(0% gravel, 60% sand, 40% fines)	Collect AG02SB037-S05 at 09:59.
6						OVM = 0.0 ppm in breathing zone.
7						
8					Trace amounts of gray staining from 7 to 9 ft. interval.	
9					POORLY GRADED SAND with SILT (SP-SM). Light brownish gray (10YR 6/2), damp, loose, homogenous, fine sand, poorly	OVM = 0.0 ppm in breathing zone.
10	10.0-15.0	100%	CC		graded. (0% gravel, 90% sand, 10% fines)	Collect AG02SB037-S10 at 10:02.
11					SANDY SILT (ML). Pale brown (10YR 6/3), damp, firm, fine sand, non-plastic fines, rapid dilatancy, iron oxide staining.	OVM = 0.0 ppm in breathing zone.
12					SILTY SAND (SM). Strong brown (7.5YR 5/8), damp, weak	
13					cementation, homogenous, fine to medium sand, poorly graded, non-plastic fines, iron oxide staining. (0% gravel, 65% sand, 35% fines)	
14						
15						Collect AG02SB037-S15 at 10:07.
16						End of boring at 15 ft.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB038**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-2

ELEVATION: 74.88 NORTHING: 366408.967 EASTING: 2173999.671 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/9/2007 END: 10/9/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-4.0	100%	HA		SILTY SAND with GRAVEL (SM). Brownish yellow (10YR 6/6), dry, loose, homogenous, fine to medium sand, poorly graded, non-plastic fines, angular to rounded gravel up to 1/2". (20% gravel, 40% sand, 40% fines)	Surface covering is bare soil. Collect AG02SB038-S0.5 at 9:05. OVM = 0.0 ppm in breathing zone.
1						
2						
3					SILTY SAND (SM). Brown (7.5YR 4/2), damp, weak cementation, homogenous, fine to medium sand, poorly graded, low plastic	OVM = 0.0 ppm in breathing zone.
4	4.0-5.0	100%	CC		fines, bluish gray (GLEY1 2.5/1) staining from 4 to 6 ft. (0% gravel, 60% sand, 40% fines)	
5	5.0-10.0	100%	CC			Collect AG02SB038-S05 at 9:15. OVM = 0.0 ppm in breathing zone.
6						
7						
8					SANDY SILT (ML). Pale brown (10YR 6/3), damp, firm homogenous, fine sand, low plastic fines, rapid dilatancy,	OVM = 0.0 ppm in breathing zone.
9					iron oxide staining. (0% gravel, 40% sand, 60% fines)	
10						Collect AG02SB038-S10, S10MS and S10SD at 9:25.
11						End of boring 10 ft.
12						
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB039** Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-2

ELEVATION: 74.97 NORTHING: 366419.419 EASTING: 2174035.404 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/9/2007 END: 10/9/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-4.0	100%	HA		SILTY SAND with GRAVEL (SM). Brownish yellow (10YR 6/6), dry, loose, homogenous, fine to medium sand, poorly graded, non-plastic fines, angular to subround gravel up to 3/4". (20% gravel, 40% sand, 40% fines)	Surface covering is bare soil. OVM = 0.0 ppm in breathing zone. Collect AG02SB039-S0.5 at 8:05.
1					SILTY SAND (SM). Strong brown (7.5YR 5/6), dry, loose, homogenous, fine to medium sand, poorly graded, low plastic fines. (5% gravel, 60% sand, 35% fines).	
2						
3						
4	4.0-10.0	100%	CC		Soil staining at 4 ft., hydrocarbon odor, soil staining from 4 to 5 ft.	
5						Collect AG02SB039-S05 at 08:35. OVM = 0.0 ppm in breathing zone.
6						
7					SILTY SAND (SM). Grayish brown (10YR 5/2), moist, fine sand, poorly graded, low plastic fines, laminated with	OVM = 0.0 ppm in breathing zone.
8					1/2mm layers of strong brown (7.5YR 5/6), silty sand, gray hydrocarbon staining and hydrocarbon odor, also iron oxide staining.	
9					(0% gravel, 55% sand, 45% fines)	
10	10.0-15.0	100%	CC			Collect AG02SB039-S10 at 08:45. OVM = 0.0 ppm in breathing zone.
11						
12					SANDY SILT (ML). Strong brown (7.5YR 4/6), moist, soft, homogenous, fine sand, non-plastic fines, rapid dilatancy, iron oxide staining. (0% gravel, 40% sand, 60% fines)	
13						
14						OVM = 0.0 ppm in breathing zone.
15					SILTY SAND (SM). Light yellowish brown (10YR 6/4), moist, weak cementation, homogenous, fine sand, poorly graded, low plastic fines, iron oxide staining. (0% gravel, 60% sand,	Collect AG02SB039-S15 at 08:55.
16					40% fines)	End of soil boring 15 ft.
17						
18						
19						
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB040**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-2

ELEVATION: 75.11 NORTHING: 366399.573 EASTING: 2174075.432 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/10/2007 END: 10/10/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-4.0	100%	HA		SILTY SAND with GRAVEL (SM). Brown (10YR 5/3), moist, loose, homogenous, fine to coarse, poorly graded, angular to subround soil up to 1/2".	Surface cover is bare soil. Collect AG02SB040-S0.5 at 11:20. OVM = 0.0 ppm in breathing zone.
1						
2						
3					SANDY ELASTIC SILT (MH). Dark brown (7.5YR 3/4), damp, soft, homogenous, fine to medium sand, medium plasticity,	
4	4.0-5.0	100%	CC		slow dilatancy, 35% sand.	OVM = 0.0 ppm in breathing zone.
5	5.0-10.0	100%	CC		SANDY SILT (SM). Brown (7.5YR 5/4), weak cementation, fine to medium sand, poorly graded, low plastic fines, iron	
6					oxide staining, ~40% fines.	
7						OVM = 0.0 ppm in breathing zone.
8						
9						
10						Collect AG02SB040-S10 at 11:55.
11						End of boring at 10 ft.
12						
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB041**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-2

ELEVATION: 73.97 NORTHING: 366411.738 EASTING: 2173967.238 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/10/2007 END: 10/10/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-4.0	100%	HA		SILTY SAND (SM). Strong brown (7.5YR 4/6), damp, weak cementation, homogenous, fine to medium sand, poorly graded, low plastic fines. (0% gravel, 60% sand, 40% fines)	Degraded asphalt surface cover. Collect AG02SB041-S0.5 at 14:20. OVM = 0.0 ppm in breathing zone.
1						
2						
3						
4	4.0-10.0	100%	CC			
5						
6						OVM = 0.0 ppm in breathing zone.
7					(SM) as above, but color change to light yellowish brown (10YR 6/4). (0% gravel, 65% sand, 35% fines)	
8						
9						
10					Decreasing silt content. (0% gravel, 75% sand, 25% fines)	Collect AG02SB011-S10 and S10B at 14:30.
11						End of boring at 10 ft.
12						
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AG02SB042**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC G-2

ELEVATION: 75.49 NORTHING: 366444.892 EASTING: 2174020.744 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/10/2007 END: 10/10/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-4.0	100%	HA		SILTY SAND (SM). Strong brown (7.5YR 4/6), dry, loose, homogenous, fine to medium sand, poorly graded, low plastic fines. (5% gravel, 55% sand, 40% fines)	Bare soil vegetative mixture at surface level. Collect AG02SB042-S0.5 at 3:15. OVM = 0.0 ppm in breathing zone.
1						
2					SANDY SILT (ML). Very dark brown (7.5YR 3/1), moist, soft, homogenous, fine to medium sand, medium plastic fines, rapid dilatancy, small lenses of gray (GLEY1 6/1), staining present, slight hydrocarbon odor. (0% gravel, 40% sand, 60% fines)	
3						
4	4.0-10.0	100%	CC			
5						Collect AG02SB042-S05 at 13:30. OVM = 0.0 ppm in breathing zone.
6						
7						
8					SILTY SAND (SM). Strong brown (7.5YR 4/6), damp, weak cementation, homogenous, fine to medium sand, poorly graded, non-plastic fines, no staining, color change to pale brown (10YR 6/3). (0% gravel, 65% sand, 35% fines)	
9						
10	10.0-15.0	100%	CC		SANDY SILT (ML). Very dark brown (7.5YR 3/1), moist, soft, homogenous, fine to medium sand, medium plastic fines, rapid dilatancy, small amount of gray (GLEY1 6/1), staining, slight hydrocarbon odor. (0% gravel, 35% sand, 65% fines)	Collect AG02SB042-S10 at 13:40.
11						
12					SILTY SAND (SM). Brown (10YR 5/3), moist, fine to medium sand, poorly graded, low plastic fines, lenses of strong brown (7.5YR 4/6), silty sand, up to 1/4", no staining. (0% gravel, 55% sand, 45% fines)	
13						
14						
15						Collect AG02SB042-S15 at 13:50.
16						End of boring at 15 ft.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA011**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 75.13 NORTHING: 364478.676 EASTING: 2175712.359 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/22/2007 END: 8/22/2007 LOGGER: Stephanie Moore

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5	100%	HA		WELL GRADED GRAVEL (GW). Gray (7.5YR 5/1), moist, medium dense, subrounded to subangular fine to medium metamorphic gravel with 40% well graded sand.	Gunnite with wire reinforcement - top inch. Collect AH12HA011-S0.5 at 14:04.
1						
	1.5-2.0	100%	HA		SILTY SAND (SM). Brown (7.5YR 4/4), moist, loose, fine sand with 25% silty fines.	
2						Collect AH12HA011-S02 hold at 14:27. End of boring at 2 ft. Backfill with native material and top with concrete cap.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA012**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 74.98 NORTHING: 364552.958 EASTING: 2175683.460 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/22/2007 END: 8/22/2007 LOGGER: Travis Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5		HA		POORLY GRADED SAND with SILT and GRAVEL (SP-SM). Dark gray (10YR 4/1), damp, medium to coarse, subround to subangular, low plastic fines, ~20% gravel.	Gunnite lined trench. Collect AH12HA012-S0.5 at 9:20.
1					Color change to grayish brown (2.5YR 5/2).	
	1.5-2.0		HA		SILTY SAND (SM). Light olive brown (2.5YR 5/4), damp,	
2					medium to coarse grained, poorly graded low plasticity fines.	Collect AH12HA012-S02 hold at 9:40. End of boring at 2 ft.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA013**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 74.78 NORTHING: 364618.683 EASTING: 2175678.938 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/21/2007 END: 8/21/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5	100%	HA		WELL GRADED GRAVEL (GW). Dark gray (7.5YR 4/1), saturated, medium dense, fine to medium angular metamorphic gravel with 30% sand.	Surface is 2 inches concrete with reinforcing wires.
1						Collect AH12HA013-S0.5, AH12HA013-S0.5MS, AH12HA013-S0.5SD at 13:15.
	1.5-2.0	100%	HA		WELL GRADED SAND with GRAVEL (SW). Dark gray (7.5YR 4/1), saturated, medium dense, fine to coarse lithic sand with 25% fine gravel.	
2						Collect AH12HA013-S02 hold at 13:45.
3						End of boring at 2 ft. Backfill with native material, cap with 3 inch concrete.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA014**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 75.03 NORTHING: 364685.206 EASTING: 2175658.337 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/22/2007 END: 8/22/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0						2" gunnite.
0	0.02-0.05	100%	HA		SILTY SAND (SM). Brown (7.5YR 5/3), damp to medium dense, fine to medium sand, with ~30% silty fines	Collect AH12HA014-S0.5 at 15:50.
1						
	1.5-2.0	100%	HA		(SM) as above, but saturated.	
2						Collect AH12HA014-S02 hold at 16:10. End of boring at 2 ft.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA015**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 76.35 NORTHING: 364690.739 EASTING: 2175651.992 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/21/2007 END: 8/21/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5	100%	HA		SILTY SAND with GRAVEL (SM). Pinkish gray (7.5YR 6/2), dry, dense, fine to coarse subangular sand, ~20% silty fines, ~30% fine angular gravel	Gravelly bare soil. Collect AH12HA015-S0.5 at 10:35.
1						
	1.5-2.0	100%	HA		POORLY GRADED SAND with SILT (SP-SM). Brown (7.5YR 4/3), damp, medium dense, fine sand, ~15% silty fines.	
2						Collect AH12HA015-S02 hold at 11:10. End of boring at 2 ft.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA016**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 76.54 NORTHING: 364665.334 EASTING: 2175650.290 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/21/2007 END: 8/21/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5	100%	HA		SILTY SAND with GRAVEL (SM). Brown (7.5YR 4/3), dry, medium dense, fine subangular sand, ~20% silty fines, ~25% fine angular gravel.	Gravelly bare soil. Collect AH12HA016-S0.5 at 10:06.
1						
	1.5-2.0	100%	HA		SILTY SAND (SM). Brown (7.5YR 4/3), damp, medium dense, fine subrounded sand, 15-20% silty fines.	
2						Collect AH12HA016-S02 hold at 10:25. End of boring at 2 ft. Backfill with native material.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA017**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 76.54 NORTHING: 364588.607 EASTING: 2175664.935 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/21/2007 END: 8/21/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5	100%	HA		SILTY SAND (SM). Brown (7.5YR 4/3), moist, loose to medium dense, fine sand, ~25% silty fines.	Lawn cover. Collect AH12HA017-S0.5 and MS/MSD at 11:45
1						
	1.5-2.0	100%	HA		(SM) as above.	
2						Collect AH12HA017-S02 at 12:00
						End of boring at 2 ft. Backfill with native
3						material.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA018**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 76.82 NORTHING: 364541.885 EASTING: 2175649.252 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/21/2007 END: 8/21/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5	100%	HA		SILTY SAND (SM). Dark brown (7.5YR 3/2), moist, loose, fine subrounded sand, with 35% silty fines.	Lawn surface. Collect AH12HA018-S0.5 at 14:15, duplicate at 14:18.
1						
	1.5-2.0	100%	HA		SILTY SAND (SM). Brown (7.5YR 5/3), damp, medium dense, fine sand with 20% fines.	
2						Collect AH12HA018-S02 hold at 14:30. End of boring at 2 ft. Backfill with native material.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA019**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 77.04 NORTHING: 364502.346 EASTING: 2175677.403 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/21/2007 END: 8/21/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5	100%	HA		SILT (ML). Dark brown (7.5YR 3/2), moist, soft, non-plastic, no to slow dilatancy, minor fine sand.	Lawn cover. Collect AH12HA019-S0.5 at 14:50.
1						
	1.5-2.0	100%	HA		SANDY LEAN CLAY (CL). Brown (7.5YR 4/3), wet, firm, low plasticity, no dilatancy.	
2						Collect AH12HA019-S02 hold at 15:00. End of boring at 2 ft.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA020**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 77.78 NORTHING: 364450.208 EASTING: 2175716.522 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/21/2007 END: 8/21/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5	100%	HA		SILT (ML). Dark brown (7.5YR 3/2), moist, firm, non-plastic, no to slow dilatancy, some fine sand.	Lawn cover. Collect AH12HA020-S0.5 at 15:10.
1						
	1.5-2.0	100%	HA		LEAN CLAY with SAND (CL). Brown (7.5YR 5/3), wet, soft, slightly plastic, no dilatancy.	Collect AH12HA020-S02 hold at 15:20. End of boring at 2 ft.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA021**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 77.58 NORTHING: 364481.350 EASTING: 2175742.736 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/22/2007 END: 8/22/2007 LOGGER: Stephanie Moore

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5	100%	HA		POORLY GRADED SAND with SILT (SP-SM). Very dark brown (7.5YR 2.5/2), damp, loose, fine subrounded sand with approximately 15% silty fines.	Lawn cover. Collect AH12HA021-S0.5 at 12:54.
1						
	1.5-2.0	100%	HA		POORLY GRADED SAND with SILT (SP-SM). Brown (7.5YR 4/4), loose, fine subrounded sand with ~10% silty fines.	Collect AH12HA021-S02 hold at 13:00. End of boring at 2 ft. Backfill with native material.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA022**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 77.60 NORTHING: 364525.762 EASTING: 2175704.194 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/22/2007 END: 8/22/2007 LOGGER: Stephanie Moore

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5	100%	HA		SILTY SAND (SM). Very dark brown (7.5YR 2.5/2), damp, loose, fine subrounded sand with ~20% silty fines.	Lawn cover. Collect AH12HA022-S0.5 and duplicate at 13:26
1						
	1.5-2.0	100%	HA		CLAYEY SAND (SC). Strong brown (7.5YR 4/6), moist, loose, fine subrounded sand with ~20% clay.	Collect AH12HA022-S02 hold at 13:34. Encountered metal pipe and dug around it to collect sample. End of boring at 2 ft. Backfill with native material.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA023**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 77.73 NORTHING: 364630.371 EASTING: 2175694.844 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/22/2007 END: 8/22/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5	100%	HA		SILT (ML). Very dark grayish brown (10YR 3/2), moist, soft, no to low dilatancy, no to low plasticity, trace fine sand.	Lawn cover. Collect AH12HA023-S0.5 at 9:13.
1						
	1.5-2.0	100%	HA		SILTY SAND (SM). Dark brown (10YR 3/3), moist, loose, fine subrounded sand, ~35-45% silty fines.	Collect AH12HA023-S02 hold at 9:54. End of boring at 2 ft. Backfill with native material.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA024**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12 Building 929

ELEVATION: 77.95 NORTHING: 364731.967 EASTING: 2175669.659 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 8/22/2007 END: 8/22/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0						Lawn cover.
0	0.2-0.5	100%	HA		SILT (ML). Dark brown (7.5YR 3/3), mosit, soft, low dilatancy, not plastic, roots.	Collect AH12HA024-S0.5 at 16:15.
1						
	1.5-2.0	100%	HA		CLAYEY SAND (SC). Brown (7.5YR 4/3), moist, loose, slightly plastic, ~35% fines.	Collect AH12HA024-S02 hold at 16:30.
2						End of boring at 2 ft. Backfill with native material.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA025**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 77.91 NORTHING: 364696.280 EASTING: 2175589.232 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 10/8/2007 END: 10/8/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5		HA		SILTY SAND with GRAVEL (SM). Dark brown (7.5YR 3/2), dry, loose, fine to coarse, homogenous, gap graded, angular to subround gravel, non-plastic fines, gravel up to 1/4".	Asphalt surface covering.
					SANDY SILT (ML). Reddish brown (5YR 4/3), moist, soft, fine to medium sand, homogenous, medium plasticity, rapid dilatancy, ~40% sand.	Collect AH12HA025-S0.5 at 13:18.
						End of boring at 0.5 ft.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA026**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 76.68 NORTHING: 364597.852 EASTING: 2175620.614 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 10/8/2007 END: 10/8/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5		HA		SILTY SAND with GRAVEL (SM). Reddish gray (5YR 5/2), dry, loose, homogenous, fine to medium, poorly graded, non-plastic fines, angular to subround gravel, up to 3/4", ~45% fines.	Surface cover to sample. Collect AH12HA026-S0.5 at 16:35. End of boring at 0.5 ft.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA027**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 77.47 NORTHING: 364598.951 EASTING: 2175587.408 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 10/8/2007 END: 10/8/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5		HA		SILTY SAND with GRAVEL (SM). Dark brown (7.5YR 3/2), damp, loose, fine to coarse sand, homogenous, gap graded, low plastic fines, fine gravel up to 1/3", angular to subround, ~35% fines.	Asphat surface cover. Collect AH12HA027-S0.5 at 15:30. End of boring at 0.5 ft.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA028**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 77.35 NORTHING: 364477.006 EASTING: 2175587.483 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 10/8/2007 END: 10/8/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5		HA		SILTY SAND with GRAVEL (SM). Dark brown (7.5YR 3/2), dry, loose, fine to medium, homogenous, poorly graded, low plastic fines, fine angular to subangular gravel up to 1/4", ~40% fines.	Asphalt surface cover.
					SANDY SILT (ML). Reddish brown (5YR 4/3), damp, firm, fine sand, homogenous, low plastic fines, rapid dilatancy, ~40% sand.	Collect AH12HA028-S0.5 at 15:49.
1						End of boring at 0.5 ft.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA029**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 76.74 NORTHING: 364473.617 EASTING: 2175617.018 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 10/8/2007 END: 10/8/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5		HA		SILTY SAND with GRAVEL (SM). Reddish gray (5YR 5/2), dry, loose, fine to medium, homogenous, poorly graded, non-plastic fines, angular to subround gravel up to 3/4", ~45% fines.	Surface cover.
					SANDY SILT (ML). Dark reddish brown (5YR 3/3), damp, firm, fine sand, homogenous, medium plasticity, rapid dilatancy, ~45% sand.	Collect AH12HA029-S0.5 at 16:10.
1						End of boring at 0.5 ft.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA030**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 77.34 NORTHING: 364462.846 EASTING: 2175667.284 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 10/8/2007 END: 10/8/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.6		HA		SANDY SILT (ML). Dark brown (7.5YR 3/2), moist, very soft, homogenous, fine to medium sand, low plasticity, medium dilatancy, ~40% sand.	Vegetative grass surface cover. Collect AH12HA030-S0.5, S0.5MD, and S0.5SD at 12:05. End of boring 0.6 ft.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12HA031**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 78.56 NORTHING: 364483.696 EASTING: 2175785.431 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hand Augered DRILLING CONTRACTOR: CH2M HILL

DEPTH TO WATER: N/A START: 10/8/2007 END: 10/8/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5		HA		SANDY SILT (ML). Dark brown (7.5YR 3/3), moist, very soft, homogenous, fine to medium sand, low plastic fines, rapid dilatancy.	Vegetative grass surface cover. Collect AH12HA031-S0.5 at 09:35. End of boring at 0.5 ft.
1						
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB010**

Sheet 1 of 5

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: 9 ft. N, 21 ft. W of Building 929

ELEVATION: 77.72 NORTHING: 364672.677 EASTING: 2175685.344 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/24/2007 END: 8/24/2007 LOGGER: Rob Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-0.5		HA			
1					LEAN CLAY with SAND (CL). Reddish brown (5YR 4/3), moist, firm clay with 15-25% fine sand (impacted top soil).	Collect AH12SB010-S0.5, and duplicate at 9:25.
2						Collect AH12SB010-S02. OVM = 0.0 ppm.
3						
4						
5	5.0-6.5	1.5	SS	1-8-25	SANDY LEAN CLAY (CL). Reddish brown (5YR 4/3), moist, firm clay with fine sand, ~25%.	Soil gas sample, AH12SB010-G05 at 11:16.
6						Bottom of imported fill about 6 ft.
7						
8						OVM = 0.0 ppm.
9						
10	10.0-11.5	1.5	SS	6-12-14	SILT with SAND (ML). Light yellowish brown (2.5Y 6/4), dry, stiff, laminated with ~20%, very fine sand some iron staining along fractures.	
11						
12						
13						
14						OVM = 0.0 ppm.
15	15.0-16.5	1.5	SS	4-10-17	SANDY SILT (ML). Light yellowish brown (2.5Y 6/3), dry, stiff silt with fine sand, root marked with some iron staining.	Soil gas sample. AH12SB010-G15, AH12SB010-G15B at 11:30 and 11:32.
16						
17						
18						
19						
20	20.0-21.5	1.5	SS	5-6-9	SANDY SILT (ML) and SILTY SAND (SM). Light yellowish brown, dry, firm interbedded sandy silt and silty sand.	
21						
22						
23						
24						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB010**

Sheet 2 of 5

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: 9 ft. N, 21 ft. W of Building 929

ELEVATION: 77.72 NORTHING: 364672.677 EASTING: 2175685.344 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/24/2007 END: 8/24/2007 LOGGER: Rob Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
25	25.0-26.5	1.5	SS	3-9-10	SILT with SAND (ML). Light yellowish brown (2.5Y 6/3), dry, firm silt with fine sand. SILTY SAND (SM). Light yellowish brown (2.5Y 6/4), dry, medium dense, fine sand with 20-30% silt.	Silt 25 to 25.5 ft., silty sand 25.5 to 26.5 ft.
30	30.0-31.5	1.5	SS	3-11-14	SANDY SILT (ML). Yellowish brown (5Y 6/4), dry, stiff silt with fine sand. SILTY SAND (SM). Light olive brown (10YR 5/4), dry, medium dense, fine sand with silt.	Sandy silt 30 to 30.5 ft., silty sand 30.5 to 31.5 ft..
35	35.0-36.5	1.5	SS	3-8-14	SANDY SILT (ML). Yellowish brown (2.5Y 6/4), moist, stiff silt with fine sand.	
40	40.0-41.5	1.5	SS	6-9-13	POORLY GRADED SAND (SP). Dark grayish brown (2.5Y 4/2), moist, medium dense, fine to medium sand, cheifly subrounded quartz and lithic clasts, micaceous.	Soil gas sample, AH12SB010-G40 at 12:00.
45	45.0-46.5	1.5	SS	4-10-12	SILT with SAND (ML). Light yellowish brown (2.5Y 6/4), dry, stiff silt with very fine sand, root marked. SANDY SILT (ML). Strong brown (5Y 5/4), dry stiff silt with very fine sand, ~31% massive with some black organic matter.	Silt with sand 45 ft. to 46.2 ft..

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB010**

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: 9 ft. N, 21 ft. W of Building 929

ELEVATION: 77.72 NORTHING: 364672.677 EASTING: 2175685.344 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/24/2007 END: 8/24/2007 LOGGER: Rob Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
49						
50	50.0-51.5	1.5	SS	5-9-11	SILT with SAND (ML). Light yellowish brown (2.5Y 6/3), moist, stiff silt with ~10% very fine sand, massive.	
51						
52						
53						
54						
55	55.0-56.5	1.5	SS	4-8-16	(ML) as above, SILT with SAND.	
56						
57						
58						
59						
60	60.0-61.5	1.2	SS	7-12-23	SANDY SILT (ML). Light olive brown (2.5Y 5/4), moist, stiff silt with fine sand.	Soil gas sample, AH12SB010-G60 at 12:32.
61					POORLY GRADED SAND (SP). Light olive brown (10YR 5/4), moist, dense, fine to medium sand.	
62						
63						
64						
65	65.0-66.5	1.2	SS	12-13-17	POORLY GRADED SAND with SILT (SP-SM). Brown (2.5Y 4/2) and light olive brown (2.5Y 5/4), moist, dense, fine to medium subangular sand.	
66						
67						
68						
69						
70	70.0-71.5	1.5	SS	8-13-15	POORLY GRADED SAND (SP). Dark grayish brown (2.5Y 4/2), moist, medium dense, fine to medium subangular sand.	
71						
72						
73						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB010**

Sheet 4 of 5

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: 9 ft. N, 21 ft. W of Building 929

ELEVATION: 77.72 NORTHING: 364672.677 EASTING: 2175685.344 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/24/2007 END: 8/24/2007 LOGGER: Rob Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
74						
75	75.0-76.5	1.5	SS	6-9-14	SILT with SAND (ML). Light yellowish brown (2.5Y 6/3), moist, stiff silt with ~20% very fine sand.	
76						
77						
78						
79						
80	80.0-81.5	1.5	SS	5-6-17	SANDY SILT (ML). Light olive brown (2.5Y 5/4), moist, fine to stiff silt with very fine sand, root marked with iron staining.	Soil gas sample, AH12SB010-G80 at 13:26.
81						
82						
83						
84						
85	85.0-86.5	1.5	SS	9-15-15	(ML) as above, SANDY SILT.	
86					SILTY SAND (SM). Light yellowish brown (2.5Y 6/3), moist, medium dense, fine subangular quartz sand with silt.	Silty sand 85.5 to 86.5 ft.
87						
88						
89						
90	90.0-91.5	1.5	SS	6-14-19	(SM) as above, SILTY SAND.	
91						
92						
93						
94						
95	95.0-96.5	1.5	SS	6-10-12	SANDY SILT (ML). Light olive brown (2.5Y 5/4), moist, stiff silt with very fine sand.	
96						
97						
98						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB010**

Sheet 5 of 5

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: 9 ft. N, 21 ft. W of Building 929

ELEVATION: 77.72 NORTHING: 364672.677 EASTING: 2175685.344 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Hollow Stem Auger CME-85 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/24/2007 END: 8/24/2007 LOGGER: Rob Pexton

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
99						
100	100.0-101.	1.5	SS	12-20-22	SILT with SAND (ML). Light yellowish brown (2.5Y 6/3), dry to moist, very stiff silt with very fine sand, some iron staining.	Soil gas sample, AH12SB010-G100 at 13:52.
101						
102						
103						
104						
105	105.0-106.	1.0	SS	6-11-18	SILTY SAND (SM). Light yellowish brown (2.5Y 6/3), moist, medium dense, fine sand with ~20-30% silt.	
106						End of boring at 105 ft. Backfill with grout.
107						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB011**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC 11-12 North of Building 929

ELEVATION: 77.81 NORTHING: 364689.700 EASTING: 2175708.893 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/24/2007 END: 8/24/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Lawn cover.	Lawn cover.
	0.5-1.5		HA		SILTY SAND (SM). Dark brown (10YR 3/3), moist, loose, fine	Collect AH12SB011-S0.5 at 13:25. OVM = 0.0 ppm in
1					sand, ~35% fines.	soil, 0.0 ppm in breathing zone.
2	2.0-2.5		HA			Collect AH12SB011-S02 at 13:30.
3						
4						Push probe 4 to 5.5 ft.
5						Collect AH12SB011-G05, OVM = 0.0 ppm in soil gas,
	5.5-7.5	40%	CC		WELL GRADED SAND with SILT (SW-SM). Brown (7.5YR 5/3),	0.0 ppm in breathing zone.
6					damp, loose cobble at 7 ft., ~15% fines.	
7						
	7.5-10.0	110%	CC			
8						
9						
					(SW-SM) as above, but dark yellowish brown (10YR 4/4).	OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
10	10.0-13.5	100%	CC			
11					SILTY SAND (SM). Yellowish brown (10YR 5/4), damp, loose,	
12					fine sand, ~30% fines.	
13					SILT (ML). Grayish brown (10YR 5/2), moist, firm, non-plastic, no dilatancy, trace fine sand, low dry strength.	
	13.5-15.0	0%			No core below 13.5	Push soil gas probe 13.5 to 15 ft.
14						
15						Collect AH12SB011-G15 at 14:35. OVM = 0.0 ppm in soil gas.
						End of boring at 15 ft. Backfill with grout to 2 ft., top soil at surface.
16						
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB012**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 78.35 NORTHING: 364742.465 EASTING: 2175720.859 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/9/2007 END: 10/9/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-3.0	100%	HA		SANDY SILT (ML). Dark brown (7.5YR 3/2), very soft, fine to medium sand, homogenous, low plastic fines, rapid dilatancy. (0% gravel, 40% sand, 60% fines)	Vegetative grass surface cover. Collect AH12SB012-S0.5 at 14:52. OVM = 0.0 ppm in breathing zone.
3	3.0-5.0	100%	CC		SILTY SAND (SM). Brown (7.5YR 5/3), damp, fine to medium sand, homogenous, poorly graded, non-plastic fines, weak cementation. (0% gravel, 60% sand, 40% fines)	
5	5.0-10.0	100%	CC			Formation is too tight to collect a 5 ft. soil gas sample. OVM = 0.0 ppm in breathing zone.
7					Color change to pinkish gray (7.5YR 6/2).	OVM = 0.0 ppm in breathing zone, 0.4 ppm in head space. Collect soil gas sample AH12SB012-G07 at 15:30.
8					Sand size changing to fine only, poorly graded. (0% gravel, 55% sand, 45% fines)	
10	10.0-15.0	100%	CC		(SM) As above, with sand grain size increasing to fine to medium, iron oxide staining.	OVM 0.0 ppm in breathing zone.
13						OVM 0.0 ppm in breathing zone.
14					POORLY GRADED SAND with SILT (SP-SM). Yellowish brown (10YR 5/4), moist, fine sand, loose, homogenous, iron oxide staining. (0% gravel, 90% sand, 10% fines)	
15						Collect soil gas sample AH12SB012-G15 at 16:01.
16						End of boring at 15 ft.
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB013**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 79.10 NORTHING: 364699.148 EASTING: 2175774.407 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/9/2007 END: 10/9/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-3.0	100%	HA		SILTY SAND (SM). Strong brown (7.5YR 4/6), moist, weak cementation, homogenous, fine to medium sand, poorly graded, low plastic fines. (0% gravel, 60% sand, 40% fines)	Vegatative grass surface cover. Collect AH12SB013-S0.5 at 13:15. OVM = 0.0 ppm in breathing zone.
3	3.0-5.0	100%	CC			
5	5.0-10.0	100%	CC		SILTY SAND (SM). Pale brown (10YR 6/3), dry, fine to medium sand, poorly graded, non-plastic fines, moderately cemented, lenses of dark brown. (0% gravel, 80% sand, 20% fines)	OVM = 0.0 ppm in breathing zone, 0.6 ppm in head space. Collect soil gas sample AH12SB013-G05 at 13:55.
					SILTY SAND (SM). (10YR 3/3) up to 1" thick fine sand only, increasing silt content, homogeneous, no lenses. (0% gravel, 45% sand, 55% fines)	OVM = 0.0 ppm in breathing zone.
					SANDY SILT (ML). Light yellowish brown (10YR 6/4), firm sand, homogenous, low plastic fines, rapid dilatancy.	
10	10.0-15.0	100%	CC		SILTY SAND (SM). Pale brown (10YR 6/3), damp, weak cementation, homogenous, fine to medium sand, poorly graded, low plastic fines, iron oxide staining. (0% gravel, 75% sand, 25% fines)	OVM = 0.0 ppm in breathing zone.
					Silt content decreasing. (0% gravel, 75% sand, 25% fines)	
15						Collect soil gas sample AH12SB013-G15 at 14:24. End of boring at 15 ft.
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB014**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 78.33 NORTHING: 364601.550 EASTING: 2175764.705 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/9/2007 END: 10/9/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-3.0	100%	HA		SILTY SAND (SM). Brown (7.5YR 4/2), moist, weak cementation, homogenous, fine to medium sand, poorly graded, low plastic fines. (0% gravel, 60% sand, 40% fines)	Vegetative grass surface cover. Collect AH12SB014-S0.5 at 11:27. OVM = 0.0 ppm in breathing zone.
3	3.0-5.0	100%	CC		Color change to light brownish yellow (10YR 6/4).	
5	5.0-10.0	100%	CC		POORLY GRADED SAND with SILT (SP-SM). Strong brown (7.5YR 4/6), moist, loose, homogenous, fine to medium sand, angular to subround. (0% gravel, 90% sand, 10% fines)	Collect soil gas sample AH12SB014-G05 at 11:47. OVM = 0.0 ppm in breathing zone.
7					SILT SAND (SM). Brown (7.5YR 5/4), fine to medium sand, weak cementation, homogenous, poorly graded, low plastic fines, iron oxide staining. (0% gravel, 55% sand, 45% fines)	
10	10.0-15.0	100%	CC			OVM = 0.0 ppm in breathing zone.
11					(SM) as above, but amount of silt decreasing, fine grained sand only. (0% gravel, 75% sand, 25% fines)	
13					(SM) as above, but color change to strong brown (7.5YR 4/6), grain size increasing to fine to medium, silt % increasing. (0% gravel, 60% sand, 40% fines)	
15						Collect soil gas sample AH12SB014-G15 at 12:32. OVM = 0.0 ppm in breathing zone, 1.0 ppm in head space. End of boring at 15 ft.
16						
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB015**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 77.28 NORTHING: 364678.748 EASTING: 2175619.084 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/8/2007 END: 10/8/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-3.0	100%	HA		SILTY SAND with GRAVEL (SM). Light brown (7.5YR 6/3), dry, loose, fine to coarse, gap graded, angular to subround gravel, non-plastic fines.	Bare soil and gravel surface cover. Collect AH12SB015.S0.5 at 12:42.
3	3.0-5.0	100%	CC		(SM) as above.	OVM = 0.0 ppm in breathing zone.
5	5.0-10.0	100%	CC			Could not collect 5 ft. soil gas sample due to formation tightness.
6						OVM = 0.3 ppm in cuttings.
7					SANDY SILT (ML). Brown (7.5YR 5/4), damp, fine sand, homogenous, non-plastic, rapid dilatancy, firm, iron oxide staining, ~45% sand.	Collect soil gas sample AH12SB015-G07 at 14:41.
10	10.0-15.0	100%	CC		SILTY SAND (SM). Brown (7.5YR 5/4), damp, weak cementation, homogenous, fine to medium sand, poorly graded, low plastic fines, iron oxide staining, ~40% fines.	
11						OVM = 0.2 ppm in cuttings.
12					SANDY SILT (ML). Yellowish brown (10YR 5/4), damp, soft, fine sand, homogenous, low plastic fines, rapid dilatancy, iron oxide staining, ~35% sand.	
13					SILTY SAND (SM). Brown (7.5YR 5/4), damp, weak cementation, homogenous, fine to medium sand, poorly graded, non-plastic fines, with iron oxide staining, ~30% fines.	
15						Collect soil gas sample AH12SB015-G15 at 14:48. End of boring at 15 ft.
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB016**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 78.67 NORTHING: 364632.940 EASTING: 2175728.340 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: START: 10/8/2007 END: 10/8/2007 LOGGER: T. Young

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-4.0		HA		SANDY SILT (ML). Brown (7.5YR 4/3), moist, very soft, homogenous, fine sand ~35%, medium plastic fines, rapid dilatancy.	Concrete floor, ~4" thick.
1						
2						
3						
4	4.0-10.0	100%	CC		SILTY SAND (SM). Yellowish brown (10YR 5/4), damp, weak cementation, fine to medium sand, homogenous, poorly graded, low plastic fines, ~30% fines.	OVM = 0.0 ppm in cuttings.
5						Could not collect a soil gas sample at 5 ft. due to formation tightness.
6					SANDY SILT (ML). Brown (7.5YR 4/4), damp, firm, fine sand, homogenous, non-plastic, rapid dilatancy, ~45% sand.	
7						Collect soil gas sample AH12SB016-G07 at 10:42.
8					(ML) as above, but with lenses of sandy silt, strong brown (7.5YR 5/6), fine to medium sand, up to 4" long.	OVM = 0.0 ppm in cuttings.
9					Iron oxidation.	
10	10.0-15.0	100%	CC		SILTY SAND (SM). Brown (10YR 5/3), damp, weakly cemented, homogenous, fine to medium, poorly graded, non-plastic fines, ~20% fines.	OVM = 0.0 ppm in cuttings.
11					SANDY SILT (ML). Light brownish gray (2.5Y 6/2), damp, soft, fine sand, homogenous, low plastic fines, rapid dilatancy, iron oxide staining, ~30% sand.	
12						
13						
14						
15						Collect soil gas sample AH12SB016-G15 at 11:15.
16						End of boring at 15 ft.
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB017** Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 78.97 NORTHING: 364843.236 EASTING: 2175766.824 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/29/2007 END: 10/29/2007 LOGGER: B. Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-3.5		HA		SILTY SAND (SM). Reddish brown (5YR 4/4), wet, loose, fine sand, with ~30% silty fines, becomes dense, pinkish gray (7.5YR 6/2) at 2 ft.	Hand auger to 3.5 ft.
1						OVM = 0.0 ppm in soil and breathing zone.
2						
3						
4					SILT (ML). Brown (7.5YR 5/3), damp, very stiff, no dry strength, no plasticity, no sand.	Drive soil gas point 3.5 to 5 ft.
5	5.0-8.0	4 ft.	CC			Collect AH12SB017-G05 and duplicate at 11:23. OVM = 7.0 to 10.7 ppm in soil gas. OVM = 0.0 ppm
6					SILTY SAND (SM). Brown (7.5YR 5/3), moist, medium dense, fine quartz sand, with ~20-25% fines.	in soil and breathing zone.
7						Calcium concretion at 7.5 ft.
8	8.0-10.0	3 ft.	CC		Saturated at 8.5 to 9 ft. becomes reddish brown (5YR 4/4) at 9.5 ft.	Breathing zone: CO = H2S = 0.0 ppm, LEL = 0%, O2 = 20.9%.
9						
10	10.0-13.0	4 ft.	CC		SILT (ML). Brown (7.5YR 5/2), moist, very stiff, non-plastic, low dry strength.	
11						
12						
13					SILTY SAND (SM). Brown (7.5YR 5/4), damp, medium dense, fine quartz and lithic sand, ~15-20% fines.	Drive soil gas point 13.5 to 15 ft.
14						
15						Collect AH12SB017-G15 at 11:50. OVM = 0.2 to 0.7 pppm in soil gas. End of boring at 15 ft. Backfill with grout to 5 ft. and with native material 0 to 5 ft.
16						
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB018**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 78.16 NORTHING: 364842.033 EASTING: 2175652.847 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/29/2007 END: 10/29/2007 LOGGER: B. Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-3.5		HA		LEAN CLAY with SAND (CL). Dark brown (7.5 3/3), with gray striations, wet, soft, moderate plasticity, ~15% fine sand.	Lawn Surface. Hand auger to 3.5 ft.
1						
2						OVM = 0.0 ppm in soil and breathing zone.
3						
4					SILTY SAND (SM). Strong brown (7.5YR 4/6), damp, dense, fine quartz sand and lithic sand with ~20% fines.	Drive soil gas point 3.5 to 5 ft.
5	5.0-9.0	5 ft.	CC			Collect AH12SB018-G05 at 09:40. OVM = 0.5 to 0.7 ppm in vapor.
6					Lense of sandy lean clay at 5-5.5 ft. silty sand to 7.5 ft.	
7						
8					SANDY SILT (ML). Brown (7.5YR 5/3), damp, very stiff, non-plastic, low to no dilatancy, 10-30% fine quartz sand.	OVM = 0.0 ppm in soil and breathing zone.
9	9.0-13.0	4 ft.	CC			Breathing zone: CO= H2S = 0.0 ppm, LEL = 0%, O2 = 20.9%.
10						
11						
12					SILTY SAND (SM). Mottled brown and gray (7.5YR 5/3 & 5/1), damp, dense, fine subrounded quartz sand with 30-35% silty fines.	
13						
14						Drive soil gas point 13.5 to 15 ft.
15						Collect AH12SB018-G15 at 10:00.
16						End of boring at 15 ft. Backfill with grout to 5 ft. and native material 0 to 5 ft.
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB019**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 78.46 NORTHING: 364769.622 EASTING: 2175539.794 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/29/2007 END: 10/29/2007 LOGGER: B. Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-5.0		HA		CLAYEY SAND (SC). Reddish brown (5YR 4/4), damp to moist, loose, fine to medium lithic sand with ~25% plastic fines.	Asphalt to 3 inches. OVM = 0.0 ppm in soil.
1						
2						
3						
4					WELL GRADED SAND with CLAY (SW-SC). Reddish brown (5YR 4/4), damp, medium dense, fine to coarse subrounded lithic	Drive soil gas point 4.0 to 5.5 ft.
5	5.0-10.0	5 ft.	CC		sand.	Collect AH12SB019-G05 at 08:35. OVM = 0.1 to 0.0 ppm in soil gas.
6					SILTY SAND (SM). Reddish brown (5YR 4/3), damp, dense, fine quartz sand with 15-20% silty fines.	Breathing zone: CO = H2S = 0.0 ppm, LEL = 0%. OVM = 0.0 ppm in soil.
7						
8						
9						
10	10.0-13.0	3.5 ft.	CC			
11						
12					SANDY SILT (ML). Brown (10YR 5/3), with rusty striations, damp, very stiff, non-plastic, low dry strength, ~25% fine sand.	
13						Drive soil gas point 13.5 to 15 ft.
14						
15						Collect AH12SB019-G15 at 08:49. OVM = 0.0 to 0.3 ppm in soil gas. End of boring at 15 ft. Backfill with grout.
16						
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB020**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 79.43 NORTHING: 364753.342 EASTING: 2175832.644 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 10/29/2007 END: 10/29/2007 LOGGER: B. Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-4.0		HA		SILTY SAND (SM). Reddish brown (5YR 4/4), dry, medium dense, fine to medium sand with ~25% fines.	Gravel cover. Hand auger to hardpan.
1						
2						
3						
4					WELL GRADED SAND with SILT (SW-SM). Strong brown (7.5YR 5/6), dry, medium dense, fine to coarse quartz and lithic sand with 10-15% fines.	Drive soil gas point 4 to 5.5 ft.
5						Collect AH12SB020-G05 at 13:46. OVM = 0.2 to 1.3 ppm in soil gas.
	5.5-9.0	4 ft	CC		SANDY SILT (ML). Brown (7.5YR 5/4), dry, stiff, non-plastic, low dry strength, ~20% fine sand.	OVM = 0.0 ppm in soil and breathing zone.
6						
7						
8						Breathing zone: CO = H2S = 0.0 ppm, LEL = 0%, O2 = 20.9%.
9	9.0-13.5	5 ft	CC			
10					Becomes damp and brown (7.5YR 4/3).	
11						
12						
13					SILTY SAND (SM). Brown (7.5YR 4/4), damp, medium dense.	Drive soil gas point 13.5 to 15 ft.
14						
15						Collect AH12SB020-G15 at 14:11. OVM = 0.2 to 0.9 ppm in soil gas. End of boring at 15 ft. Backfill with grout to 5 ft. and with native material to surface.
16						
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB021**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 78.79 NORTHING: 364916.555 EASTING: 2175617.965 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 11/15/2007 END: 11/15/2007 LOGGER: M. Sebra

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-3.0	1.5	HA		SILTY SAND (SM). Brown (10YR 5/3), dry, homogenous, subangular sand, 30-35% fines.	OVM = 0.0 ppm in breathing zone.
3	3.0-5.0	2	CC		(SM) as above, but damp, with 40-45% fines	OVM = 0.0 ppm in breathing zone.
5	5.0-8.0	4	CC		SILTY SAND (SM). Light yellowish brown (2.5Y 6/3), damp, homogenous, subangular quartz, lithic sand, 30-35% silt.	Collect AH12SB021-G05 at 08:47. OVM = 0.0 ppm in breathing zone.
8	8.0-15.0	5	CC		SANDY SILT (ML). Light yellowish brown (2.5Y 6/3), damp, non-plastic, low dry strength, 30-35% sand.	OVM = 0.0 ppm in breathing zone.
15						Collect AH12SB021-G15 at 10:30. End of boring at 15 ft.

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB022**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 80.04 NORTHING: 364793.300 EASTING: 2175891.010 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 11/15/2007 END: 11/15/2007 LOGGER: M. Sebra

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-3.0	3	HA		SILTY SAND (SM). Dark yellowish brown (10YR 4/4), damp, subangualr lithic sand, ~25-30% fines.	6" concrete.
1						
2						OVM = 0.0 ppm in breathing zone.
3	3.0-6.0	3	CC		SILTY SAND (SM). Brown (10YR 4/3), damp, subangular lithic sand, ~20-25% fines, iron oxide staining on grains.	
4						
5						
6	6.0-9.0	5	CC		SANDY SILT (ML). Light yellowish brown (2.5Y 6/3), damp, non-plastic, rapid dilatancy, no dry strength, ~20-25% sand.	Collect AH12SB022-G06 at 13:26. OVM = 0.0 ppm in breathing zone.
7						
8						
9	9.0-15.0	5	CC		(ML) as above.	OVM = 0.0 ppm in breathing zone.
10						
11						
12						
13						
14						
15						Collect AH12SB022-G15 at 13:55. End of boring at 15 ft.
16						
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **AH12SB023**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: AOC H-12

ELEVATION: 79.04 NORTHING: 364699.072 EASTING: 2175881.542 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730DT DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 11/15/2007 END: 11/15/2007 LOGGER: M. Sebra

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0.0-3.0	3	HA		SILTY SAND (SM). Dark grayish brown (2.5Y 4/2), dry, 30-35% fines.	4" asphalt.
1					SILT with SAND (ML). Dark olive brown (2.5Y 3/3), moist, medium plasticity, rapid dilatancy, 15-20% sand.	OVM = 0.0 ppm in breathing zone.
2						
3	3.0-5.0	3	CC		SILTY SAND (SM). Dark yellowish brown (10YR 4/4), damp, subangular lithic sand, 35-40% fines.	
4						
5	5.0-9.0	5	CC		SILT with SAND (ML). Light yellowish brown (2.5Y 6/3), damp, non-plastic, low dry strength, rapid dilatancy,	Unable to collect 5 ft. soil gas sample due to tight formation.
6					~25-30% sand.	Approximately 1 ft. slough in core barrel.
7						Collect AH12SB023-G07 at 11:31.
8					(ML) as above.	
9	9.0-15.0	5	CC		SILTY SAND (SM). Light olive brown (2.5Y 5/3), damp, subangular lithic sand, ~35-40% fines.	
10						
11						
12						
13						
14						
15						Collect AH12SB023-G15 at 12:30 End of boring at 15 ft.
16						
17						
18						
19						
20						

CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **CS49SB001**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: CS S-049

ELEVATION: 63.91 NORTHING: 359646.427 EASTING: 2168948.739 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/28/2007 END: 8/28/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0						Bare soil surface.
	0.4-0.8		HA		SILTY SAND with GRAVEL (SM). Brown (7.5YR 4/4), loose, fine	Collect CS49SB001-S0.5 at 8:03. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
1					to coarse quartz and lithic sand with 15-20% fines and 15-25% fine gravel, no odor.	
2						
	2.5-3.0		HA		SILTY SAND (SM). Reddish brown (2.5YR 4/4), moist, medium	
3					dense, fine to medium sand, ~30% fines, no odor.	Collect CS49SB001-S03 at 8:11. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
						Hand auger to hardpan at 3.5 ft.
	3.6-5.0	100%	CC			
4					WELL GRADED SAND with SILT (SW-SM). Yellowish red (5YR	
					4/6), damp, loose, fine to coarse subangular quartz and	
5	5.0-8.0	100%	CC		lithic sand, ~10-15% fines, no odor.	OVM = 0.0 ppm in soil.
6						
7					SILT (ML). Gray (7.5YR 5/1), damp, firm.	
8						Collect CS49SB001-S08 hold at 8:29. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
						End of boring at 8 ft. Backfill with native material.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **CS49SB002**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: CS S-049

ELEVATION: 64.35 NORTHING: 359645.695 EASTING: 2168988.822 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/28/2007 END: 8/28/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0						Bare soil surface.
	0.6-1.0		HA		WELL GRADED SAND with SILT and GRAVEL (SW-SM). Brown	Collect CS49SB002-S0.5 at 8:35. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
1					(7.5YR 4/5), damp, medium dense, fine to coarse subrounded/subangular sand with ~10% fines, ~35% fine to	Found abandoned pipe, step over 1 ft. Hand auger to hard pan at 3.5 ft.
2					medium gravel, no odor.	
	2.6-3.0		HA		SILTY SAND (SM). Reddish brown (2.5YR 4/4), moist, medium	
3					dense fine to medium sand, ~25-30% fines, no odor.	Collect CS49SB002-S03 at 8:59. OVM = 0.0 ppm in
	3.6-5.0	100%	CC			soil, 0.0 ppm in breathing zone.
4						
					Becomes strong brown (7.5YR 4/6), subangular sand with	OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
5	5.0-8.0	100%	CC		15-20% fines.	
6						
7					SANDY SILT (ML). Gray (7.5YR 5/1), damp, medium dense, low dry strength, blocky, non-plastic.	
8						Collect CS49SB002-S08 hold at 9:05. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
						End of boring at 8 ft. Backfill with native material.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **CS49SB003**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: CS S-049

ELEVATION: 63.55 NORTHING: 359644.721 EASTING: 2169027.832 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/27/2007 END: 8/27/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Soil to 2 inches, asphalt to 4 inches.	Bare soil surface.
	0.5-1.0		HA		WELL GRADED SAND with SILT and GRAVEL (SW-SM). Dark brown	Collect CS49SB003-S0.5 at 14:12. OVM = 0.3 - 0.5
1					(7.5YR 3/3), moist, medium dense, fine to coarse subangular	ppm in soil, 0.0 ppm in breathing zone.
					sand with 15% fines and 15-20% fine gravel.	
2						Hand auger to hardpan at 2 ft.
	2.5-5.0	100%	CC		SILTY SAND (SM). Reddish yellow to strong brown (7.5YR 6/6	
3					to 4/6), medium to dense, fine to coarse quartz and lithic	Collect CS49SB003-S03 at 14:25. OVM = 0.0 ppm in
					sand, 15-25% fines.	soil, 0.0 ppm in breathing zone.
4						
5	5.0-8.0	100%	CC			OVM = 0.0 ppm in soil.
6						
					SILT with SAND (ML). Gray (7.5YR 5/1), damp, hard,	
7					non-plastic, low dry strength, 10-20% fine sand.	
8						Collect CS49SB003-S08 hold at 14:35. OVM = 0.0 ppm in soil.
						End of boring at 8 ft. Backfill with native material.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **CS49SB004**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: CS S-049

ELEVATION: 63.40 NORTHING: 359625.584 EASTING: 2168966.352 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/24/2007 END: 8/24/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Asphalt to 4 inches.	
	0.5-1.0		HA		WELL GRADED SAND with SILT and GRAVEL (SW). Dark yellowish brown (10YR 3/4), damp, medium dense, fine to coarse lithic sand, with 10% fines and 40% fine gravel.	Collect CS49SB004-S0.5 at 10:00. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
1						
2						
3						Collect CS49SB004-S03 at 10:20 and MS/MSD. Hardpan at 3 ft.
4						
	4.5-8.0	100%	CC			
5						
6					SILTY SAND with GRAVEL (SM). Yellowish red (5YR 5/6), damp to dry, dense, partially cemented well graded sand with ~20% fines and ~25% gravel.	
7						
8					SANDY SILT (ML). Grayish brown (10YR 5/2), damp, stiff, non-plastic, slow to low dilatancy, ~35% fine sand.	Collect CS49SB004-S08 hold at 10:30. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
9						End of boring at 8 ft. Backfill with native soil, asphalt patch.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **CS49SB005**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: CS S-049

ELEVATION: 63.81 NORTHING: 359626.021 EASTING: 2169008.543 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/27/2007 END: 8/27/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Asphalt to 3 inches.	
	0.5-1.0		HA			Collect CS49SB05-S0.5 at 10:20. OVM = 0.1 ppm in
1					WELL GRADED SAND with GRAVEL (SM). Brown (7.5YR 5/2), damp,	soil, 0.0 ppm in breathing zone.
					dense, fine to coarse lithic sand, ~40% fine gravel, mild	
2					petroleum odor.	Hand auger to hardpan at 3 ft.
	2.5-3.0		HA		SANDY LEAN CLAY (CL). Yellowish red (5YR 4/6), moist,	
3	3.0-5.0	100%	CC		stiff, low plasticity, massive, ~30% fine sand.	Collect CS49SB005-S03 at 10:30 and duplicate at
						10:35. OVM = 0.0 ppm in soil, 0.0 ppm in
4					SILTY SAND (SM). Yellowish red (5YR 4/6), damp, dense, fine to medium sand with 15-20% fines, cemented.	breathing zone.
					WELL GRADED SAND with SILT (SW-SM). Reddish brown (5YR 4/4), dry, medium dense, fine to coarse subrounded quartz and lithic sand, ~10% fines, no odor.	
5	5.0-8.0	100%	CC			OVM = 0.0 ppm in soil.
6						
7					SANDY SILT (ML). Brown (7.5YR 5/2), damp, firm to medium,	
					non-plastic, no dry strength, ~30% fine sand, no odor.	
8						Collect CS49SB005-S08 hold at 10:45.
						End of boring at 8 ft. Backfill with native
9						material and patch with concrete.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **CS49SB006**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: CS S-049

ELEVATION: 63.40 NORTHING: 359606.913 EASTING: 2168946.222 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/24/2007 END: 8/24/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Asphalt to 3 inches	
	0.5-1.0		HA			Collect CS49SB006-S0.5 at 11:00. OVM = 0.2 - 0.5
1					WELL GRADED SAND with SILT and GRAVEL (SW-SM). Grayish	ppm in soil, 0.0 ppm in breathing zone.
					brown (10YR 4/2), damp, medium dense, fine to coarse lithic	
2					sand with 30% fine gravel and 15% fines.	
					SILTY SAND (SM). Reddish brown (2.5YR 4/3), damp, dense,	
3	2.8-3.4		HA		fine to medium lithic sand with 20-30% fines and 10% fine	
					gravel.	Collect CS49SB006-S03 at 11:15. Just above hard pan. OVM = 0.0 ppm in soil and 0.0 ppm in breathing zone.
4	4.0-8.0	100%	CC			Hand auger to 4 ft.
					(SM) as above, but yellowish red (5YR 5/6), with fine to	
5					coarse sand and 15-20% fines.	
6						OVM = 0.0 ppm in breathng zone.
7					SANDY SILT (ML). Dark grayish brown (10YR 4/2), damp, firm,	
					non-plastic no dilatancy, ~30% fine sand.	
8						Collect CS49SB006-S08 hold at 11:30. OVM = 0.0 ppm in soil.
						End of boring at 8 ft. Backfill with native materials and asphalt patch.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **CS49SB007**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: CS S-049

ELEVATION: 63.70 NORTHING: 359607.797 EASTING: 2168987.864 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/27/2007 END: 8/27/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Asphalt to 3 inches.	
	0.5-1.0		HA		WELL GRADED SAND with SILT and GRAVEL (SW-SM). Gray (7.5YR	Collect CS49SB007-S0.5 at 11:05. OVM = 0.5 - 0.9
1					5/1), moist, dense, fine to coarse lithic sand with ~35%	ppm in soil, 0.0 ppm in breathing zone.
					fine gravel, 10% fines, petroleum odor.	Hand auger to hardpan at 3.5 ft.
2						
3	3.0-3.5		HA		SILTY SAND (SM). Reddish brown (7.5YR 4/4), damp, dense	Collect CS49SB007-S03 at 11:20. OVM = 0.0 ppm in
	3.5-5.0	100%	CC		fine to coarse subrounded quartz and lithic sand, ~15-20%	soil, 0.0 ppm in breathing zone.
4					silty fines, partially cemented, no odor.	
5	5.0-8.0	100%	CC			OVM = 0.0 ppm in soil.
6						
7					SILT with SAND (ML). Gray (7.5YR 5/1), damp, medium dense,	
					non-plastic, no dry strengh, ~15-25% fine sand.	
8						Collect CS49SB007-S08 hold at 11:50. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
						End of boring at 8 ft. Backfill with native materials and cap with asphalt.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **CS49SB008**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: CS S-049

ELEVATION: 64.11 NORTHING: 359608.848 EASTING: 2169027.765 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/27/2007 END: 8/27/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Asphalt to 3 inches.	
	0.5-1.0		HA		WELL GRADED SAND with GRAVEL (SW). Gray (7.5YR 5/1), damp,	Collect CS49SB008-S0.5 at 12:50. OVM = 0.5 - 0.7
1					dense, fine to coarse lithic sand, ~20% fine to medium	ppm in soil, 0.0 ppm in breathing zone.
					gravel.	
2						
	2.6-3.2		HA		CLAYEY SAND (SC). Dark reddish brown (5YR 3/4), damp,	
3					dense, fine to coarse quartz and lithic sand, ~20-40%	Collect CS49SB008-S03 at 13:00. OVM = 0.0 ppm in
	3.6-5.0	100%	CC		plastic fines, no odor.	soil, 0.0 ppm in breathing zone.
						Hand auger to hardpan at 3.7 ft.
4					SILTY SAND (SM). Reddish brown (5YR 4/4), damp, medium	
					dense, fine to coarse, subangular quartz and lithic sand,	
5	5.0-8.0	100%	CC		~15-20% silty fines, no odor.	OVM = 0.0 ppm in breathing zone.
6					Becomes gray at 6 ft.	
7					SILT (ML). Gray (7.5YR 5/1), damp, stiff, non-plastic, no	
					dry strength, trace fine sand, no odor.	
8						Collect CS49SB008-S08 hold at 13:15. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
						End of boring at 8 ft. Backfill with native material and cap with asphalt.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **CS49SB009**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: CS S-049

ELEVATION: 63.79 NORTHING: 359592.380 EASTING: 2168976.697 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/24/2007 END: 8/24/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Asphalt to 3 inches.	
	0.4-0.8		HA		WELL GRADED GRAVEL with SILT (GW-GM). Grayish brown (10YR 4/2), damp, dense, fine to medium subrounded igneous and metamorphic gravel, with ~35% well graded lithic sand and ~15% fines.	Collect CS49SB009-S0.5 at 11:50 and duplicate at 11:55. OVM = 0.5 - 1.1 ppm in soil, 0.0 ppm in breathing zone.
1						
2						
	2.6-3.0		HA		SILTY SAND (SM). Yellowish red (5YR 5/6), damp, dense, fine	Hand auger to 3 ft.
3	3.0-5.0	100%	CC		to medium sand with 15-20% silty fines.	Collect CS49SB009-S03 at 12:15. OVM = 0.2 - 0.4 ppm in soil, 0.0 ppm in breathing zone.
4						Break off hand auger at 3.5 ft. Begin direct push in hardpan.
5	5.0-8.0	100%	CC		(SM) as above, but medium dense and fine to coarse sand.	
6						
7					SILT (ML). Grayish brown (10YR 5/2), dry, stiff, non-plastic, trace fine sand.	
8						Collect CS49SB009-S08 hold at 12:25. End of boring at 8 ft. Backfill with native material and asphalt patch.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **CS49SB010**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: CS S-049

ELEVATION: 64.00 NORTHING: 359590.957 EASTING: 2169010.318 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/27/2007 END: 8/27/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Asphalt to 3 inches.	
	0.45-1.0		HA		WELL GRADED SAND with GRAVEL (SW). Brown (7.5YR 5/2), damp, dense, fine to coarse subangular lithic sand, with ~30% fine gravel and ~5% fines, petroleum odor.	Collect CS49SB010-S0.5 at 9:15. OVM = 0.0 - 0.4 ppm in soil, 0.0 ppm in breathing zone.
1						
2						Hand auger to 3.5 ft.
3	2.8-3.2		HA		SANDY LEAN CLAY (CL). Yellowish red (5YR 4/6), moist, hard, low plasticity massive, ~30% fine sand.	
	3.6-5.0	100%	CC			Collect CS49SB010-S03 and MS/MSD at 9:35. 9 ft. interface between clay and SW. OVM = 0.0 - 0.2
4					SILTY SAND (SM). Yellowish red (5YR 4/6), damp, dense, fine to coarse subangular quartz and lithic sand, 10-25% silty	ppm in soil, 0.0 ppm in breathing zone.
5	5.0-8.0	100%	CC		fines partially cemented at 3.5 to 4.5 ft., no odor.	
6						OVM = 0.0 ppm in soil.
					SILT (ML). Gray (7.5YR 5/2), damp, dense, non-plastic, no	
7					to slow dilatancy, trace fine sand, no odor.	
8						Collect CS49SB010-S08 hold at 9:52. OVM = 0.0 ppm in soil. End of boring at 8 ft. Backfill with native material and patch with asphalt.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **CS49SB011**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: CS S-049

ELEVATION: 63.67 NORTHING: 359574.790 EASTING: 2168947.302 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/27/2007 END: 8/27/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0						Deteriorated asphalt surface.
0	0.2-0.8		HA		WELL GRADED SAND with SILT and GRAVEL (SW-SM). Dark brown (7.5YR 3/3), moist, dense, fine to coarse lithic sand, ~35%	Collect CS49SB011-S0.5 at 8:30 and duplicate at
1					fine to medium gravel, ~10% fines, no odor.	8:35. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
2						
3					SANDY LEAN CLAY (CL). Dark reddish brown (5YR 3/4), moist, stiff, low to medium plasticity, 35-45% fine sand, no odor.	Collect CS49SB011-S03 at 8:45. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
	3.4-5.0	100%	CC			Hand auger to hardpan at 3.5 ft.
4					WELL GRADED SAND with SILT (SW-SM). Red (2.5YR 5/6), damp, dense, fine to coarse quartz and lithic sand with ~10-15%	
5	5.0-8.0	100%	CC		fines, partially cemented, no odor.	OVM = 0.0 ppm in soil
6						
7					SILTY SAND (SM). Brown (7.5YR 4/2), damp, medium dense, fine to medium sand with ~15-20% fines.	
8						Collect CS49SB011-S08 hold at 8:55. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone. End of boring at 8 ft. Backfill with native material.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **CS49SB012**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: CS S-049

ELEVATION: 63.84 NORTHING: 359575.243 EASTING: 2168986.840 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/27/2007 END: 8/27/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					WELL GRADED SAND with SILT (SW-SM). Brown (7.5YR 4/3),	Soil surface
0	0.2-0.8		HA		moist, loose to medium dense, fine to coarse lithic sand, trace gravel, ~10-15% fines, mild petroleum odor.	Collect CS49SB012-S0.5 at 7:50. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
1						
2						
3					CLAYEY SAND (SC). Reddish brown (5YR 4/4), moist, medium dense, fine to medium sand, ~20% plastic fines, no odor.	
	3.5-5.0	80%	CC			Hand Auger to hardpan at 3.5 ft.
4					WELL GRADED SAND with SILT (SW-SM). Red (2.5YR 4/6), damp to dry, dense, fine to coarse quartz and lithic sand, 10%	OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
5	5.0-8.0	100%	CC		silty fines, partially cemented, no odor.	Collect CS49SB012-S05 at 8:10. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone.
6						
7					SILTY SAND (SM). Gray (7.5YR 5/1), moist, medium dense, fine sand ~20% fines.	
8						Collect CS49SB012-S08 hold at 8:20. OVM = 0.0 ppm in soil, 0.0 ppm in breathing zone. End of boring at 8 ft. Backfill with native material.
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CH2MHILL

PROJECT NUMBER: 340972.02.07.09.01

BORING ID: **CS49SB013**

Sheet 1 of 1

SOIL BORING LOG

PROJECT: McClellan IP#2 Pre-Decision Fieldwork LOCATION: CS S-049

ELEVATION: 64.28 NORTHING: 359573.861 EASTING: 2169026.314 COORDINATE SYSTEM: NAD27, CA Zone II

DRILLING METHOD/EQUIPMENT USED: Geoprobe 7730 DRILLING CONTRACTOR: Water Development Corp., Woodland,

DEPTH TO WATER: N/A START: 8/27/2007 END: 8/27/2007 LOGGER: Ben Moayyad

DEPTH BGS (ft)	INTERVAL (ft)	RECOVERY	TYPE-# (SS=Split Spoon ST=ShelbyTube)	STANDARD PENETRATION TEST RESULTS 6-6-6 (in) (N)	CORE DESCRIPTION: SOIL NAME (USCS GROUP SYMBOL), COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0					Asphalt to 3 inches.	
	0.6-1.0		HA		WELL GRADED SAND with SILT and GRAVEL (SW-SM). Yellowish red (5YR 5/6), dry, dense, fine to coarse, subangular sand with 15% fines and 20-30% gravel, petroleum odor.	Collect CS49SB013-S0.5 at 13:30 and MS/MSD.OVM = 0.5 - 0.6 ppm in soil, 0.0 ppm in breathing zone.
1						
2						
	2.6-3.0		HA		CLAYEY SAND (SC). Reddish brown (2.5YR 4/4), moist, medium dense.	
3						Collect CS49SB013-S03 at 13:50 and duplicate. OVM = 0.0 - 0.3 ppm in soil. Hand auger to hardpan at 3.5 ft.
	3.6-5.0	100%	CC			
4					SILTY SAND (SM). Reddish brown (5YR 4/4), damp, dense, fine to coarse subangular quartz and lithic sand with 15-20%	
5	5.0-8.0	100%	CC		fines, no odor.	OVM = 0.0 ppm in soil.
6						
7					SILT (ML). Gray (7.5YR 5/1), damp, stiff, non-plastic, no dry strength, no sand, no odor.	
8						Collect CS49S013-S08 hold at 14:00.
9						End of boring at 8 ft. Backfill with native materials and asphalt patch.
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Attachment D4
Technical Memorandum: AOC H-12 (Building 929) Indoor and Ambient Air Samples

URS

TECHNICAL MEMORANDUM

TO: **Ken Smarkel, Noblis, AFRPA SVE Remedial Project Manager**

FROM: **Paul Graff, URS McClellan SVE Project Manager**

DATE: **9 November 2007**

RE: **AOC H-12 (Building 929) Indoor and Ambient Air Samples**

The purpose of this technical memorandum (tech memo) is to document the collection and analysis of two indoor and one ambient (outdoor) air samples in and near Building 929 at McClellan Installation Restoration Program (IRP) site AOC H-12 in September 2007. The indoor air samples were collected to compare results with shallow soil gas samples collected immediately beneath the building and to assess possible low levels of chloroform indicated by remedial investigation (RI) downhole soil gas samples. The ambient air sample was collected outside the building to assess ambient conditions while sampling.

The attached map shows the location of AOC H-12 soil gas samples and borings, along with analytical results from the RI samples. The September 2007 samples were analyzed for low-level volatile organic compounds (VOCs) using modified EPA Method TO-15 SIM (selective ion monitoring) by Air Toxics Limited. Each sample was collected over a 24- hour period in a 6-liter, SIM-certified Summa canister equipped with a SIM-certified 24-hour flow controller. The canister was set down on the floor or ground, the initial vacuum was recorded and the flow controller opened. After 24 hours, the sampler returned, closed the controller, and recorded the final vacuum, prior to shipping the canisters to the laboratory.

Indoor Air 1 was collected in the southwest part of the building among office cubicles. Indoor Air 2 was collected in a small room near a floor drain where a boring was to be drilled and sampled. The ambient air sample was collected outside of the building near the northwest corner. The laboratory analytical report and URS chain of custody are attached. Detected analytes are tabulated below.

AOC H-12, Bldg. 929 Air Sample Results (parts-per-billion-by volume)

Analyte	Indoor Air 1	Indoor Air 2	Ambient Air
Chloroform	0.053	0.059	0.077
Benzene	Not Detected	0.95	Not Detected
Toluene	1.7	5.8	1.9
Ethylbenzene	0.88	2.2	Not Detected
m,p-Xylene	3.6	8.5	0.83
o-Xylene	0.93	2.8	Not Detected

Attachments

AOC H-12 Site Map

AOC H-12 (Bldg. 929) Indoor and Ambient Air Samples Laboratory Report and Chain of Custody

ATTACHMENTS

Receipt VFR 9/29/07

0709629

Bldg. #929 12867

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY
THE INSTRUCTIONS FOR FILLING OUT
THIS FORM ARE ON THE BACK

URS

2870 GATEWAY OAKS, SUITE 300
SACRAMENTO, CA 95833
PH. (916) 679-2000
FAX (916) 679-2900

TASK OR SUB TASK (one per form): MCCLN MSSVE H12-CH2M

LABORATORY NAME AND ADDRESS: A. Tecnos LTD, Rancho Cordova, CA

CONTRACT NAME: Mrs Oams SVE September 2007

CHARGE NUMBER: 18C00186.57001

	SAMPLE NUMBER	COLLECTION DATE	COLLECTION TIME	SAMPLER'S INITIALS	NUMBER OF UNITS	UNIT QUANTITY	MATRIX CODE	PRESERVATIVE	TYPE OF ANALYSIS	QC
01A	Indoor Air 1	9/27/07	1515	JF	1	6L Can stor	AA	none	TO15 SIM 6.0"Hg	
02A	Indoor Air 2	9/27/07	1515	JF	1	6L Can stor	AA	none	TO15 SIM 7.5"Hg	
03A	Ambient Air	9/27/07	1515	JF	1	6L Can stor	AA	none	TO15 SIM 5.5"Hg	

JF

RELEASED BY	DATE	TIME	COMMENTS:
[signature]	9/27/07	10:00	

RECEIVED BY	DATE	TIME	RELINQUISHED BY	DATE	TIME
[signature]	9/28/07	12:43		/ /	:
	/ /	:	drop off	/ /	:
	/ /	:	CUSTODY SEAL INTACT? Y N NONE TEMP NA	/ /	:
	/ /	:		/ /	:
	/ /	:		/ /	:

DISPOSAL CONFIRMED BY	DATE	TIME	CHAIN OF CUSTODY RETURNED BY	DATE	TIME
	/ /	:		/ /	:

WHITE - COORDINATOR • PINK - SAMPLE CONTROL • YELLOW - LABORATORY

DO NOT WRITE IN THIS AREA

5/91 1

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Air Toxics Ltd. Introduces the Electronic Report

Thank you for choosing Air Toxics Ltd. To better serve our customers, we are providing your report by e-mail. This document is provided in Portable Document Format which can be viewed with Acrobat Reader by Adobe.

This electronic report includes the following:

- Work order Summary;
- Laboratory Narrative;
- Results; and
- Chain of Custody (copy).

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

(916) 985-1000 .FAX (916) 985-1020
Hours 8:00 A.M to 6:00 P.M. Pacific

Air Toxics LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0709629

Work Order Summary

CLIENT:	Ms. Lynn Sandsor URS Corporation 2870 Gateway Oaks Drive Suite 300 Sacramento, CA 95833	**BILL TO:**	Ms. Lynn Sandsor URS Corporation 2870 Gateway Oaks Drive Suite 300 Sacramento, CA 95833
PHONE:	916-679-2237	**P.O. #**	
FAX:	916-679-2900	**PROJECT #**	18600186.57001 MCCLN MSSVE H12-CH2M
DATE RECEIVED:	09/28/2007	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	10/10/2007		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.
01A	IndoorAir 1	Modified TO-15 SIM	6.0 "Hg
02A	IndoorAir 2	Modified TO-15 SIM	7.5 "Hg
02AA	IndoorAir 2 Lab Duplicate	Modified TO-15 SIM	7.5 "Hg
03A	Ambient Air	Modified TO-15 SIM	5.5 "Hg
04A	Lab Blank	Modified TO-15 SIM	NA
05A	CCV	Modified TO-15 SIM	NA
06A	LCS	Modified TO-15 SIM	NA

CERTIFIED BY: Linda D. Frumarn DATE: 10/10/07

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004
NY NELAP - 11291, UT NELAP - 9166389892
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/07, Expiration date: 06/30/08
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

AN ENVIRONMENTAL ANALYTICAL LABORATORY

LABORATORY NARRATIVE
Modified TO-15 SIM
URS Corporation
Workorder# 0709629

Three 6 Liter Summa Canister (OTS Certified Overnight) samples were received on September 28, 2007. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the SIM acquisition mode. The method involves concentrating up to 0.5 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
ICAL %RSD acceptance criteria	</=30% RSD with 2 compounds allowed out to < 40% RSD	Project specific; default criteria is </=30% RSD with 10% of compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	Project specific; default criteria is </= 30% Difference with 10% of compounds allowed out up to </=40%.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM

Client Sample ID: IndoorAir 1

Lab ID#: 0709629-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Chloroform	0.017	0.053	0.082	0.26
Toluene	0.84	1.7	3.2	6.6
Ethyl Benzene	0.84	0.88	3.6	3.8
m,p-Xylene	0.84	3.6	3.6	15
o-Xylene	0.84	0.93	3.6	4.0

Client Sample ID: IndoorAir 2

Lab ID#: 0709629-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Chloroform	0.018	0.059	0.087	0.29
Benzene	0.90	0.95	2.8	3.0
Toluene	0.90	5.8	3.4	22
Ethyl Benzene	0.90	2.2	3.9	9.6
m,p-Xylene	0.90	8.5	3.9	37
o-Xylene	0.90	2.8	3.9	12

Client Sample ID: IndoorAir 2 Lab Duplicate

Lab ID#: 0709629-02AA

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Chloroform	0.018	0.058	0.087	0.28
Benzene	0.90	0.96	2.8	3.0
Toluene	0.90	5.8	3.4	22
Ethyl Benzene	0.90	2.2	3.9	9.6
m,p-Xylene	0.90	8.6	3.9	37
o-Xylene	0.90	2.8	3.9	12

Client Sample ID: Ambient Air

Lab ID#: 0709629-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Chloroform	0.016	0.077	0.080	0.38
Toluene	0.82	1.9	3.1	7.0
m,p-Xylene	0.82	0.83	3.6	3.6

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: IndoorAir 1

Lab ID#: 0709629-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**a100419**	**Date of Collection: 9/27/07**	
Dil. Factor:	**1.68**	**Date of Analysis: 10/5/07 01:31 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Chloroform	0.017	0.053	0.082	0.26
Freon 12	0.84	Not Detected	4.2	Not Detected
Chloromethane	0.84	Not Detected	1.7	Not Detected
Vinyl Chloride	0.84	Not Detected	2.1	Not Detected
Freon 11	0.84	Not Detected	4.7	Not Detected
Freon 113	0.84	Not Detected	6.4	Not Detected
1,1-Dichloroethene	0.84	Not Detected	3.3	Not Detected
Methylene Chloride	0.84	Not Detected	2.9	Not Detected
trans-1,2-Dichloroethene	0.84	Not Detected	3.3	Not Detected
1,1-Dichloroethane	0.84	Not Detected	3.4	Not Detected
cis-1,2-Dichloroethene	0.84	Not Detected	3.3	Not Detected
1,1,1-Trichloroethane	0.84	Not Detected	4.6	Not Detected
Carbon Tetrachloride	0.84	Not Detected	5.3	Not Detected
Benzene	0.84	Not Detected	2.7	Not Detected
1,2-Dichloroethane	0.84	Not Detected	3.4	Not Detected
Trichloroethene	0.84	Not Detected	4.5	Not Detected
Toluene	0.84	1.7	3.2	6.6
Tetrachloroethene	0.84	Not Detected	5.7	Not Detected
Chlorobenzene	0.84	Not Detected	3.9	Not Detected
Ethyl Benzene	0.84	0.88	3.6	3.8
m,p-Xylene	0.84	3.6	3.6	15
o-Xylene	0.84	0.93	3.6	4.0

Container Type: 6 Liter Summa Canister (OTS Certified Overnight)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	116	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: IndoorAir 2

Lab ID#: 0709629-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**a100420**	**Date of Collection: 9/27/07**	
Dil. Factor:	**1.79**	**Date of Analysis: 10/5/07 02:21 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Chloroform	0.018	0.059	0.087	0.29
Freon 12	0.90	Not Detected	4.4	Not Detected
Chloromethane	0.90	Not Detected	1.8	Not Detected
Vinyl Chloride	0.90	Not Detected	2.3	Not Detected
Freon 11	0.90	Not Detected	5.0	Not Detected
Freon 113	0.90	Not Detected	6.8	Not Detected
1,1-Dichloroethene	0.90	Not Detected	3.5	Not Detected
Methylene Chloride	0.90	Not Detected	3.1	Not Detected
trans-1,2-Dichloroethene	0.90	Not Detected	3.5	Not Detected
1,1-Dichloroethane	0.90	Not Detected	3.6	Not Detected
cis-1,2-Dichloroethene	0.90	Not Detected	3.5	Not Detected
1,1,1-Trichloroethane	0.90	Not Detected	4.9	Not Detected
Carbon Tetrachloride	0.90	Not Detected	5.6	Not Detected
Benzene	0.90	0.95	2.8	3.0
1,2-Dichloroethane	0.90	Not Detected	3.6	Not Detected
Trichloroethene	0.90	Not Detected	4.8	Not Detected
Toluene	0.90	5.8	3.4	22
Tetrachloroethene	0.90	Not Detected	6.1	Not Detected
Chlorobenzene	0.90	Not Detected	4.1	Not Detected
Ethyl Benzene	0.90	2.2	3.9	9.6
m,p-Xylene	0.90	8.5	3.9	37
o-Xylene	0.90	2.8	3.9	12

Container Type: 6 Liter Summa Canister (OTS Certified Overnight)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	117	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: IndoorAir 2 Lab Duplicate

Lab ID#: 0709629-02AA

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**a100422**	**Date of Collection: 9/27/07**	
Dil. Factor:	**1.79**	**Date of Analysis: 10/5/07 03:59 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Chloroform	0.018	0.058	0.087	0.28
Freon 12	0.90	Not Detected	4.4	Not Detected
Chloromethane	0.90	Not Detected	1.8	Not Detected
Vinyl Chloride	0.90	Not Detected	2.3	Not Detected
Freon 11	0.90	Not Detected	5.0	Not Detected
Freon 113	0.90	Not Detected	6.8	Not Detected
1,1-Dichloroethene	0.90	Not Detected	3.5	Not Detected
Methylene Chloride	0.90	Not Detected	3.1	Not Detected
trans-1,2-Dichloroethene	0.90	Not Detected	3.5	Not Detected
1,1-Dichloroethane	0.90	Not Detected	3.6	Not Detected
cis-1,2-Dichloroethene	0.90	Not Detected	3.5	Not Detected
1,1,1-Trichloroethane	0.90	Not Detected	4.9	Not Detected
Carbon Tetrachloride	0.90	Not Detected	5.6	Not Detected
Benzene	0.90	0.96	2.8	3.0
1,2-Dichloroethane	0.90	Not Detected	3.6	Not Detected
Trichloroethene	0.90	Not Detected	4.8	Not Detected
Toluene	0.90	5.8	3.4	22
Tetrachloroethene	0.90	Not Detected	6.1	Not Detected
Chlorobenzene	0.90	Not Detected	4.1	Not Detected
Ethyl Benzene	0.90	2.2	3.9	9.6
m,p-Xylene	0.90	8.6	3.9	37
o-Xylene	0.90	2.8	3.9	12

Container Type: 6 Liter Summa Canister (OTS Certified Overnight)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	116	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: Ambient Air

Lab ID#: 0709629-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**a100421**	**Date of Collection: 9/27/07**	
Dil. Factor:	**1.64**	**Date of Analysis: 10/5/07 03:07 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Chloroform	0.016	0.077	0.080	0.38
Freon 12	0.82	Not Detected	4.0	Not Detected
Chloromethane	0.82	Not Detected	1.7	Not Detected
Vinyl Chloride	0.82	Not Detected	2.1	Not Detected
Freon 11	0.82	Not Detected	4.6	Not Detected
Freon 113	0.82	Not Detected	6.3	Not Detected
1,1-Dichloroethene	0.82	Not Detected	3.2	Not Detected
Methylene Chloride	0.82	Not Detected	2.8	Not Detected
trans-1,2-Dichloroethene	0.82	Not Detected	3.2	Not Detected
1,1-Dichloroethane	0.82	Not Detected	3.3	Not Detected
cis-1,2-Dichloroethene	0.82	Not Detected	3.2	Not Detected
1,1,1-Trichloroethane	0.82	Not Detected	4.5	Not Detected
Carbon Tetrachloride	0.82	Not Detected	5.2	Not Detected
Benzene	0.82	Not Detected	2.6	Not Detected
1,2-Dichloroethane	0.82	Not Detected	3.3	Not Detected
Trichloroethene	0.82	Not Detected	4.4	Not Detected
Toluene	0.82	1.9	3.1	7.0
Tetrachloroethene	0.82	Not Detected	5.6	Not Detected
Chlorobenzene	0.82	Not Detected	3.8	Not Detected
Ethyl Benzene	0.82	Not Detected	3.6	Not Detected
m,p-Xylene	0.82	0.83	3.6	3.6
o-Xylene	0.82	Not Detected	3.6	Not Detected

Container Type: 6 Liter Summa Canister (OTS Certified Overnight)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	117	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: Lab Blank

Lab ID#: 0709629-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**a100405**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/4/07 02:30 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Chloroform	0.010	Not Detected	0.049	Not Detected
Freon 12	0.50	Not Detected	2.5	Not Detected
Chloromethane	0.50	Not Detected	1.0	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Methylene Chloride	0.50	Not Detected	1.7	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	111	70-130

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: CCV

Lab ID#: 0709629-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**a100402**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/4/07 10:57 AM**	

Compound	%Recovery
Chloroform	94
Freon 12	82
Chloromethane	82
Vinyl Chloride	77
Freon 11	99
Freon 113	90
1,1-Dichloroethene	92
Methylene Chloride	91
trans-1,2-Dichloroethene	95
1,1-Dichloroethane	90
cis-1,2-Dichloroethene	96
1,1,1-Trichloroethane	94
Carbon Tetrachloride	100
Benzene	91
1,2-Dichloroethane	93
Trichloroethene	86
Toluene	92
Tetrachloroethene	90
Chlorobenzene	95
Ethyl Benzene	101
m,p-Xylene	104
o-Xylene	104

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	118	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: LCS

Lab ID#: 0709629-06A

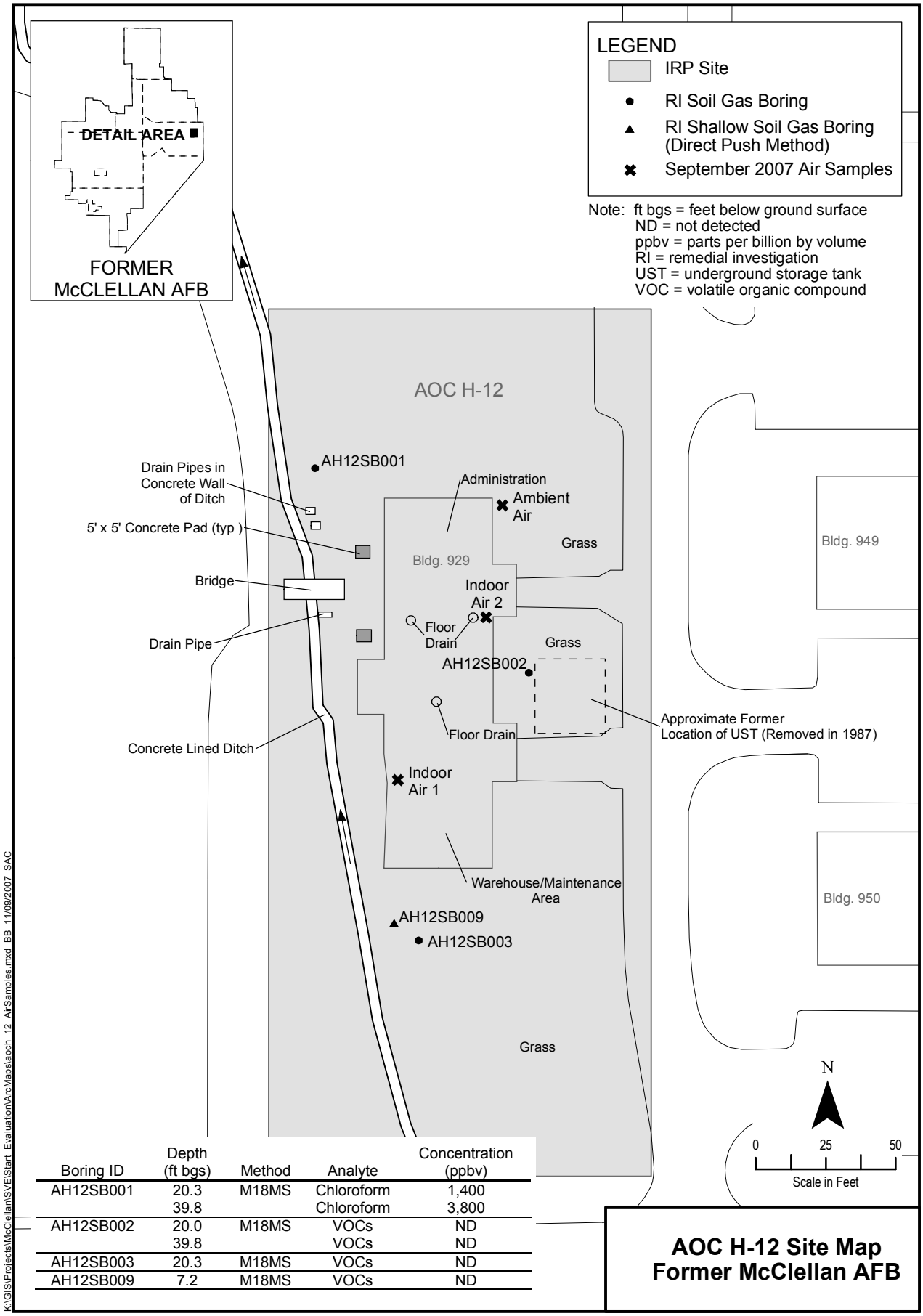
MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**a100403**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/4/07 11:52 AM**	

Compound	%Recovery
Chloroform	95
Freon 12	78
Chloromethane	79
Vinyl Chloride	79
Freon 11	95
Freon 113	97
1,1-Dichloroethene	100
Methylene Chloride	96
trans-1,2-Dichloroethene	94
1,1-Dichloroethane	93
cis-1,2-Dichloroethene	96
1,1,1-Trichloroethane	93
Carbon Tetrachloride	101
Benzene	89
1,2-Dichloroethane	93
Trichloroethene	84
Toluene	93
Tetrachloroethene	90
Chlorobenzene	93
Ethyl Benzene	96
m,p-Xylene	99
o-Xylene	99

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	116	70-130



Boring ID	Depth (ft bgs)	Method	Analyte	Concentration (ppbv)
AH12SB001	20.3	M18MS	Chloroform	1,400
	39.8		Chloroform	3,800
AH12SB002	20.0	M18MS	VOCs	ND
	39.8		VOCs	ND
AH12SB003	20.3	M18MS	VOCs	ND
AH12SB009	7.2	M18MS	VOCs	ND

AOC H-12 Site Map
Former McClellan AFB

Attachment D5
Technical Memorandum: AOC H-12 (Building 948) Indoor and Ambient Air Samples

TECHNICAL MEMORANDUM

TO: **Ken Smarkel, Noblis, AFRPA SVE Remedial Project Manager**

FROM: **Paul Graff, URS McClellan SVE Project Manager**

DATE: **22 April 2008**

RE: **AOC H-12 (Building 948) Indoor and Ambient Air Samples**

The purpose of this technical memorandum (tech memo) is to document the collection and analysis of two indoor and one ambient (outdoor) air samples in and near Building 948 at McClellan Installation Restoration Program (IRP) site AOC H-12 in March 2008. The indoor air samples were collected to compare results with shallow soil gas samples collected immediately beneath the building and to assess possible low levels of chloroform indicated by remedial investigation (RI) downhole soil gas samples. The ambient air sample was collected outside the building to assess ambient conditions while sampling.

The attached map shows the location of AOC H-12 soil gas samples and borings, along with analytical results from the RI samples. The March 2008 samples were analyzed for low-level volatile organic compounds (VOCs) using modified EPA Method TO-15 SIM (selective ion monitoring) by Air Toxics Limited. Each sample was collected over a 24- hour period in a 6-liter, SIM-certified Summa canister equipped with a SIM-certified 24-hour flow controller. The canisters were at approximately five feet or breathing zone by setting them on desk or shelf tops. The initial vacuum was recorded and the flow controller opened. After 24 hours, the sampler returned, closed the controller, and recorded the final vacuum, prior to shipping the canisters to the laboratory.

B948-SE-NS was collected in the south part of the building in office number 103. B948-NW-NS was collected in a room in the center of the building with a field duplicate. The ambient air sample was collected outside of the building on the South side near the main entrance. The laboratory analytical report and URS chain of custody are attached. Detected analytes are tabulated below.

AOC H-12, Bldg. 948 Air Sample Results (parts-per-billion-by volume)

Analyte	B948-SE-NS	B948-NW-NS	B948-NW-FD	Ambient Air
Chloroform	ND	ND	ND	ND
Benzene	0.21	0.23	0.26	0.19
Toluene	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND
m,p-Xylene	ND	ND	ND	ND
o-Xylene	ND	ND	ND	ND
Napthalene	ND	1.0	5.2	ND

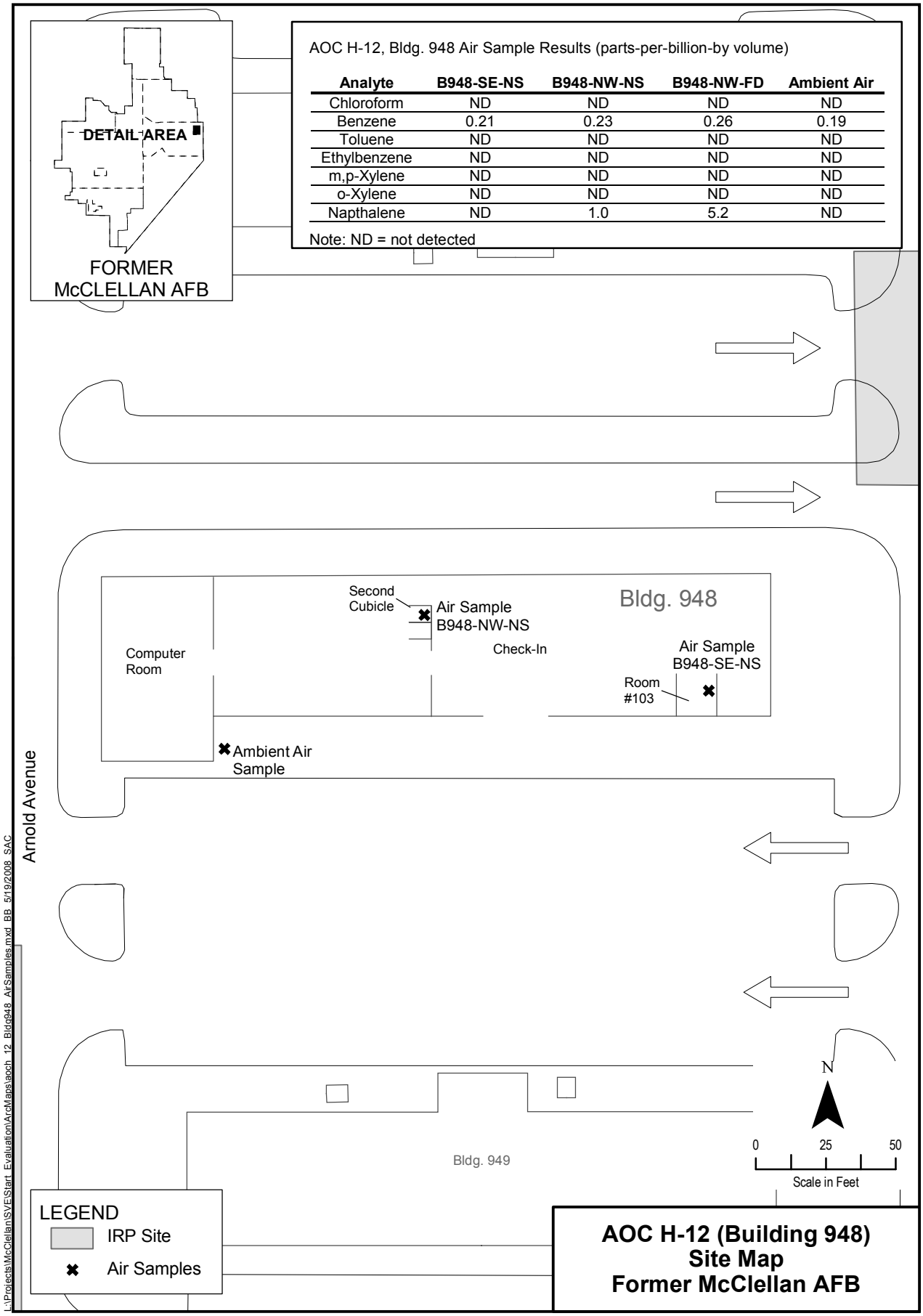
URS

TECHNICAL MEMORANDUM

PCE	ND	0.040	0.044	ND

Attachments

AOC H-12 (Bldg. 948) Indoor and Ambient Air Samples Laboratory Report and Chain of Custody


DETAIL AREA
FORMER
McCLELLAN AFB
AOC H-12, Bldg. 948 Air Sample Results (parts-per-billion-by volume)
Analyte | B948-SE-NS | B948-NW-NS | B948-NW-FD | Ambient Air
Chloroform | ND | ND | ND | ND
Benzene | 0.21 | 0.23 | 0.26 | 0.19
Toluene | ND | ND | ND | ND
Ethylbenzene | ND | ND | ND | ND
m,p-Xylene | ND | ND | ND | ND
o-Xylene | ND | ND | ND | ND
Napthalene | ND | 1.0 | 5.2 | ND
Note: ND = not detected
Second Cubicle
Air Sample B948-NW-NS
Bldg. 948
Computer Room
Check-In
Air Sample B948-SE-NS
Room #103
Ambient Air Sample
Arnold Avenue
Bldg. 949
N
0
25
50
Scale in Feet
LEGEND
IRP Site
Air Samples
AOC H-12 (Building 948)
Site Map
Former McClellan AFB
L:\Projects\McClellan\SVEStart Evaluation\ArcMaps\aoch 12 Bldg948 AirSamples.mxd BB 5/19/2008 SAC

ATTACHMENTS

0803541

375428

CHAIN OF CUSTODY RECORD

USE A BALLPOINT PEN AND PRESS FIRMLY
SEE INSTRUCTIONS FOR FILLING OUT
THIS FORM ARE ON THE BACK

URS

2870 GATEWAY OAKS, SUITE 300
SACRAMENTO, CA 95833
PH. (916) 679-2000
FAX (916) 679-2900

TASK OR SUB TASK (one per form): MOOLN MSSVE 8948

LABORATORY NAME AND ADDRESS: Air Toxics LTD, Rancho Cordova, CA

CONTRACT NAME: MRS OAMS SVE, Air sampling at Building 948

CHARGE NUMBER: 18600168.57001

SAMPLE NUMBER	COLLECTION DATE	COLLECTION TIME	SAMPLERS (INITIALS)	NUMBER OF UNITS	CONTAINER TYPE	MATRIX CODE	PRESERVATIVE	TYPE OF ANALYSIS	QC
8948-NW-FD	3/25/08	0921	JN	1	6 L Canister	AI	NONE	TO15-HiLo	
8948-NW-NS	3/25/08	0921	JN	1	6 L Canister	AI	NONE	TO15-HiLo	
8948-S-AAS	3/25/08	0857	JN	1	6 L Canister	AA	NONE	TO15-HiLo	
8948-SE-NS	3/25/08	0931	JN	1	6 L Canister	AI	NONE	TO15-HiLo	

CUSTODY SEAL INTACT?
Y N NONE TEMP AA

RELEASED BY	DATE	TIME	COOLER ID:
	3/25/08	10:15	COMMENTS:

RECEIVED BY	DATE	TIME	RELINQUISHED BY	DATE	TIME
	3/25/08	11:10		/ /	:
	/ /	:		/ /	:
	/ /	:		/ /	:
	/ /	:		/ /	:
	/ /	:		/ /	:

DISPOSAL CONFIRMED BY	DATE	TIME	CHAIN OF CUSTODY RETURNED BY	DATE	TIME
	/ /	:		/ /	:

WHITE - COORDINATOR • PINK - SAMPLE CONTROL • YELLOW - LABORATORY

McClellan AFB Site 7502 Page 773 of 1773 AR # 6504

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Air Toxics Ltd. Introduces the Electronic Report

Thank you for choosing Air Toxics Ltd. To better serve our customers, we are providing your report by e-mail. This document is provided in Portable Document Format which can be viewed with Acrobat Reader by Adobe.

This electronic report includes the following:

- Work order Summary;
- Laboratory Narrative;
- Results; and
- Chain of Custody (copy).

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

(916) 985-1000 .FAX (916) 985-1020
Hours 8:00 A.M to 6:00 P.M. Pacific

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0803541

Work Order Summary

CLIENT:	Ms. Lynn Sandsor URS Corporation 2870 Gateway Oaks Drive Suite 300 Sacramento, CA 95833	**BILL TO:**	Ms. Lynn Sandsor URS Corporation 2870 Gateway Oaks Drive Suite 300 Sacramento, CA 95833
PHONE:	916-679-2237	**P.O. #**	
FAX:	916-679-2900	**PROJECT #**	18600186.57001 MCCLN MSSVE B948
DATE RECEIVED:	03/25/2008	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	04/07/2008		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	B948-NW-FD	Modified TO-15	6.0 "Hg	5 psi
01B	B948-NW-FD	Modified TO-15	6.0 "Hg	5 psi
02A	B948-NW-NS	Modified TO-15	5.0 "Hg	5 psi
02B	B948-NW-NS	Modified TO-15	5.0 "Hg	5 psi
03A	B948-S-AAS	Modified TO-15	4.5 "Hg	5 psi
03B	B948-S-AAS	Modified TO-15	4.5 "Hg	5 psi
04A	B948-SE-NS	Modified TO-15	5.0 "Hg	5 psi
04B	B948-SE-NS	Modified TO-15	5.0 "Hg	5 psi
05A	Lab Blank	Modified TO-15	NA	NA
05B	Lab Blank	Modified TO-15	NA	NA
06A	CCV	Modified TO-15	NA	NA
06B	CCV	Modified TO-15	NA	NA
07A	LCS	Modified TO-15	NA	NA
07B	LCS	Modified TO-15	NA	NA

CERTIFIED BY: Linda D. Frumarn DATE: 04/07/08

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004
NY NELAP - 11291, UT NELAP - 9166389892
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/07, Expiration date: 06/30/08
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

AN ENVIRONMENTAL ANALYTICAL LABORATORY

LABORATORY NARRATIVE
Modified TO-15 Full Scan/SIM
URS Corporation
Workorder# 0803541

Four 6 Liter Summa Special (SIM Certified) samples were received on March 25, 2008. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the Full Scan and SIM acquisition modes. The method involves concentrating up to 1.0 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
ICAL %RSD acceptance criteria	</=30% RSD with 2 compounds allowed out to < 40% RSD	For Full Scan: 30% RSD with 4 compounds allowed out to < 40% RSD For SIM: Project specific; default criteria is </=30% RSD with 10% of compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	For Full Scan: </= 30% Difference with four allowed out up to </=40%.; flag and narrate outliers For SIM: Project specific; default criteria is </= 30% Difference with 10% of compounds allowed out up to </=40%.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The results for each sample in this report were acquired from two separate data files originating from the same analytical run. The two data files have the same base file name and are differentiated with a "sim" extension on the SIM data file.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

Client Sample ID: B948-NW-FD

Lab ID#: 0803541-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Naphthalene	0.84	5.2	4.4	27

Client Sample ID: B948-NW-FD

Lab ID#: 0803541-01B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	0.084	0.26	0.27	0.84
Tetrachloroethene	0.034	0.044	0.23	0.30

Client Sample ID: B948-NW-NS

Lab ID#: 0803541-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Naphthalene	0.80	1.0	4.2	5.5

Client Sample ID: B948-NW-NS

Lab ID#: 0803541-02B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	0.080	0.23	0.26	0.75
Tetrachloroethene	0.032	0.040	0.22	0.27

Client Sample ID: B948-S-AAS

Lab ID#: 0803541-03A

No Detections Were Found.

Client Sample ID: B948-S-AAS

Lab ID#: 0803541-03B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	0.079	0.19	0.25	0.61

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

Client Sample ID: B948-SE-NS

Lab ID#: 0803541-04A

No Detections Were Found.

Client Sample ID: B948-SE-NS

Lab ID#: 0803541-04B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	0.080	0.21	0.26	0.66

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: B948-NW-FD

Lab ID#: 0803541-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040220**	**Date of Collection: 3/25/08**	
Dil. Factor:	**1.68**	**Date of Analysis: 4/3/08 01:00 AM**	

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (uG/m3)**	**Amount (uG/m3)**
Chloroform	0.17	Not Detected	0.82	Not Detected
Carbon Tetrachloride	0.17	Not Detected	1.0	Not Detected
Naphthalene	0.84	5.2	4.4	27

Container Type: 6 Liter Summa Special (SIM Certified)

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	100	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: B948-NW-FD

Lab ID#: 0803541-01B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040220sim**	**Date of Collection: 3/25/08**	
Dil. Factor:	**1.68**	**Date of Analysis: 4/3/08 01:00 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	0.084	0.26	0.27	0.84
Trichloroethene	0.034	Not Detected	0.18	Not Detected
Tetrachloroethene	0.034	0.044	0.23	0.30

Container Type: 6 Liter Summa Special (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	97	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: B948-NW-NS

Lab ID#: 0803541-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040221**	**Date of Collection: 3/25/08**	
Dil. Factor:	**1.61**	**Date of Analysis: 4/3/08 01:52 AM**	

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (uG/m3)**	**Amount (uG/m3)**
Chloroform	0.16	Not Detected	0.79	Not Detected
Carbon Tetrachloride	0.16	Not Detected	1.0	Not Detected
Naphthalene	0.80	1.0	4.2	5.5

Container Type: 6 Liter Summa Special (SIM Certified)

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	90	70-130
4-Bromofluorobenzene	100	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: B948-NW-NS

Lab ID#: 0803541-02B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040221sim**	**Date of Collection: 3/25/08**	
Dil. Factor:	**1.61**	**Date of Analysis: 4/3/08 01:52 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	0.080	0.23	0.26	0.75
Trichloroethene	0.032	Not Detected	0.17	Not Detected
Tetrachloroethene	0.032	0.040	0.22	0.27

Container Type: 6 Liter Summa Special (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	114	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	96	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: B948-S-AAS

Lab ID#: 0803541-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040222**	**Date of Collection: 3/25/08**	
Dil. Factor:	**1.58**	**Date of Analysis: 4/3/08 02:35 AM**	

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (uG/m3)**	**Amount (uG/m3)**
Chloroform	0.16	Not Detected	0.77	Not Detected
Carbon Tetrachloride	0.16	Not Detected	0.99	Not Detected
Naphthalene	0.79	Not Detected	4.1	Not Detected

Container Type: 6 Liter Summa Special (SIM Certified)

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	102	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: B948-S-AAS

Lab ID#: 0803541-03B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040222sim**	**Date of Collection: 3/25/08**	
Dil. Factor:	**1.58**	**Date of Analysis: 4/3/08 02:35 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	0.079	0.19	0.25	0.61
Trichloroethene	0.032	Not Detected	0.17	Not Detected
Tetrachloroethene	0.032	Not Detected	0.21	Not Detected

Container Type: 6 Liter Summa Special (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	100	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: B948-SE-NS

Lab ID#: 0803541-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040223**	**Date of Collection: 3/25/08**	
Dil. Factor:	**1.61**	**Date of Analysis: 4/3/08 03:20 AM**	

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (uG/m3)**	**Amount (uG/m3)**
Chloroform	0.16	Not Detected	0.79	Not Detected
Carbon Tetrachloride	0.16	Not Detected	1.0	Not Detected
Naphthalene	0.80	Not Detected	4.2	Not Detected

Container Type: 6 Liter Summa Special (SIM Certified)

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	103	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	106	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: B948-SE-NS

Lab ID#: 0803541-04B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040223sim**	**Date of Collection:**	**3/25/08**
Dil. Factor:	**1.61**	**Date of Analysis:**	**4/3/08 03:20 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Benzene	0.080	0.21	0.26	0.66
Trichloroethene	0.032	Not Detected	0.17	Not Detected
Tetrachloroethene	0.032	Not Detected	0.22	Not Detected

Container Type: 6 Liter Summa Special (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	99	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: Lab Blank

Lab ID#: 0803541-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/2/08 12:51 PM**	

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (uG/m3)**	**Amount (uG/m3)**
Chloroform	0.10	Not Detected	0.49	Not Detected
Carbon Tetrachloride	0.10	Not Detected	0.63	Not Detected
Naphthalene	0.50	Not Detected	2.6	Not Detected

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	103	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	98	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: Lab Blank

Lab ID#: 0803541-05B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040204sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/2/08 12:51 PM**	

Compound	**Rpt. Limit (ppbv)**	**Amount (ppbv)**	**Rpt. Limit (uG/m3)**	**Amount (uG/m3)**
Benzene	0.050	Not Detected	0.16	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	94	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: CCV

Lab ID#: 0803541-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/2/08 10:33 AM**	

Compound	**%Recovery**
Chloroform	95
Carbon Tetrachloride	106
Naphthalene	107

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	104	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: CCV

Lab ID#: 0803541-06B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040202sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/2/08 10:33 AM**	

Compound	**%Recovery**
Benzene	92
Trichloroethene	84
Tetrachloroethene	81

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	100	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: LCS

Lab ID#: 0803541-07A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/2/08 11:30 AM**	

Compound	**%Recovery**
Chloroform	97
Carbon Tetrachloride	106
Naphthalene	103

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	103	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: LCS

Lab ID#: 0803541-07B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**z040203sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/2/08 11:30 AM**	

Compound	**%Recovery**
Benzene	90
Trichloroethene	84
Tetrachloroethene	81

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	101	70-130

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