

**GROUP 7 – NORTHERN PORTION OF AREA IV
RCRA FACILITY INVESTIGATION REPORT
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA**

VOLUME II – RFI SITE REPORTS

APPENDIX B

BUILDING 4133 SODIUM BURN FACILITY (SWMU 7.2)

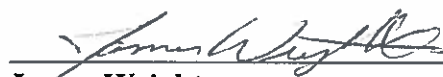
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LIST OF ACRONYMS AND ABBREVIATIONS

AI	Atomics International
ALARA	As Low as Reasonably Achievable
AOC	Area of Concern
AST	aboveground storage tank
B4133	Building 4133
BBC	Brandeis-Bardin Campus
bgs	below ground surface
BMP	Best Management Practices
Boeing	The Boeing Company
CCR	Current Conditions Report
CFOU	Chatsworth Formation Operable Unit
CMS	Corrective Measures Study
COPC	chemical of potential concern
CPEC	chemical of potential ecological concern
Cs-137	cesium-137
CUA	chemical use area
D&D	Decontamination and Decommissioning
DHS	Department of Health Services
Dioxins/Furans	(a) - <i>see table below</i>
DOE	Department of Energy
DTSC	Department of Toxic Substances Control
ECL	Environmental Chemistry Laboratory
EcoRBSL	ecological risk-based screening level
ENTS	Engineered Natural Treatment System
EPC	Exposure Point Concentration
ERA	Ecological risk assessment
ETEC	Energy Technology Engineering Center
Freon 113	1,1,2-trichlorotrifluoroethane
H&A	Haley and Aldrich
HI	hazard index
HQ	hazard quotient

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

HRA	human health risk assessment
HSA	Historical Site Assessment
HWMF	Hazardous Waste Management Facility
HWSF	Hazardous Waste Storage Facility
HWTF	Hazardous Waste Treatment Facility
ICF	ICF Kaiser Engineers
ILCR	Incremental Lifetime Cancer Risks
ISF	Interim Storage Facility
K	potassium
KOH	potassium hydroxide
lb	pound
Li	lithium
LiH	lithium hydride
LMEC	Liquid Metal Engineering Center
mg/kg	milligrams per kilogram
mR/hr	miliroentgen per hour
mrad/hr	milirad per hour
msl	mean sea level
MWH	MWH, Inc
NAA	North American Aviation
Na	sodium
NaK	sodium-potassium alloy
NaOH	sodium hydroxide
NFA	No Further Action
ng/kg	nanograms per kilogram
NPDES	National Pollutant Discharge Elimination System
NSGW	near-surface groundwater
Ogden	Ogden Environmental and Energy Services Company, Inc.
OMRE	Organic Moderated Reactor Experiment
ORISE	Oak Ridge Institute for Science and Education
OU	operable unit

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
pCi/g	picocuries per gram
PVC	polyvinyl chloride
QA	quality assurance
RBSL	risk-based screening level
RCRA	Resource Conservation and Recovery Act
ResRBSL	residential risk-based screening level
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RME	reasonable maximum exposure
RMHF	Radioactive Materials Handling Facility
Rockwell	Rockwell International
SAIC	Science Applications International Corporation
Sapere	Sapere Consulting Inc.
SNAP	Systems for Nuclear Auxiliary Power
SRAM	Standardized Risk Assessment Methodology Work Plan
SRE	Sodium Reactor Experiment
SSFL	Santa Susana Field Laboratory
Surficial OU	Surficial Media Operable Unit
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TCE	trichloroethene
TPH	total petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
UST	underground storage tank
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
VOC	volatile organic compound
WPA	RFI Work Plan Addendum
WPAA	RFI Work Plan Addendum Amendment
Zr	zirconium

(a) Definition of dioxin/furan congeners

PCDD/PCDFs	Polychlorinated dibenzo-p-dioxins/dibenzofurans
2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
1,2,3,7,8-PeCDD	1,2,3,7,8-pentachlorodibenzo-p-dioxin
1,2,3,4,7,8-HxCDD	1,2,3,4,7,8-hexachlorodibenzo-p-dioxin
1,2,3,6,7,8-HxCDD	1,2,3,6,7,8-hexachlorodibenzo-p-dioxin
1,2,3,7,8,9-HxCDD	1,2,3,7,8,9-hexachlorodibenzo-p-dioxin
1,2,3,4,6,7,8-HpCDD	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin
OCDD	1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin
2,3,7,8-TCDF	2,3,7,8-tetrachlorodibenzofuran
1,2,3,7,8-PeCDF	1,2,3,7,8-pentachlorodibenzofuran
2,3,4,7,8-PeCDF	2,3,4,7,8-pentachlorodibenzofuran
1,2,3,4,7,8-HxCDF	1,2,3,4,7,8-hexachlorodibenzofuran
1,2,3,6,7,8-HxCDF	1,2,3,6,7,8-hexachlorodibenzofuran
2,3,4,6,7,8-HxCDF	2,3,4,6,7,8-hexachlorodibenzofuran
1,2,3,7,8,9-HxCDF	1,2,3,7,8,9-hexachlorodibenzofuran
1,2,3,4,6,7,8-HpCDF	1,2,3,4,6,7,8-heptachlorodibenzofuran
1,2,3,4,7,8,9-HpCDF	1,2,3,4,7,8,9-heptachlorodibenzofuran
OCDF	1,2,3,4,6,7,8,9-octachlorodibenzofuran
TEQ	Toxic Equivalent (normalized to 2,3,7,8-TCDD)

B.1 INTRODUCTION

This appendix to the Group 7 Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI) Report presents a site report detailing findings and recommendations for the investigation of the Building 4133 (B4133) RFI Site at the Santa Susana Field Laboratory (SSFL). The B4133 RFI Site is comprised of Solid Waste Management Unit (SWMU) 7.2 and additional chemical use areas. The RCRA Corrective Action Program at the SSFL is being conducted under the oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC).

The B4133 RFI Site is one of three RFI sites included in the Group 7 RFI Report. An RFI site is defined to comprise SWMUs and AOCs, and includes all associated operational areas where site activities were conducted. In addition, surrounding areas are investigated as needed to evaluate potential chemical impacts from peripheral activities or migration. The other two Group 7 RFI sites are the Radioactive Materials Handling Facility (RMHF) (SWMU 7.6 and AOC) and the Building 4029 Reactive Metal Storage Yard (SWMU 7.11). Buildings 4133 and 4029 previously operated as the Hazardous Waste Management Facility (HWMF), a RCRA permitted hazardous treatment and storage facility for non-radiological chemical wastes generated onsite.

The B4133 RFI Site is located in the northeast portion of Area IV, approximately 900 feet northwest of Building 4029 and approximately 75 feet east of the RMHF RFI site. The location of the B4133 RFI Site within the SSFL and Group 7 Reporting Area is shown on Figure B.1-1.

The B4133 RFI Site was operated by the Energy Technology and Engineering Center (ETEC) division of Rockwell International (predecessor companies of The Boeing Company [Boeing]), on behalf of the Department of Energy (DOE). Prior to 1978, ETEC was known as the Liquid Metal Engineering Center (LMEC).

The SSFL RFI is being conducted to characterize the presence of SSFL operation-related chemicals in environmental media and to estimate risks to human health and the environment (i.e., the ecosystem), gather data for the next phase of RCRA Corrective Action, the Corrective Measures Study (CMS), and identify areas for further work.

The SSFL has been divided into two operable units (OUs): the Surficial Media Operable Unit (Surficial OU) and the Chatsworth Formation Operable Unit (CFOU). The B4133 RFI Site characterization presented in this site report comprises data for both the Surficial OU and CFOU. The Surficial OU includes soil, sediment, surface water, air, biota, and near-surface groundwater (NSGW) at the SSFL. NSGW is defined as groundwater occurring within alluvium or weathered bedrock of the Chatsworth formation. Vadose zone bedrock and deeper groundwater that occurs within unweathered Chatsworth formation bedrock is defined as the CFOU.

DOE SWMUs and AOCs at the SSFL identified as having potential radioactive contamination are addressed by DOE site closure programs under RCRA permits. Any potential chemical contamination within the permitted units is also addressed under the closure programs. Potential chemical contamination outside these permitted facilities is addressed by the RFI (this report) under DTSC oversight, as described in Section B.3.

Typically, RFI fieldwork and reporting at radiological facilities is conducted after DOE has investigated and released the facilities for unrestricted use. In December 2006, DTSC approved the RCRA Closure Plan for the HWMF. The implementation of the closure plan began in 2007 with characterization wipe sampling of the building structures and features at Buildings 4133 and 4029 (see Section B.2.2). However, since May 24, 2007, Decontamination and Decommissioning (D&D) activities in Area IV have been on hold. Due to the delay in radiological closure programs, the RFI fieldwork at the HWMF was conducted at accessible locations prior to full implementation of the closure plan to allow timely reporting of potential impacts for the RFI. Closure plan samples collected as part of the RFI for the B4133 RFI Site are noted on tables presented in this report, and results from these samples included for description of nature and extent and risk assessment evaluations.

B.1.1 Report Organization

This B4133 RFI Site report provides detailed sampling data and evaluation pertaining to the B4133 RFI Site, which includes the relevant information needed to evaluate the completeness of characterization, risk assessment results, and site recommendations based on the receptors evaluated. This information is presented in sections organized as follows:

- **Section B.2 – Site History, Chemical Use, and Current Conditions.** Presents the site history and chemical use, and the current conditions including geology and groundwater conditions.

- **Section B.3 – Nature and Extent of Chemical Impacts.** Presents a summary of Surficial OU, NSGW, and CFOU characterization information for the B4133 RFI Site.
- **Section B.4 – Risk Assessment Findings Summary.** Presents a summary of the human health risk assessment (HRA) and ecological risk assessment (ERA) results; the complete Building 4133 RFI Risk Assessment is included in Appendix E, Attachment E-2.
- **Section B.5 – Site Actions Recommendations.** Presents a summary of chemical use areas recommended for no further action (NFA), further characterization in the CMS, and areas identified for stabilization to prevent chemical contaminant migration.
- **Section B.6 – References.** Presents the references cited in this site report.

Site-specific additional information is provided in the following attachments:

- **Attachment B-1:** Site-specific regulatory agency documents and correspondence.
- **Attachment B-2:** Subsurface information (soil borings, trench, piezometer, and well logs).
- **Attachment B-3:** Data quality, validation, and laboratory reports.
- **Attachment B-4:** Building Evaluation Documentation Logs. Includes documentation (maps, logs, and photos) for building features as outlined in the Standard Operating Procedure: Building Features Evaluation and Sampling (MWH/CH2M Hill, 2008b).

Information regarding characterization for the B4133 RFI Site is provided in the following figures and tables:

- **Figure B.1-1:** Presents the location of the B4133 RFI Site within the SSFL and the Group 7 Reporting area.
- **Figure B.2-1:** Present views of the B4133 RFI Site, showing known and potential chemical use areas. Tables B.2-1 through B.2-6 present summaries of buildings, tanks, transformers, other features, chemicals used, and spills at the B4133 RFI Site.
- **Figure B.2-2:** Present views of the B4133 RFI Site, showing soil and vapor sampling locations, and nearby monitoring wells.
- **Figure B.2-3:** Presents geologic cross-sections locations and geologic cross sections across the B4133 RFI Site.
- **Figure B.2-4:** Presents a plan view of the soil disturbance areas at the B4133 RFI Site.
- **Figures B.3-1 through B.3-6C:** Present characterization details for all soil and vapor sampling at the B4133 RFI Site. Soil and vapor sampling results are shown on the maps and correlate with appropriate sections of Table B.3-2A.

- **Table B.3-2A:** Presents a description of chemical use areas and a summary of soil and vapor sampling results.
- **Table B.3-2B:** Presents a summary of groundwater characterization.

Information regarding Group 7 area-wide conditions, transport and fate of chemicals between RFI sites, and other evaluations of area-wide issues are contained in the Group 7 RFI Report, and appendices. Pertinent appendices to this Group 7 RFI Report are:

- **Appendix D:** Presents information regarding groundwater conditions in the Group 7 reporting area, including the B4133 RFI Site. Information includes groundwater occurrence and quality, chemical transport, data set representativeness, and supporting data (monitoring results, time-series plots, and hydrographs), as well as an evaluation of naturally occurring constituents.
- **Appendix E:** Presents risk assessment information including a description of any methodology variances from the Standardized Risk Assessment Methodology (SRAM) Work Plan, risk calculations, result tables, and all transport and fate modeling (except groundwater).
- **Appendix F:** Presents the results of the waste debris survey activities performed in 2008 at the SSFL, which consisted of systematic visual inspections of the SSFL for surficial evidence of solid waste (MWH/CH2M Hill, 2008a).
- **Appendix G:** Presents the documentation (maps, logs, and photos) for sewer inspection, in which 2 out of the 2 manholes located in Group 7 were inspected to assess potential releases from the sewer lines.

B.1.2 Historical Reference Documents

Historical documents for the Group 7 Reporting Area are being submitted to DTSC along with this report (Boeing, 2009a). These documents represent a compilation of information from multiple sources that were searched to find SSFL documents relevant to the Group 7 RFI. Included in the document submittal are the available photographs, maps and drawings, manifests, memoranda, tabulations, facility records, correspondence, and reports relevant to site operations and types and sources of chemicals that may have been used, handled, or released in the Group 7 Reporting Area. Documents pertaining to the entire SSFL are also included if they have relevant information also specific to Group 7. These documents were reviewed to: (1) evaluate the history of site operations, (2) identify areas of known or potential chemical use for evaluation in the RFI, (3) compile site characterization data, and (4) identify areas where additional data were required to adequately characterize environmental site conditions. The results of the historical document review and sampling data collected relevant to the B4133 RFI Site are presented in this site report. This document review, coupled with the site characterization data, provides a solid basis for the

recommendations provided in Section B.5 of this report, including areas that are recommended for further evaluation in the CMS and areas that are recommended for NFA.

It is worth noting that information presented in this B4133 RFI Site report is also supplemented by other environmental reports that contain information about site and facility background, Surficial OU Program background, and methodologies/procedures. Key historical documents are listed below with brief descriptions:

- RCRA Facility Assessment (RFA) (Science Applications International Corporation [SAIC], 1991 and 1994):
 - A brief description of the SSFL facility, including an operational history, physical setting information, and regulatory programs and oversight during the late 1980s and early 1990s.
 - Visual inspection records performed at facility operations.
 - Definition and description of SWMUs and AOCs identified during the assessment.
- Current Conditions Report (CCR) (ICF Kaiser Engineers [ICF], 1993):
 - A general description of the SSFL facility, including an operational history, physical setting information, and regulatory programs and oversight during the late 1980s and early 1990s.
 - Descriptions of SWMUs and AOCs, including a presentation of results from environmental sampling performed to assess current conditions.
 - A draft work plan for further investigation during the RFI for selected SWMUs and AOCs.
- RFI Work Plan Addendum (WPA) (Ogden Environmental and Energy Services Company, Inc. [Ogden], 1996), and RFI Work Plan Addendum Amendments (WPAA); (Ogden 2000a; 2000b):
 - Sampling procedures and rationale.
 - RFI site descriptions and operational history.
 - Shallow groundwater characterization sampling and analysis plan for the SSFL.
- RFI Program Report (MWH, 2004):
 - A general description of the SSFL facility, including an operational history, physical setting information, and regulatory programs and oversight.
 - A summary of the RCRA Corrective Action Program being conducted at the SSFL and a description of the OUs.

- A comprehensive description of the Surficial OU field sampling program, including work plans followed, overall sampling scope, sampling methods and subcontractors used, and protocol followed.
- Details of the analytical program for the Surficial OU RFI, including laboratories used, data validation findings, and Data Quality Assessment findings.
- Programmatic key decision points or significant issues that influenced sampling, laboratory procedures, methodologies, or step-out requirements.
- Standardized Risk Assessment Methodology (SRAM) Work Plan, Revision 2 (MWH, 2005):
 - Procedures for completing HRAs and ERAs.
 - Background soil concentrations and groundwater comparison concentrations.
 - A biological conditions report for the SSFL.
- Near-Surface Groundwater Characterization Report (MWH, 2003a):
 - Nature and extent of NSGW at the SSFL.
 - Distribution, transport, and fate of trichloroethene (TCE) and other chemicals of concern, and the relationship of NSGW to CFOU groundwater.
- CFOU Characterization Reports (Montgomery Watson, 2000; MWH, 2002; 2003):
 - Geologic framework at the SSFL and hydrogeologic conditions of both NSGW and CFOU groundwater.
 - Transport and fate of TCE, and the occurrence and transport of other chemicals of concern in the CFOU.
- Annual and quarterly groundwater monitoring reports, including:
 - Annual Groundwater Monitoring Report (Haley & Aldrich, Inc. [H&A], 2008a).
 - First Quarter 2008 Groundwater Monitoring Report (H&A, 2008b).
 - Second Quarter 2008 Groundwater Monitoring Report (H&A, 2008c).
 - Third Quarter 2008 Groundwater Monitoring Report (H&A, 2008d).
- Historical Site Assessment (Sapere, 2005). This report contains:
 - Facility descriptions and historical operational information for all buildings in Area IV.
 - Information regarding demolition activities, radiological surveys, releases, and removal actions conducted for radiological areas within Area IV.

- Building Feature Evaluation and Sampling Standard Operating Procedure (MWH/CH2M Hill, 2008b):
 - Procedure for evaluation of environmental conditions associated with existing building and other miscellaneous building support infrastructure.
 - Describes approach for building feature inspection and sampling activities.

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B.2 SITE HISTORY, CHEMICAL USE AND CURRENT CONDITIONS

The B4133 RFI Site consists of approximately 1.5 acres located in the northeast portion of Area IV at the SSFL. The site location within the SSFL is shown on Figure B.1-1, which also shows the Group 7 Reporting Area boundary. The site layout and the locations of identified and potential chemical use areas are shown on Figure B.2-1. The sampling locations are shown on Figure B.2-2 and the locations of surficial cross-sections across the site are shown on Figure B.2-3.

During the RFA, various SMWUs and AOCs were identified within the SSFL. Building 4133 was identified as the Sodium Burn Facility (SWMU 7.2), with the boundaries shown on Figure B.2-1, in the RFA (SAIC, 1994). No other SWMUs or AOCs were identified at the B4133 RFI Site. The B4133 RFI Site has been defined to include the this SWMU and former operational areas to the south near former Building 4654.

A comprehensive review of historical documents generated during facility operations or in subsequent environmental investigations was performed to identify known or potential chemical use areas at or near the B4133 RFI Site. As provided in the documents submitted in conjunction with this report (Boeing, 2009a), thousands of records (some dating back to 1958) were reviewed to identify areas of potential environmental concern at the Group 7 RFI sites or elsewhere within the Group 7 Reporting Area. As described in Section B.1, documents reviewed included facility operational reports, maps and drawings, internal and external correspondence, regulatory compliance information, historical and aerial photographs, facility personnel interview records, and previous environmental reports.

Based on a comprehensive review of this compiled information, the Building 4133 RFI reporting area was defined to include not only operations associated with the SWMU identified above, but also nearby facilities or features aside from those associated with the SWMU that warranted assessment in the RFI. These features are considered and evaluated as part of the main operational areas at the B4133 RFI Site and include the Former Building 4654 Interim Storage Facility (ISF) and the Western Drainage Debris Area. Eleven known and potential chemical use areas at the B4133 RFI Site are shown on Figure B.2-1.

The following sections describe the SWMU 7.2, site history and operations, chemical use areas, and current conditions at the B4133 RFI Site.

B.2.1 SWMUs and AOCs at the B4133 RFI Site

A brief summary of SWMU (7.2) that is included in this RFI site report is presented below.

Building 4133 (SWMU 7.2)

Building 4133 is a galvanized steel building, 462 square feet in size, mounted on a concrete slab. The building comprises two rooms, a Treatment Room and a Control Room, and sits in the middle of an approximately 6,600 square foot mostly asphalt lot, which is surrounded by an asphalt berm. The building is located in the northeast portion of Area IV of the SSFL (Rockwell, 1993) in a fenced area that is approximately 81 feet x 71 feet. Part of Building 4133 was used as the former Building 4724, the Hot Oil Sodium Cleaning Facility at the Sodium Reactor Experiment (SRE) RFI Site, located east of the B4133 RFI Site (MWH, 2003b; Sapere, 2005).

From 1978 to 1997, Building 4133 (along with Building 4029) operated as the HWMF, a RCRA permitted hazardous treatment and storage facility for non-radiological chemical wastes generated onsite. Building 4133, known then as the Hazardous Waste Treatment Facility (HWTF), was used for the treatment of reactive metal waste.

As the HWTF, Building 4133 was used to support ETEC operations that generated alkali metal wastes through the use of alkali metals as heat transfer media. The waste material and the equipment/components that contained them were stored at Building 4029, then known as the Hazardous Waste Storage Facility (HWSF), until capacity at the treatment facility became available (MWH, 2003b). The predominant alkali metal wastes treated were sodium (Na) and sodium-potassium (NaK) alloy, though reactive forms of potassium (K), lithium (Li), and zirconium (Zr) were also treated and stored (Rockwell, 1991a; MWH, 2003b).

Alkali metal wastes and components containing them were treated by heating them on a 6 square foot burn pan located in the Treatment Room. The heated metal in the pan reacted with the air to form oxides that either remained in the pan or were exhausted from the room through a wet (water) scrubber to remove the oxide aerosols prior to release to the atmosphere. The oxides remaining in the pan were then washed down with water, which formed an aqueous caustic solution, mainly sodium hydroxide (NaOH) and potassium hydroxide (KOH), which was then directed via an indoor sump through underground piping to one out of the two below grade storage vessels (the Neutralizing Pit and Tank T-1) that

were located north of Building 4133 at different times during the facility's period of operation.

Originally, Building 4133 was designed to collect, and neutralize with acid, all caustic solution wastes generated by the treatment process in a 12 by 6 by 6 feet deep below grade Neutralizing Pit, located north of the building. A 4-inch polyvinyl chloride (PVC) pipe connected to the Neutralizing Pit would then drain the waste to an asphalt-lined drainage ditch, 300 feet to the east of Building 4133 at the SRE RFI Site. The asphalt-lined drainage discharged to the SRE Pond (Rockwell, 1977c; Rockwell, 1977d). It is unknown if this process was ever used and the drain pipe was permanently sealed in 1986 following a caustic solution spill at which an expandable plug failed and the drain pipe facilitated the release of approximately 1,000 gallons of sodium hydroxide to the asphalt-lined drainage. The asphalt-lined drainage was later flushed and vacuumed (MWH, 2003b). Between 1987 and 1988, the Neutralizing Pit was replaced by Tank T-1, a 1,318 gallon underground storage tank, used for storage of the treated waste. In 1990 Tank T-3, a 5,190-gallon aboveground caustic waste temporary storage tank, was installed at the northeast corner of the fenced area to store the waste when tank T-1 reached its capacity. The contents of caustic waste storage tank T-3 would be removed by vacuum truck for offsite management at a permitted facility (MWH, 2003b). NaK was stored in a 300 gallon AST (tank T-2) and was kept under cover of argon gas due to its reactivity with air; tank T-2 also acted as a feeder system to transport the alloy to the burn pan.

South of Building 4133 is the Size Reduction Area, where contaminated equipment too large to fit in the burn pan was cut into smaller pieces. It consisted of a cutting area covered by an awning, a metal secondary containment unit, and an overhead monorail which transported heavier equipment into the Treatment Room. The Size Reduction Area was also used to store kerosene and mineral oil used in the cutting process. In 1997, the HWMF was deactivated and all operations at Buildings 4133 and 4029 ceased. During this deactivation all remaining hazardous waste stored at Building 4133 was removed. Final closure, decontamination and demolition for the HWMF will be implemented under the 2003 DTSC approved HWMF Closure Plan.

B.2.2 B4133 RFI Site History

A summary of the site chronology, description of operations, and investigation activities for the B4133 RFI Site is presented below. Facility correspondence, investigation reports, waste disposal records, facility maps, drawings, photographs, and personnel interviews were

reviewed and evaluated to compile the site history information presented below. Primary sources of information include:

- RFA (SAIC, 1991 and 1994)
- CCR (ICF, 1993)
- RFI WPA (Ogden, 1996)
- Closure Plan for the HWMF Buildings 4029 and 4133 (MWH, 2003b)
- RFI WPAA (MWH, 2004)
- HSA (Sapere, 2005)
- Historical Photographs (various sources and dates)

Site Chronology: Building 4133

1960s – 1970s	Prior to the design and operation of HWMF, the Building 4133 area was unpaved and used as a drum and equipment storage area. (SAIC, 1994)
1977	Building 4133 was designed as a non-radiological sodium metal treatment facility in August of 1977 (Rockwell, 1993). The building is comprised of two rooms, a Treatment Room and a Control Room. Parts of the building, including the Treatment Room and monorail leading from the Size Reduction Area to the Treatment Room, were moved from Building 4724, the Contaminated Sodium Facility at the SRE, to the current site location in December of 1977. Building 4724 was a facility that was used to treat radioactive sodium waste and contaminated equipment at the SRE. Prior to relocation the building was surveyed for radiological contamination and released for unrestricted use (Rockwell, 1978).
1978 – 1997	The HWMF began operation in 1978 as a storage and treatment facility for reactive alkali metals, and equipment contaminated by those metals. The alkali metal wastes (predominantly sodium and NaK) were used as heat transfer media at onsite ETEC facilities. Building 4029 was designated as the HWSF, and Building 4133 was designated as the HWTF. Building 4133 was used to treat reactive forms of sodium, NaK alloy, lithium, lithium hydride (LiH) powder, and zirconium hydride (ZrH₂) powder (Rockwell, 1988; Rockwell, 1991a; MWH, 2003b) as described above. Large contaminated equipment would be cut into pieces that would fit inside the burn pan at the Size Reduction Area, located to the south of the Treatment Room. Kerosene and mineral oil were often used as lubricants in the cutting process.
1983	The HWMF was permitted as a RCRA hazardous waste treatment and storage facility for non-radiological chemical wastes generated onsite. The RCRA permit was renewed in 1988 and 1993 (MWH, 2003b).

<i>April 1984</i>	Approximately 1,500 gallons of 12 percent sodium hydroxide solution was spilled due to a pipe nipple failure in a scrubbing solution storage tank. The spill was contained onsite and contaminated about 1,500 square feet of soil. Surface soil samples contained 2 to 3 percent alkalinity. Thirteen drums of contaminated soil were removed from the site (Rockwell, 1984a; 1984b). The location from where the soil was removed and where removed soil was disposed of was not in reviewed documents.
<i>February 1986</i>	Approximately 1,000 gallons containing 2.4 percent sodium hydroxide solution were spilled due to failure of an expandable plug in the concrete Neutralizing Pit. The spill drained into the asphalt paved SRE flood control asphalt-lined drainage, via the Neutralizing Pit drain pipe. The asphalt-lined drainage was flushed and vacuumed, and the Neutralizing Pit Drain Pipe was permanently plugged (MWH, 2003b).
<i>1987 - 1988</i>	The underground Neutralizing Pit, used to collect and store caustic solution waste, was removed due to lack of secondary containment. When the pit was removed several feet of soil surrounding the pit were also excavated. The amount of soil and where the excavated soil was disposed was not in reviewed documents. A temporary underground storage tank located north of the asphalt berm was used to store caustic wastes generated by the treatment process while tank T-1 was being installed to replace the Neutralizing Pit. T-1, a steel UST inside of a concrete secondary containment, was placed in the same location as the former Neutralizing Pit. (MWH, 2003b) Information regarding the amount of soil removed, and where the removed soil was disposed, was not available in provided documents.
<i>1988</i>	The storage and treatment of lithium metal, also used as heat transfer media, was also performed at the HWMF, as authorized under the 1988 RCRA Part B Permit (MWH, 2003b). The Building 4133 treatment facility was also modified to accommodate the processing of lithium hydride and zirconium hydride (Rockwell, 1988). The lithium and zirconium hydride powders were purchased, but never used, and were stored at Building 4029 (MWH 2003b). A 540 gallon lithium hydride (LiH) reaction vessel (T-3) is included in the tank inventory of the 1988 HWMF Operation Plan. Operation of the tank was expected to begin in 1989 as part of the lithium hydride treatment process with a service life of six months, the anticipated time required to treat and dispose the lithium hydride inventory at the Rocketdyne at the time (Rockwell, 1988). There is no record of how the zirconium hydride was treated; however, it is assumed that it was treated at the site due to records showing zirconium being stored at Building 4029 (Rockwell, 1991a).

1988 (Continued)	Rocketdyne collected and analyzed 6 soil samples at and just north of Building 4133. The samples were analyzed for gross alpha and gross beta. All measurements were below release limits, however some appeared to be higher than background levels as determined by Rockwell (Rockwell, 1994c).
October 1989	The Energy Technology Engineering Center (ETEC) officially took over control of HWMF operations from Atomics International (AI). (Rockwell, 1989b)
1990	In 1990 an additional caustic solution storage tank (also named tank T-3) was brought to the Building 4133 facility. Caustic waste storage tank T-3 was a 5,190 gallon polyethylene AST, located at the northeastern corner of the fenced area, where caustic waste solution from T-1 was pumped when T-1 ran out of storage capacity (MWH, 2003b; Rockwell, 1990c). The contents of caustic waste storage tank T-3 would be removed by vacuum truck for offsite management at a permitted facility (MWH, 2003b). Seventy-five thirty ounce containers of metallic sodium were found abandoned by an unknown party in Butte County, CA. This sodium was treated at Building 4133 by order of an emergency DHS permit. (DHS, 1990).
1997 - present	After 1997 the only ongoing operation conducted at Building 4133 was the site weed abatement program (DTSC, 2000).
1999	Boeing conducted a survey of Building 4133 that included the collection of soil samples, along with scans and smears of the building and equipment. The results of the survey indicated that the facility and yard would be suitable for release for unrestricted use if Building 4133 had been a licensed facility or radiological facility (Boeing, 2004; Sapere, 2005).
2000	The Oak Ridge Institute for Science and Education (ORISE) conducted a radiologic verification survey of Building 4133. The survey included the interior and exterior of the building including the surrounding soil. All release criteria were met (ORISE, 2000). DHS performed a verification survey (DHS, 2000).
2003	A 15 x 15 foot area northwest of Building 4133 was excavated to a depth of one foot due to elevated levels of cesium-137 (Cs-137) (Boeing, 2003a). The removed soil managed as low-level radioactive waste and disposed offsite at the Nevada Test Site (Boeing, 2009b).

2007	In 2007, implementation of the HWMF Closure Plan began after approval by DTSC in 2006. At Building 4029, this initial effort included sampling of equipment and structures for verification of decontamination levels as required by the Closure Plan (MWH, 2003b), and will provide the basis of management of building material and equipment for the future demolition of Building 4029. Final closure, decontamination, and demolition for the HWMF is currently on hold. Wipe sampling of equipment and structures was performed in accordance with California Code of Regulations Title 22, Section 66261 for verification of decontamination levels as part of the implementation of the DTSC-approved 2003 HWMF Closure Plan. The characterization will provide the basis of management of building material and equipment for the future demolition of Building 4133. The NaK tank at Building 4133 was disassembled as part of the initial phase of implementing the HWMF Closure Plan. Since May 24, 2007, D&D activities at Area IV have been on hold.
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Site Chronology: Building 4654

1958 - mid 1960s	Building 4654, the Interim Storage Facility (ISF) was constructed to store dummy and spent fuel elements, shipping and storage casks, and hot waste generated at the SRE. After the SRE was shut down (1967) the facility was also used to store materials from the Organic Moderated Reactor Experiment (OMRE) and Systems for Nuclear Auxiliary Power (SNAP) (Rockwell, 1985). Building 4654 was comprised of eight 20-inch diameter galvanized steel storage cells (wall thickness of 3/16 of an inch), extending 25 feet into 32-inch diameter wells drilled into the bedrock. A concrete berm encased the wells at ground level (Rockwell, 1985). The annular space around each cell was packed with sand (Rockwell, 1981). The ISF was located on a hill side, south of the sodium burn facility. The facility area measured 65 by 40 feet and was paved with 2-inch thick asphalt. A chain link fence with two sliding gates enclosed the facility (Rockwell, 1981). Low level contamination was released over the years to the asphalt near the casks and the soil just outside the fence due to the deterioration of the seals and packaging, caused by constant exposure to the elements, of some of the casks and equipment stored in the ISF fenced area. Interior surfaces of the storage tubes and internal storage baskets were also contaminated by radioactive core components and other materials stored in the eight storage tubes. (DOE, 2001)
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<i>January 1962</i>	Equipment stored in the ISF fenced area spread contamination, ranging from 2 mrad/hr to 17 mrad/hr, to surrounding asphalt areas outside of the fence. No decontamination was conducted as a result of this release (Sapere, 2005).
<i>Mid 1960s – 1985</i>	The ISF was not used and was designated as an exclusion area (area of known contamination). Surveillance and periodic maintenance were performed to prevent the ISF from spreading contamination to other unrelated areas. While the facility was not in use, all stored equipment was removed (Rockwell, 1985).
<i>July 1979</i>	Shipping casks stored at Building 4654 were found to be emitting up to 35 mR/hr (Sapere, 2005).
<i>1984 – 1985</i>	Building 4654 was decontaminated, decommissioned and demolished. During the demolition process, surface and imbedded contamination (including contaminated soil) was removed (contaminated areas were excavated to depths ranging from less than 6 inches to 18 inches bgs), the storage cells were excavated and removed (the area to the north of the trench in which the cells were located [approximately 30 x 15 feet] had soil and rock excavated to a depth of 23 feet bgs), and the site was restored to natural grade. A total of approximately 220 cubic yards of waste was packaged and sent to Hanford Reservation in Washington State for burial. During excavation, a hydraulic hammer mounted on a backhoe punctured one of the storage tubes. The storage tube and surrounding area were surveyed and found to be free of contamination (Rockwell, 1985). Rocketdyne conducted a Phase I Radiation Survey during and after the D&D effort and found that all surface contamination had been removed and all radiation levels were within acceptable levels (Sapere, 2005).
<i>1997</i>	ORISE performed an independent verification survey and determined that no elevated direct radiation resulting from residual contamination was found (ORISE, 1997). Rocketdyne performed a Supplemental Status Survey in 1997 and finalized the report in 1999. The report survey concluded that the site was suitable for unrestricted release (Boeing, 1999). DHS also performed verification sampling (Sapere, 2005); however, a copy of this verification survey has not as of the date of this report been provided to Boeing (Boeing, 2009b).
<i>1999</i>	DOE issued the draft certification docket for the release of Building 4654 at the ETEC (DOE, 1999).

2002	In August 2002, follow up sampling to the 1988 and Area IV survey results was conducted in grid blocks neighboring the former location of Building 4654, based on potential storage of materials from SRE. Sixteen out of 20 soil samples had values greater than background. The highest was 4.9 picocuries per gram (pCi/g) of Cs-137 (background = 0.068 pCi/g for Cs-137) (Boeing, 2003b).
2007	In 2007, implementation of the HWMF Closure Plan began after approval by DTSC in 2006. At Building 4133, this initial effort included disassembling and sampling of equipment and structures for verification of decontamination levels as required by the Closure Plan (MWH, 2003c), and will provide the basis of management of building material and equipment for the future demolition of Building 4133. Final closure, decontamination and demolition for the HWMF is on hold.

Spill Record

A summary of documented spills at Building 4133 is provided in Table B.2-6. Approximately 20 spills were reported in the Building 4133 area in the 1960s through the 1990s. Historical releases at the B4133 RFI Site include: oil, mercury, sodium metal, sodium oxide, sodium hydroxide, and caustic solutions. Radioactive contamination was reported at the ISF area. The largest documented release at the B4133 RFI Site was a spill on April 12, 1984 in which 1,500 gallons of sodium hydroxide solution was released due to a pipe nipple failure (described above). (Rockwell, 1984a; Rockwell, 1984b; Rockwell, 1989a)

Site Inventories

Inventories of buildings, tanks, transformers, and chemicals used at the B4133 RFI Site were compiled during preparation of this RFI site report. Historical reports and facility drawings were reviewed and visual site inspections were conducted. The locations of identified buildings, tanks, and transformers are shown on Figure B.2-1. The inventories are included as the following tables:

- Building inventory – Table B.2-1
- Fuel, solvent, and other storage tank inventory – Table B.2-2
- Transformer inventory – Table B.2-3
- Other features inventory – Table B.2-4
- Documented chemical use – Table B.2-5
- Spills / Release inventory – Table B.2-6

B.2.3 B4133 RFI Site Chemical Use Areas

Chemical use areas include areas where chemicals were documented to have been (or potentially may have been) used, stored, spilled, discharged, and/or disposed. Chemical use areas at the B4133 RFI Site are shown on Figure B.2-1 and described in detail in Section B.3. The 6 B4133 RFI Site chemical use area types (11 individual chemical use areas) evaluated at or near the site are listed below in order of chemical use area number:

- 1 – Building 4133 Treatment Building, Southern Concrete Pad, and Size Reduction Area
- 2(a-f) – Caustic Solution and Metal Waste Storage Tanks
- 3 – Building 4133 Storage and Staging Area
- 4 – Western Drainage Debris Area
- 5 – Northwest Excavation Area
- 6 – Former Building 4654 Interim Storage Facility

The site characterization information is described relative to these chemical use areas in Section B.3. Potential chemicals used or stored at the B4133 RFI Site are listed on Table B.2-5.

B.2.4 Site Conditions

This section provides summaries of site conditions at and near the B4133 RFI Site including topography, geology, soils, groundwater, surface water, seeps and springs, and biology.

General Conditions and Topography

The B4133 RFI Site is located in the northeastern portion of Area IV off of 11th and E Streets. This part of the SSFL consists of a heavily vegetated (with exception of dirt roads) and rocky area bordered by steep relief to the west and north with some rock outcrops to the north and south.

Surface elevation at the site ranges from about 1,860 feet above mean sea level (msl) along the western border of the RFI site, to about 1,880 feet msl along the southern border of the RFI site south of the former ISF. Topography for the site is shown on two geologic cross sections, presented in Figure B.2-3: one oriented east-west (Building 4133 Cross Section A-A'), and one oriented north-south (Building 4133 Cross Section B-B') through the middle of Building 4133. Locations of the cross-sections are shown on Figure B.2-3.

Building 4133 is bordered to the north, east, and south by higher ground, with bedrock outcrops to the north and south. Grades decrease to the west-northwest into an east-west trending canyon/drainage area. The site has been inactive since 1997. Building 4133, sumps, pipes, tanks T-1, T-2, and T-3, the scrubber, the surrounding fence, and the asphalt paved area underlying Building 4133 still remain at the RFI site.

As noted above the former ISF (Building 4654) was excavated in 1984-1985 (Figure B.2-4), backfilled, and the area returned to natural grade. Soils were excavated from an area approximately 80 feet by 50 feet, up to depths of 23 feet below ground surface. Native soil that was surveyed and deemed free of radiation was used as backfill (Rockwell, 1985). It is unknown if additional soil was brought in from other areas for use as backfill. The former ISF area is located south of Building 4133 and separated from that area by sandstone outcrops. The two areas are connected by an asphalt road that leads from the former storage areas around Building 4133 to the ISF area.

Other excavation areas at the B4133 RFI Site include the former Neutralizing Pit and surrounding soil (an area approximately 18 feet by 8 feet and 8 feet deep); the area north of the asphalt berm (north of Building 4133) where a temporary storage tank was installed in 1987 during the replacement of the Neutralizing Pit with Tank T-1 (an area approximately 15 feet by 5 feet and 5 feet deep); and a 15 by 15 foot area (one foot deep) northwest of the B4133 RFI Site that was excavated in 2003 due to a high detection of the radioactive isotope Cs-137. All of these excavations were later backfilled with soil from an unknown location, with the exception of the 15 by 15 foot excavation which was not backfilled. The extent of disturbed soil at the B4133 RFI Site is shown on Figure B.2-4. As discussed in the site chronology above, thirteen 55-gallon drums of contaminated soil were removed in 1984 due to a spill of sodium hydroxide solution. It is not known from what area the soil was removed. All soil disturbance features at the site predate soil sampling conducted for the RFI.

During a site visit by personnel from Boeing and DTSC in 2008, sinkholes were observed in an area southwest of Building 4133.

Geology

The B4133 RFI Site is located on the Upper Burro Flats Member of the Chatsworth formation, just north of exposure and stratigraphically above the “Lot Bed”, which is located approximately 70 feet bgs at the B4133 RFI Site (MWH, 2002). The Upper Chatsworth formation is a series of interbedded sandstone and shale units that generally strike north

70 degrees east and dip 25 degrees northwest. The Upper Burro Flats Member is comprised of fine to medium-grained sandstone. The “Lot Bed” is a thin shale unit (approximately 6 feet thick) that occurs at the site within the Upper Burro Flats Member. Figure 2-5 of the Group 7 RFI Report shows the geologic units represented within the site. The ELV Member occurs between the Upper and Lower Burro Flats Members, and is comprised of thinly interbedded, fine-grained sandstone, siltstone, and shale.

Soils

Surface conditions at the B4133 RFI Site are characterized by asphalt and concrete surfaces over most of the site, with the remaining area comprised of both sandstone outcrops and shallow soils. Based on soil borings and exploratory trench logs, soil thickness at the B4133 RFI Site ranges from less than 1 foot to 19.5 feet (Attachment B-2). A map depicting the general distribution of alluvial soils within the Group 7 Reporting Area is provided as Figure 2-4 in the Group 7 RFI Report. Soils are generally comprised of silty sands and clayey sands with occasional clayey silt, silt with sand, and lean clay interpreted to be weathered products of the Chatsworth Formation Upper Burrow Flats member interbedded with sandstone, siltstone, and shale bedrock. Soil boring logs are included as Attachment B-2 to this site report.

Several soil disturbance areas were noted in the B4133 RFI Site and adjacent areas. Soil disturbance areas are shown on Figure B.2-4. Soil disturbance areas include:

- A disturbed area resulted from the demolition of Building 4654 in 1984 - 1985, which required the removal of the subsurface spent and dummy fuel storage tubes (which reached depths of 25 feet below ground surface), and the removal of soil and rock in an approximately 80 by 50 foot area up to a depth of 23 feet below ground surface. This area was later backfilled and graded.
- A soil disturbance resulted from the removal the former Neutralizing Pit in 1987 – 1988. The disturbance consisted of the excavation of an area approximately 18 by 8 feet to an approximate depth of 8 feet below ground surface.
- A soil disturbance resulted from the removal the former temporary storage tank in 1987 – 1988. The disturbance consisted of the excavation of an area approximately 15 by 5 feet to an approximate depth of 5 feet below ground surface.
- A soil disturbance resulted from the excavation of a 15 by 15 foot area (1 foot deep) northwest of the B4133 RFI Site, due to presence of the radioactive isotope Cs-137.

Groundwater

Chatsworth formation groundwater near the B4133 RFI Site is monitored by well RD-19, which is located approximately 125 feet west of Building 4133. Groundwater elevations measured at RD-19 typically range between 1764 to 1788 feet msl (45 feet to 90 feet bgs), but may rise by up to 40 feet (over 1800 feet msl) following periods of heavy precipitation.

Information regarding Chatsworth Formation groundwater near Building 4133 may also be obtained from well RD-85, which is located to the northeast of Building 4133 at the former Sodium Reactor Experiment (SRE) RFI site. Groundwater elevations at this well are typically 5-15 feet higher than those measured at RD-19 but exhibit similar temporal trends.

NSGW at the B4133 RFI Site is monitored by shallow well RS-25, which is located at the northern edge of the paved area surrounding Building 4133. NSGW is typically present in RS-25 during the rainy season, but occasionally subsides during periods of low precipitation. When present, NSGW is measured at depths ranging from 12 to 15 feet bgs (1848 to 1851 feet msl). On average, water levels in RS-25 are about 70 feet higher than those measured at nearby Chatsworth formation well RD-19, suggesting that NSGW is perched above Chatsworth Formation groundwater near Building 4133.

Figure B.2-2 shows well monitoring and piezometer locations at and near the B4133 RFI Site. The groundwater system and monitoring network in RFI Group 7 is presented in detail in Appendix D.

Surface Water

Surface water flow at the B4133 RFI Site is shown on Figure 2-7B of the Group 7 RFI Report. Surface water at the B4133 RFI Site, outside of the facility area discharges by sheet flow to the west to an east-west trending drainage north of RMHF, which in turn flows north onto the Brandeis-Bardin Campus (BBC). This surface water drainage joins the Meier Canyon drainage, which flows into the Arroyo Simi which leads to the Pacific Ocean. Surface water discharge from the B4133 RFI Site is monitored at NPDES Outfall 003 at the RMHF RFI Site. Surface water in the bermed asphalt area surrounding Building 4133 flows to the northeast and northwest corners of the area where it is captured by two approximately 1.5 foot by 1.5 foot by 2.5 foot deep below grade sumps located at each corner of the facility. These sumps are collection features and do not drain to any other location; surface water collected in these sumps has been and is pumped out.

During operations at Building 4133, a 4-inch polyvinyl chloride (PVC) drain pipe conveyed neutralized waste solutions from the former Neutralizing Pit to an asphalt-lined drainage ditch east of the B4133 RFI Site. The asphalt-lined drainage (located at the SRE RFI Site in Group 6) directed surface water flow to a concrete-lined ditch that discharged into the southeastern portion of the SRE Pond, where surface water was pumped and discharged to a asphalt-lined drainage in the southern portion of the Old Conservation Yard RFI Site located in the Group 6 Reporting Area (MWH, 2006). The natural drainage north of the SRE Pond leads to the Meier Canyon drainage which discharges to Arroyo Simi in Simi Valley, and from there to the Pacific Ocean. The Neutralizing Pit drain pipe at the B4133 RFI Site was permanently plugged in 1986 after an expandable plug failure at the Neutralizing Pit lead to the release of approximately 1,000 gallons of sodium hydroxide solution to the SRE RFI Site.

Seeps and Springs

There are four seeps (S19, S20, S21, and FDP-424) located northwest of the SSFL on property owned by the BBI. These springs have been assigned to the Group 7 Reporting Area due to their proximity and potential down-gradient location from Group 7. S-19, S-21, and FDP-424 have been sampled on at least one occasion for VOCs. VOCs have been detected at low levels in S-19, and an investigation is on-going to assess the representativeness of these results, and will be reported in the site-wide groundwater report. Additional information regarding seeps near the Group 7 Reporting Area may be found in Appendix D.

Biology

Biological conditions at the B4133 RFI Site, including vegetation types and sensitive species, are shown on Figure 2-13 of the Group 7 RFI Report. The majority of the area within the RFI site boundary is comprised of non-native annual grasses, coastal sage scrub, partially vegetated sandstone outcrops, and developed land. Areas of rock outcrop are present south of the Building 4133 paved area and along the southern site border. Sensitive species identified at or in the vicinity of the B4133 RFI Site include: the Santa Susana Tarplant (found along the asphalt access road), the ring-neck snake (on the northern slope below RMHF); and the coastal western whiptail, legless lizard, rufous-crowned sparrow, and sage sparrow, which were not observed but are believed to occur in the area (Padre, 2005).

During the September/October 2005 Topanga Fire, most of the vegetation at the B4133 RFI Site was burned and significant ash deposited, especially in drainages. In areas with limited vegetation (e.g., rock outcrops or developed areas), effects of the fire were minimal. Areas with more vegetation (e.g., trees and chaparral), including surface water drainages, were impacted significantly by burning and deposition of ash. At the time of this site report, the plant community at the B4133 RFI Site is in a transitional state, where early post-fire plant species are growing. It is expected that the plant community will continue to grow and transition until a more stable plant community is established.

In February 2009, a post-fire reconnaissance-level vegetation mapping was conducted at the B4133 RFI Site in support of risk assessment. Findings from this survey are presented in Appendix E, Attachment E-5.

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B.3 NATURE AND EXTENT OF CHEMICAL IMPACTS

This section describes the data used to define the nature and extent of chemical impacts to environmental media at the B4133 RFI Site. The presentation includes sampling objectives, scope, key decision points related to characterization activities, and findings.

Transport and fate evaluations are discussed in the following sections of the report:

- Group 7 RFI Report, Section 5, Contaminant Transport and Fate: Potential migration via surface water flow, soil to groundwater, and groundwater migration.
- Group 7 RFI Report, Appendix D, Groundwater Characterization: Potential migration from soil to groundwater, and groundwater migration.
- Group 7 RFI Report, Appendix E, Risk Assessment: Potential volatile organic compound (VOC) migration from groundwater to soil, soil to indoor air.

B.3.1 Sampling Objectives

Soil and groundwater samples were collected to characterize the extent of potential chemical impacts at the B4133 RFI Site. As described in Section B.1, extensive historical documents (Boeing, 2009a) were reviewed to identify potential chemical use areas for RFI sampling. The process of selecting sampling locations, depths, and analytical methods considered the following objectives:

- Defining the lateral and vertical extent of impacts.
- Defining potential chemical gradients.
- Obtaining sufficient data for risk assessment.
- Obtaining data sufficient to estimate CMS soil volumes to within a factor of 10.

To achieve these objectives, soil sampling was conducted as described in the DTSC-approved HWMF Closure Plan (MWH, 2003b), or as directed by DTSC during the RFI field program. Additional sampling was also performed to achieve objectives outlined above, considering the following:

- Additional information regarding site use and observed site conditions.
- Site sampling results and data trends.
- Knowledge of chemical properties (e.g., mobility, volatility, association with other chemicals, etc.).
- SSFL metals and dioxin background concentrations.

- SSFL SRAM-based screening concentrations for human health and ecological receptors.
- Risk assessment results and knowledge of areas recommended for requiring further evaluation during the CMS.

Groundwater has been sampled to meet site-wide routine monitoring requirements and additional characterization objectives according to regulatory agency-approved work plans (see Section B.3.2). Based on detected RFI site chemicals, chemical distribution, and site conditions, additional groundwater sampling and analysis was also conducted to complete characterization of individual RFI Sites and provide data sufficient for risk assessment. Groundwater sampling was conducted as described in the Sampling Analysis Plans (GRC, 1995a and b) and the Shallow Zone Groundwater Investigation Work Plan (Ogden, 2000b).

B.3.2 Sampling Scope

A total of 158 soil matrix samples and 35 soil vapor samples were collected between August 1988 and December 2008 to assess potential impacts associated with chemical use areas at the B4133 RFI Site. Sampling locations and analytical suites were based on DTSC requests, sampling results from previous investigations, additional facility information from historical records, site inspections and/or personnel interviews, and historical and/or aerial photographs. Sampling schedules are presented in Tables B.3-1A through B.3-1D.

Both Chatsworth Formation groundwater and NSGW have been sampled and analyzed according to agency-approved work plans (GRC, 1995a, 1995b; Ogden, 2000b). A total of three monitoring wells were used to characterize groundwater specifically at and near the B4133 RFI Site (RD-19, RD-85, and RS-25). As described in the risk assessment (Appendix E), groundwater monitoring data from the most impacted well within the Group 7 Reporting Area were used to characterize the potential direct exposure (drinking water) route for human receptors. Groundwater monitoring data collected near the B4133 RFI Site was used for potential indirect groundwater exposures (indoor air) at that site. Groundwater characterization data for the B4133 RFI Site are presented with the entire Group 7 groundwater data set in Appendix D.

Based on quality assurance (QA) review conducted on soil, soil vapor, sediment, and piezometer sampling results, data have been deemed usable and meet RFI program requirements as defined by DTSC-approved Quality Assurance Project Plans (Ogden, 2000a). The RFI QA program included individual sample data validation;

assessment of each laboratory's performance; and a qualitative review of the precision, accuracy, representativeness, reliability, and completeness parameters for the datasets. Historical samples (collected prior to the beginning of the RFI in 1996) were typically not validated for the subsequent RFI, but are deemed useable for the RFI since they were collected and reviewed according to the QA protocols for those programs and used by agencies to make decisions for the Building 4133 cleanup actions. Overall data quality is described in the RFI Program Report (MWH, 2004a). Site-specific data quality summaries for the B4133 RFI Site are described by media in the sections below.

As an ongoing, additional QA measure, DTSC's Environmental Chemistry Laboratory (ECL, formerly the Hazardous Materials Laboratory) is performing independent data quality audits of approximately 5 to 10 percent of the surficial media analyses performed for the RFI. The ECL data quality audits include data validation, electronic data file audits, and split sample comparisons. The ECL findings are compiled in a report for each audit and those available by 2004 are published in the RFI Program Report (MWH, 2004a).

This site report presents characterization results for all media sampled at the B4133 RFI Site, including the following:

- Soil vapor
- Soil matrix (including soil and drainage sediment)
- Groundwater

B.3.3 Key Decision Points

The DTSC has been an integral part of the decision-making process during the SSFL RFI program. DTSC conducted a site walk of the Building 4029 RFI Site prior to sampling and approved sampling locations (MWH, 2003b) (Table B.3-1C).

Programmatic decision points (those common to all RFI Sites) are described and included in the RFI Program Report (MWH, 2004a). Site-specific characterization decision points are listed below. These decision points represent either assumptions upon which sampling was based, or decisions made during step-out sampling or data evaluation.

- 1) Sink holes were observed south of Building 4133 and were investigated by trenching for the RFI.

- 2) Debris surveys were performed at and near the B4133 RFI Site and debris areas targeted for sampling.
- 3) In 2008, a suspect groundwater well was identified northwest of Building 4133 adjacent to a historical access road. This feature was a sub-grade plastic pipe suspected to be a historical groundwater well associated with SRE. The feature contained water in April 2008, and approximately 2 gallons of water were bailed so that potential recharge could be checked. No recharge was observed in a 24-hour period in April. In July 2008, standing water was removed from the feature (approximately 13-15 gallons), and water levels checked periodically until August 22, 2008. No recharge or change in water level was observed during this period. This feature bailed dry and measured as about 67 feet deep (total depth unknown since soft sediment was encountered). The feature has been capped and remains in place.
- 4) Areas where further assessment in the CMS is recommended were not characterized beyond data needs.
- 5) The potential release from the SSFL sewer lines in Group 7 were assessed through sewer manhole inspections. All of the sewer manholes in Group 7 were inspected (two occur at/near the RMHF RFI Site). No manholes or sewer lines existed at the B4133 RFI Site. Documentation for these inspections can be found in Appendix G of the Group 7 RFI Report.

B.3.4 Soil Matrix and Soil Vapor Findings

All soil and soil vapor sampling results and characterization findings are presented in Table B.3-2A. The goals of the table are to:

1. Present summaries of sampling results, including nature and extent of impacts.
2. Demonstrate that soil characterization is adequate for risk assessment, and that no further sampling is warranted.
3. For areas recommended for CMS evaluation, indicate that soil volumes are estimable within a factor of 10 for comparison of remedial alternatives.

Goals 2 and 3 are achieved through an iterative evaluation process that takes into account risk assessment results and CMS recommendations, as well as soil analytical data. For example, if detected chemical concentrations are sufficiently high to indicate that further evaluation in the CMS will be necessary, the data for that chemical are considered to be adequate for the purpose of risk assessment. Similarly, the risk assessment results can be used, along with the soil analytical results, to delineate CMS areas and estimate soil volumes within an order of magnitude (Goal 3). Other criteria used to evaluate characterization completeness include the sampling results compared to screening levels, the presence and magnitude of concentration gradients, types of historical site operations and chemical uses, analytical detection limits, and physical constraints (e.g., soil depth and bedrock occurrence).

Data quality summaries for the B4133 RFI Site are provided in Tables B.3-3A (soil), B.3-3B (soil vapor), and B.3-3C (surface water). To evaluate previous sampling results from soils that have been excavated from the Neutralizing Pit area, a summary of maximum detected concentrations in removed soil is presented in Table B.3-2D.

B.3.4.1 Soil Data Presentation

Relevant site information, sampling rationale, analytical results, and evaluation of results are presented in Table B.3-2A. Table B.3-2A refers to chemical results that are shown by chemical group category on Figures B.3-1 through B.3-6C. Figures 4-1 through 4-6 of the Group 7 RFI Report also present chemical results for all of Group 7. Table B.3-2A presents the following site characterization information by each chemical use area (Figure B.2-1) for each relevant chemical group within each chemical use area:

- Relevant site history, site characteristics, and activities related to chemical use for each chemical use area by chemical use number.
- Sampling scope and rationale for each chemical use area by chemical use number.
- Summary of sampling results for soil and soil vapor for each chemical use area by chemical use number. As appropriate, sample results are compared to established SSFL background concentrations (metals and dioxins only) and/or SSFL risk-based screening levels RBSLs¹. The screening levels are also displayed on Figures B.3-1 through B.3-6C.
- Summary of sampling results and assessment of whether chemical gradient characterization of each chemical group is sufficient for risk assessment.
- Determination if nature and extent of chemicals is defined sufficiently to estimate soil volumes (within a factor of 10) identified for further consideration in the CMS (if needed).

B.3.4.2 Soil Data Summary

Described in detail on Table B.3-2A, the following summary presents detected VOCs, SVOCs, TPH, PCBs, dioxins, and metals, in particular, those that exceeded Residential Risk-Based Screening Levels (ResRBSLs) and Ecological Risk-Based Screening Levels (EcoRBSLs) at the 11 confirmed and potential chemical use areas identified at the B4133

¹ The use of the SRAM-based screening levels for comparison purpose does not serve as a risk assessment. These screening levels are not used to determine the significance of detected chemical concentrations or if a chemical use area will be recommended for further consideration in the CMS, but only to provide the reader another tool to evaluate the characterization data. The SRAM-based screening levels represent conservative concentrations that pose a low level of risk. See Appendix E.

RFI Site (values compared against most conservative screening criteria). For CMS recommendations (see Section 5.0), various land uses or ecological receptors may be used based on physical site conditions and/or future land use.

VOCs

Several VOCs were detected in soil above respective RBSLs at one location in the unpaved area northeast of tank T-3 (CUA 3). Cumene, n-propylbenzene, and 1,2,4- and 1,3,5-trimethylbenzene were detected above ResRBSLs, up to 19,200 µg/kg for 1,2,4-trimethylbenzene. Benzene (0.11 µg/L) and toluene (0.27 µg/L) were detected above their ResRBSL and EcoRBSL, respectively, in soil vapor collected at the same location. VOCs were not detected, or detected below RBSLs, in surrounding samples.

Methylene chloride was detected up to 8.41 µg/kg in soil (above the ResRBSL) at two of nine locations in and around the Western Drainage Debris Area (CUA 4). Detected toluene and styrene were below respective RBSLs at CUA 4. Detected VOCs did not exceed RBSLs in downstream samples (see Appendix C, RMHF).

SVOCs

SVOCs, including benzo(a)pyrene, were detected at concentrations below RBSLs throughout the B4133 RFI Site up to 537 µg/kg (naphthalene). Benzo(a)pyrene was detected up to 11.7 µg/kg at the Western Drainage Debris Area.

TPH

Petroleum hydrocarbons were detected throughout the B4133 RFI Site at concentrations below RBSLs, with the exception of two locations:

- The unpaved area northeast of tank T-3 (CUA 3) - Gasoline range organics (C08-C11) were detected at 1,410 mg/kg and kerosene range organics (C12-C15) were detected at 2,460 mg/kg, both above respective ResRBSLs. Lubricant oil range organics (C21-C30) were also detected at 4.36 mg/kg in this area, well below ResRBSL. The maximum concentrations were detected at 5.5 feet bgs; TPH was not detected in the surface sample.
- The Western Drainage Debris Area (CUA 4) - Gasoline range organics (C08-C11) were detected up to 4.81 mg/kg in 5 of 11 samples, above the ResRBSL. Other TPH ranges were detected up to 29.4 mg/kg (lubricant oil range organics [C21-C30]). Detected TPH did not exceed RBSLs in downstream samples (see Appendix C, RMHF).

Lubricant oil range organics (C21-C30) were detected at locations throughout the asphalt-lined drainage ditch east of the B4133 RFI Site, up to 717 mg/kg at HFBS0100. No other TPH ranges were detected in the asphalt-lined drainage ditch. For characterization and delineation of TPH concentrations in the asphalt-lined drainage ditch see the Group 6 RFI Report (in progress).

Polychlorinated Biphenyls (PCBs)

PCBs were analyzed in 41 samples at the B4133 RFI Site, and were generally either not detected or detected below RBSLs. PCBs were detected above RBSLs at three locations:

- The unpaved former storage and staging area southwest of Building 4133 (CUA 3) - Aroclor 1248 was detected at 62.6 µg/kg, above EcoRBSL but below ResRBSL. Detected Aroclor 1254 and Aroclor 1260 (74.9 and 24.5 µg/kg, respectively) were below RBSLs.
- The unpaved area north of Building 4133 (CUA 3) - Aroclor 1254 was detected at 380 µg/kg, above both Res and EcoRBSLs. Aroclor 1260 was detected at 4.5 mg/kg, below RBSLs.
- The unpaved former storage and staging area east of Building 4133 (CUA 3) - Aroclor 1254 was detected at 87.8 µg/kg, above EcoRBSL but below ResRBSL. Aroclor 1260 was detected at 20.6 mg/kg, below RBSLs.

Downslope and downstream drainage samples (see Appendix C, RMHF) were either non-detect or below RBSLs.

Dioxins

Dioxins were analyzed in two samples west of the Western Drainage Debris Area (CUA 4). While one congener was detected slightly above the background concentration for this dioxin congener (OCDD at 165 pg/g; background 140 ng/kg), calculated 2,3,7,8-TCDD Toxicity Equivalency Quotients (TEQs) ranged up to 0.135 ng/kg, well below background and RBSLs.

Metals

A total of 146 samples were collected for metals analysis throughout the B4133 RFI Site; of these 27 contained metals above background ranges, primarily sodium:

- Sodium was detected above background (110 mg/kg) throughout the B4133 RFI Site, up to 6,900 mg/kg in historical samples collected during 1987-1988 soil removal at the Neutralizing Pit. In recent sampling of in place soil sodium was detected up to 2,660 mg/kg just north of the B4133 RFI Site boundary.

- Arsenic, barium, boron, cadmium, mercury, selenium and zinc were detected just over background at scattered, isolated locations within and near main Building 4133 operational areas.

Metals decrease to within background range in downslope and drainage samples.

Cadmium, cobalt, copper, lead, sodium, and zinc over background at locations throughout the asphalt-lined drainage ditch east of the B4133 RFI Site. For characterization and delineation of metals concentrations in the asphalt-lined drainage ditch see the Group 6 RFI Report (in progress).

Topanga Fire Evaluation

The potential contribution of the 2005 Topanga Fire to the concentrations of metals and dioxins in soil has been considered in the characterization of the nature and extent of chemicals at the B4133 RFI Site. This evaluation was done to determine if any elevated concentrations of metals and dioxins in soil samples collected after the fire could be due to the presence of ash and burned materials deposited in surficial soil. Only those surficial soil samples (depths down to 12 inches bgs) collected after the fire were considered in this evaluation.

For the B4133 RFI Site there were approximately 110 post-fire soil samples analyzed for metals. Of the approximately 110 samples analyzed for metals three samples had concentrations of zinc above background (SFBS0061 at 143 mg/kg, SFBS0063 at 139 mg/kg, and SFBS0080 at 115 mg/kg [background 110 mg/kg])

The presence of zinc in scattered samples across the B4133 RFI Site may be indicative of fire-related impacts outside of CMS areas.

For the RMHF RFI Site, there were 2 post-fire samples analyzed for dioxins. Neither of the 2 samples analyzed for dioxins had a calculated TCDD TEQ greater than background level (0.87 ng/kg).

B.3.5 Groundwater Findings

Groundwater occurrence and impacts at the B4133 RFI Site are described below.

B.3.5.1 Groundwater Data Presentation

Groundwater sampling results and characterization findings are summarized in Table B.3-2B. The purposes of the table are to:

- Summarize soil impacts as they potentially relate to groundwater impacts.
- Present groundwater sampling results.
- Demonstrate that groundwater characterization is sufficient for the purposes of risk assessment including:
 - That groundwater characterization is adequate for detected site-related chemical constituents.
 - That site soil characterization is adequate for detected groundwater chemical constituents.

Similar to Table B.3-2A, Table B.3-2B describes groundwater data by chemical group (metals, VOCs, SVOCs, etc.). Table B.3-2B is organized as follows:

- Column 1 – Analytical group
- Column 2 – Summary of site soil impacts
- Column 3 – Confirmation that chemicals detected in site soil are monitored in groundwater
- Column 4 – Summary of groundwater impacts
- Column 5 – Discussion of whether chemicals are site-related
- Column 6 – Conclusion regarding adequacy of groundwater characterization

A detailed compilation of groundwater data is provided in Appendix D of this Group 7 RFI Report. The groundwater appendix contains a description of hydrogeologic conditions (occurrence, water levels, recharge, yield, etc.), groundwater quality, and transport and fate. These data include:

- Laboratory analytical results
- Hydrographs
- Time-series plots

A site-wide report on SSFL groundwater will be prepared as part of the RFI Program. This report will comprehensively address across the site the same characterization and transport and fate issues addressed in Appendix D.

B.3.5.2 Groundwater Data Summary

Chatsworth formation groundwater at the B4133 RFI Site is monitored at two wells completed within unweathered bedrock (RD-19 and RD-85). Near-surface groundwater is monitored at one shallow well (RS-25) that is completed within weathered bedrock.

Analytical results from these locations are summarized and evaluated in conjunction with soil findings on Table B.3-2.B.

As described in Appendix D, analytical results for groundwater are generally characterized by infrequent, inconsistent, or low-level detections of VOCs, many of which are commonly detected as a result of field or laboratory contamination. Several metals such as copper, manganese, and selenium were detected at concentrations above their respective GWCCs but are not considered to be site-related (Table B.3-2.B). Perchlorate was detected at an estimated concentration of 2.1 µg/L in one sample collected in 2003 from RS-25, but was not detected in three samples collected at a subsequent sampling event. This well has been predominantly dry.

B.3.6 Surface Water Findings

Surface water samples have not been collected at the B4133 RFI Site since surface water bodies are not present at the site.

B.4 RISK ASSESSMENT FINDINGS SUMMARY

The following sections summarize the findings of the HRA and ERA performed for the B4133 RFI Site within the Group 7 RFI Report area. Details regarding how the HRA and ERA were conducted are presented in the SRAM (MWH, 2005) and in Appendix E of this Group 7 RFI Report.

B.4.1 Key Decision Points

Site-specific key decision points for the HRA and ERA are listed below and described in more fully in Appendix E. These decisions were made for the risk assessments based on site-specific conditions, chemical characteristics, and assessment findings. Programmatic decision points are described and included in the RFI Program Report (MWH, 2004a). Site-specific key decision points include:

1. Direct exposure risks were calculated using the maximum concentrations of compounds detected in well RD-30, which had the highest concentrations of all the wells assigned to the Group 7 Reporting Area. For metals detected in groundwater from well RD-30, filtered data were used to evaluate risks.
2. Exposure Point Concentration (EPC) calculations were based on collected characterization data, as follows:
 - All groundwater EPCs were based on maximum levels detected in a single highest concentration well at the B4133 RFI Site (RD-19) for indirect exposure, or detected within a single highest-concentration well within the Group 7 area (RD-30) for direct exposure.
 - A review of time series plots for chemical constituents, groundwater gradients, and source areas indicates maximum concentrations detected during the last consecutive three years conservatively represent potential future conditions for the purpose of estimating future risks.
 - Soil reasonable maximum exposure (RME) EPCs were based on maximum detected concentrations, or one-half the detection limit for non-detects if there was sufficient evidence that the chemical is present, unless there were sufficient data to calculate a statistical upper bound estimate of the concentration and that estimate was lower than the maximum detected concentration.
3. Large home range receptors were assumed to live only in source areas within the B4133 RFI Site. Risks for these receptors using home range adjusted exposures were calculated for the purpose of comparing to the RFI site only risks. Large home range receptor cumulative risk across SSFL will be presented later in a Site-Wide Summary Large Home Range Receptor Risk Assessment Report.

B.4.2 Human Health Risk Assessment Findings

The receptors included in the HRA are the potential trespasser and the future resident and recreator. Since the current potential trespasser and future recreator have the same exposure parameters, they have been presented together as the recreator.

Supporting information for the HRA is presented in the following tables and figure:

- Chemicals of Potential Concern (COPC) for Human Health – Table B.4-1
- Human Health Risk Estimates – Table B.4-2
- Human Health Risk Assessment Uncertainty Analysis – Table B.4-3
- Generalized Conceptual Site Model of HRA Exposures – Figure B.4-1

A summary of the HRA findings is presented below. For comparison purposes, excess upper bound theoretical incremental lifetime cancer risks (ILCRs) of 1×10^{-6} , or less, associated with multimedia exposures are considered acceptable. Potential risks between 1×10^{-6} and 1×10^{-4} require risk-management decisions and above 1×10^{-4} usually require remediation. Likewise, Hazard Indices (HIs) below 1.0 are considered acceptable and above 1.0 usually require remediation. Blood lead concentrations less than 10 microgram per deciliter ($\mu\text{g/dL}$) are generally considered to be acceptable for making remedial decisions (DTSC, 1992). These criteria were used to make evaluation recommendations for the CMS.

Exposure to Surficial Media Plus Indirect Groundwater Exposure

The RME risks presented in this section were based on exposures to all relevant surficial media, plus indirect exposure to VOCs in groundwater due to vapor migration, and included:

- Estimated ILCRs for all receptors ranged up to 7×10^{-7} (child resident) and HIs ranged up to 0.4 (child resident). The risk ranges for all receptors evaluated at the B4133 RFI Site from exposures to surficial media and VOCs due to vapor migration fall below the generally-accepted point of departure of 1×10^{-6} for selection of remedial alternatives. HI values for all receptors evaluated at the B4133 RFI Site from exposures to surficial media and VOCs due to vapor migration fall below the acceptable point of departure of 1.
- Blood lead levels were not estimated since lead was not determined to be a COPC.

The major issues related to uncertainty and conservatism in these risk estimates are presented in Table B.4-3.

B.4.3 Ecological Risk Assessment Findings

The ecological receptors representing the site are deer mouse, hermit thrush, red-tailed hawk, bobcat, mule deer, soil invertebrates, and plants. Supporting information for the ERA is presented in the following tables and figure:

- Chemicals of Potential Ecological Concern (CPEC) – Table B.4-4
- Risk Estimates for Ecological Receptors – Table B.4-5
- Ecological Risk Assessment Uncertainty Analysis – Table B.4-6
- Graphical ERA Conceptual Site Model – Figure B.4-2

A summary of the ERA findings is presented below. For comparison purposes, estimated potential ecological risks were generally considered acceptable for Hazard Quotient (HQ) or HI values less than 1 (HQs are hazard estimates for single CPECs, HIs are cumulative hazard estimates for all CPECs). The ERA findings included:

- The deer mouse, hermit thrush and mule deer had estimated HQs associated with soil exposure from the B4133 RFI Site that were greater than 1. Estimated HQs for the red-tailed hawk and the bobcat were less than 1. HQs are primarily associated with:
 - cadmium and total Aroclors for the terrestrial ecological receptors.
- The deer mouse burrow air inhalation pathway does not contribute significantly to their risks, compared to the risks from other non-volatile constituents.
- Estimated HQs for soil invertebrates are greater than 1 for lithium.
- No adverse effects on health or productivity of native plant species were observed within areas potentially impacted that are likely attributable to CPECs.

The major items related to uncertainty and conservatism in these risk estimates are presented in Table B.4-6.

These HRA and ERA results are appropriate to use in making CMS recommendations for the receptors evaluated.

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B.5 B4133 RFI SITE ACTION RECOMMENDATIONS

This section presents a summary of RFI reporting requirements as they apply to the B4133 RFI Site. Section B.5.1 describes current RFI reporting requirements, particularly identification of areas for further work, or ‘site action’ recommendations. The process and criteria used for making site action recommendations is described in Section B.5.2, and site action recommendations for the B4133 RFI Site are summarized in Section B.5.3.

B.5.1 RFI Reporting Requirements

As described in regulatory guidance documents for the SSFL RCRA Corrective Action Program (see Group 7 RFI Report Section 1.2.3), the purpose of the RFI is to: (1) characterize the nature and extent of contamination, and identify potential source areas; (2) assess potential migration pathways; (3) estimate risks to actual or potential receptors; and, (4) gather necessary data to support the CMS (DTSC, 1995). The RFI Report is required to: (1) present findings regarding the above information; (2) describe the completeness of the investigation; and, (3) indicate if additional work is needed.

This B4133 RFI Site Report accomplishes these requirements for the receptors evaluated using currently approved risk assessment methodologies:

- 1) Presenting detailed chemical characterization findings, source area identification, and investigation completeness determinations by media and by chemical class for all chemical use areas (and associated down-drainage locations) (Tables B.3-2A and B.3.2B). Section B.3 summarizes the overall characterization of chemical contamination nature and extent, potential source areas, and an assessment of investigation completeness. . Assessments of investigation completeness have been made for the known or potential chemical use areas identified in this report based on sampling results, using professional judgment, and considering historical site operations, chemical data concentration gradients or trends, and risk-based screening levels and risk assessment findings for residential, recreational, and ecological receptors.
- 2) Evaluating groundwater migration pathways in Appendix D of the Group 7 RFI Site report, and other potential transport pathways in Appendix E of the Group 7 RFI Site report.
- 3) Identifying potential receptors (residential, recreational, and ecological) and estimating potential risks at the B4133 RFI Site (Section B.4 and Appendix E).
- 4) Identifying B4133 RFI Site areas for chemicals in surficial media requiring further work (this Section)

B.5.2 Basis for Site Action Recommendations

In summary, site action recommendations for chemicals in surficial media included in the B4133 RFI Site Report identify areas for:

- Further evaluation in the CMS (CMS Areas).
- No further action (NFA) areas.
- Interim corrective measures to stabilize source areas and control chemical contaminant migration (Stabilization Areas).

Site action recommendations are based on information in historical documents, site characterization data, and risk assessment findings. Historical document review findings are used to determine areas of potential chemical use and identify areas for additional RFI sampling and characterization. Characterization findings provide definition of the nature and extent of site chemical contaminants, based on chemical data and transport and fate evaluation. Risk assessments evaluate chemical characterization data, estimate human health and ecological risks based on specified land use scenarios, and identify chemicals that drive or contribute to those risks.

Based on the review and evaluation of extensive historical records and environmental sampling data collected prior to and during the RFI, additional sampling was performed in areas where chemicals were potentially used, handled, stored, or released within the Group 7 Reporting Area. Samples were also collected in areas where the existing chemical analytical data were considered to be inadequate for site characterization and/or risk assessment (including down-gradient locations). Similarly, for areas where no historical chemical use, storage, or handling was indicated in the historical documents (i.e., for areas determined to have very limited or no potential for environmental concern), no samples were collected. Based on the documents reviewed and nearby sampling results, if any, these non-chemical use areas are recommended for NFA.

NFA and CMS recommendations for the areas sampled within the Group 7 Reporting Area are based on an integrated evaluation of characterization and risk assessment results for the receptors evaluated. Information in the historical documents indicating past chemical use practices and areas, coupled with site characterization data indicating environmental impacts or lack thereof, provide a solid basis for the NFA and CMS recommendations for chemicals in surficial media made in this site report. Stabilization Area recommendations rely on

characterization evaluations, including transport and fate analysis, and comparison to risk-based levels. Each process is described further below.

The determination of characterization and risk assessment requirements associated with SB990 is ongoing. Once these determinations are made, RFI Group documents (including the site action recommendations provided herein), will be reviewed and revised if required. The evaluation and site action recommendations presented below are based on an evaluation of chemical impacts and risk assessment findings for residential, recreational, and ecological receptors performed using currently approved RFI work plans for characterization and risk assessment.

CMS and NFA Area Site Action Evaluation Process

CMS or NFA site action recommendations for chemicals in surficial media are based on a four-step process that evaluates risk assessment results for residential, recreational, and ecological receptors in the context of characterization results and considers potential migration from identified source areas. This process is presented in detail in Section 7.1 of the Group 7 RFI Report and is summarized as follows:

- **Site Action Evaluation Step 1.** Risk assessment results for human and ecological receptors are compared to “acceptable” levels published by the USEPA or DTSC as guidance for site managers (DTSC, 1992; USEPA, 1992). The low end of the risk range (i.e., 1×10^{-6} , or 1 in 1,000,000, or HI = 1.0) is used to conservatively estimate the areal extent that is recommended for site action.
- **Site Action Evaluation Step 2.** When estimated RFI site risks are greater than 1×10^{-6} (cancer risks) or HI values greater than 1 (noncancer and ecological risks), each RFI site’s risks are reviewed on a chemical-by-chemical basis to identify risk-drivers and significant risk contributors to cumulative, total risk for each evaluated receptor.
- **Site Action Evaluation Step 3.** Characterization findings from the entire RFI site are evaluated to spatially identify areas where higher concentrations of risk drivers and contributors are detected. The identified areas are termed in this report ‘CMS Areas’ and represent locations recommended for further evaluation during the CMS. Areas recommended for further evaluation during the CMS are comprehensive of all appropriate potential receptors or land use scenarios evaluated following currently approved RFI work plans.
- **Site Action Evaluation Step 4.** The fourth step identifies any uncertainties in B4133 RFI Site characterization and risk assessments that affect findings. For example, some chemicals are assumed to be present in soil based on TPH extrapolation factors (e.g., benzene and PAHs) and contribute to total risk for the RFI site above acceptable

levels. Since this assumption is often highly conservative, its use as a basis for CMS recommendations may be further evaluated in the CMS.

As described in Step 3 above, the areas of the RFI sites proposed for further evaluation in the CMS (i.e., CMS Areas) are based on identifying chemical concentrations that are above their respective RBSL. This process results in CMS Areas that are larger than would need to be addressed during cleanup to achieve acceptable risks. This is due to comparing individual soil sample results to RBSLs as ‘bright-line’ criteria, instead of using an area-average concentration. Area-averaged concentrations will be used in the CMS to refine the cleanup extent at these recommended CMS Areas.

Site action recommendations are tabulated by chemical use area and chemical risk drivers/contributors are identified for each appropriate receptor in Table B.5-1. CMS Areas are also depicted graphically in Figure B.5-1 to illustrate location and approximate aerial extents, and summarized in Table B.5-2.

Two additional aspects of RFI reporting will serve to confirm and/or finalize the areas recommended in Group RFI Site Reports for evaluation in the CMS. The first is an ecological evaluation for large-home range receptors (e.g., mule deer and hawk). The second is a groundwater evaluation that will be reported in the Site-Wide Groundwater Report.

Stabilization Area Site Action Evaluation Process

Chemical data collected during the RFI is evaluated for chemical contaminant migration. Resulting site action recommendations focus on stabilization measures related to sediment transport via the surface water pathway.

Criteria used to evaluate if source area stabilization measures are needed to control surface water migration include:

- Presence of concentrations above background or RBSLs in surficial (not deeper) soils.
- Proximity of surficial source area to an active surface water drainage pathway.
- Moderate to steep topography.
- Absence of containment features (e.g., surface coatings, dams).
- Chemical concentration gradients that indicate prior transport away from the surficial source area.

Each criterion is considered important, and a weight-of-evidence evaluation is used to make a recommendation for chemical source area stabilization measures. Source area stabilization measures, which include the use of best management practices (BMPs), are used to prevent migration to surface water. BMPs include the installation of straw bales, fiber rolls, silt fencing, and covering areas with plastic tarp. Erosion control measures have been applied to many surficial soil source areas at the SSFL to prevent chemical contaminant migration. These are described in the SSFL Storm Water Pollution and Prevention Plan (MWH, 2006a).

B.5.3 B4133 RFI Site Recommendations

The B4133 RFI Site action recommendations are listed in Table B.5-1 and are presented on Figure B.5-1. Table B.5-1 lists CMS and NFA recommendations and includes identification of chemical risk drivers and contributors for each appropriate receptor. CMS Areas shown on Figure B.5-1 are approximate and represent evaluations inclusive of the receptors and land use evaluated. As noted above, recommendations reported in this document will be reviewed upon completion of the site-wide groundwater report and large-home range receptor evaluations, and updates to this report prepared as needed.

B4133 RFI Site areas recommended for evaluation in the CMS are summarized below. Two CMS areas were identified (Table B.5-2), including:

- B4133-1: Area North of Building 4133 (Aroclor 1254)
- RMHF-2: Area Northeast of Building 4133 (Benzene, gasoline range organics, 1,2,4-trimethylbenzene)

No CMS areas at the B4133 RFI Site were recommended for source stabilization.

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B.6 REFERENCES

- Boeing, 1999. Building 4654 Supplemental Final Status Survey Report. March 15, 1999. HDMS00731314.
- Boeing, 2000. Emergency Response Logbook. HDMS00724447.
- Boeing, 2003a. Grid S19/T19 Interim Soil Remediation. November 19, 2003. HDMS00731642.
- Boeing, 2003b. Site Environmental Report for Calendar Year 2002 DOE Operations at the Boeing Company Rocketdyne Propulsion and Power. September 2003. HDMSp00111554.
- Boeing, 2004. Building 4133 Radiation Survey Report. January 26, 2004. HDMS00731347.
- Boeing, 2007. Boeing Spill Records (Post 1995). January. HDMS00021572.
- Boeing, 2009a. Group 7 Historical Documents, Santa Susana Field Laboratory, Ventura County, California. June.
- Boeing, 2009b. Phil Rutherford Comments on Draft Building 4133 RFI Report Site History Text. May 15, 2009. HDMS00731422.
- Department of Energy (DOE), 1999. Draft Docket for the Release of Building 4654 at the Engineering Technology Engineering Center. May 1999. HDMSp00010474.
- DOE, 2001. Letter from R. Flemming to Henry DeGraca, Review of the Department of Energy/Certification Docket – Energy Technology Engineering Center – 654 Draft Docket for Release of Building 4654 at the Energy Technology Engineering Center. February 16, 2001. HDMSp00054150 and HDMSp00054151.
- DOE, 2005. Letter from Michael Lopez to Majelle Lee, Boeing, Release of Building 4654. February 1, 2005. HDMSp00054078.
- Department of Health Services (DHS), 1990. Emergency Permit for a Hazardous Waste Management Facility. July 2, 1990. HDMS00390978.
- DHS, 1991. Letter from Scott Simpson to Steve Lafflam, Rockwell, Energy Technology Engineering Center (ETEC) Hazardous Waste Management Facility Operation Plan Review, Notice of Deficiency. June 27, 1991. HDMS00375298.
- DHS, 1996. Letter from Michael Montes to P. D. Rutheford, Rockwell, Building 030, 019, and 654. March 29, 1996. HDMSp00054163.
- DHS, 2000. Confirmatory Survey Building 4133 Hazardous Waste Treatment Facility (HWTF) Santa Susana Field Laboratory Boeing – Rocketdyne Ventura County, California. HDMS00235156.

- Department of Toxic Substances Control (DTSC). 1992. Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities. October. HDMSe00719828.
- Dibblee, Thomas, W., 1992. Geologic Map of the Calabasas Quadrangle, Los Angeles and Ventura County, California. HDMSe00000124.
- DTSC, 1995. Hazardous Waste Facility Post-Closure Permit PC-94/95-3-02 (Area I & III). May. HDMSe00166796.
- DTSC, 2000. Letter from Roberto Kou, DTSC, to Roger Marshall, Boeing, Regarding DTSC Inspection of the Hazardous Waste Management Facility. September 19, 2000. HDMSe00392053.
- Groundwater Resources Consultants, Inc. (GRC), 1989. Phase II Report – Investigation of Soil and Shallow Groundwater Conditions, Santa Susana Field Laboratory – Area IV, Rockwell International Corporation – Rocketdyne Division Chatsworth, California. May 17, 1989. HDMSp001862813.
- GRC, 1995a. Sampling and Analysis Plan, Hazardous Waste Facility Post-Closure Permit PC-94/95-3-03, Area II. Santa Susana Field Laboratory, Rockwell International Corporation, Rocketdyne Division. June 5. HDMSe00167212.
- GRC, 1995b. Sampling and Analysis Plan, Hazardous Waste Facility Post-Closure Permit PC-94/95-3-02, Areas I and III. Santa Susana Field Laboratory, Rockwell International Corporation, Rocketdyne Division. June 5. HDMSe00000125.
- Haley & Aldrich, Inc. (H&A), 2008a. Report on Annual Groundwater Monitoring, 2007. Santa Susana Field Laboratory, Ventura County, California. February. HDMSe00716956 (VI of II), HDMSe00717315 (VII of II).
- H&A, 2008b. First Quarter 2008 Groundwater Monitoring Report, Santa Susana Field Laboratory, Ventura County, California. May. HDMSe00718400.
- H&A, 2008c. Second Quarter 2008 Groundwater Monitoring Report, Santa Susana Field Laboratory, Ventura County, California. August. HDMSe00724498.
- H&A, 2008d. Third Quarter 2008 Groundwater Monitoring Report, Santa Susana Field Laboratory, Ventura County, California. November. HDMSe00724753.
- ICF Kaiser Engineers (ICF), 1993. Current Conditions Report and Draft RFI Work Plan, Areas IV, Santa Susana Field Laboratory, Ventura County, California. HDMSe00011714, HDMSe00011932, and HDMSe00012436.
- Montgomery Watson (MWH), 2000. Technical Memorandum, Conceptual Site Model, Movement of TCE in the Chatsworth formation. Santa Susana Field Laboratory, Volumes I, II, and III. April. HDMSe00012888 (Volume I), HDMSe00012932 (Volume II), HDMSe00013132 (Volume III).
- MWH, 2002. Plates Depicting the Geologic Stratigraphy and Structure in the Northwest Portion of the SSFL. October. HDMSe00165005 and HDMSe00166591.
- MWH, 2003a. Near-surface Groundwater Characterization Report. Santa Susana Field Laboratory, Ventura County. November. HDMSe00015203.

- MWH, 2003b. Closure Plan for the Hazardous Waste Management Facility Buildings T029 and T133 Santa Susana Field Laboratory, Area IV Ventura County, California. EPA ID No. CAD000629972. December, 2003. HDMSp00089125.
- MWH, 2004a. RCRA Facility Investigation Program Report. Santa Susana Field Laboratory, Ventura County. July. HDMS00017872.
- MWH, 2004b. Report of Results, Phase I of Northeast Investigation Area Groundwater Characterization. Santa Susana Field Laboratory, Ventura County. September. HDMSE0014766, HDMS00122614.
- MWH, 2005. Standardized Risk Assessment Methodology (SRAM) Work Plan, Revision 2. Santa Susana Field Laboratory, Ventura County. September. HDMS00198211.
- MWH, 2006a. Storm Water Pollution Prevention Plan for Santa Susana Field Laboratory. June. HDMS00006204.
- MWH, 2006b. Group 6 Northeastern Portion of Area IV RCRA Facility Investigation Report Santa Susana Field Laboratory Ventura County California. Appendices A through D. September 2006. HDMS00150680, HDMS00151543, HDMS00154507, HDMS00156206, and HDMS00156302.
- MWH/CH2M Hill, 2008a. Waste Debris Survey, Santa Susana Field Laboratory, Ventura County, California. March. DRAFT. HDMS00720088.
- MWH/CH2M Hill, 2008b. Standard Operating Procedures: Building Feature Evaluation and Sampling, Santa Susana Field Laboratory, Ventura County, California. July. HDMS00720063.
- NAA, 1962. Internal Letter Spread of Contamination in Area #654. February 18, 1962. HDMS00024472.
- Ogden Environmental and Energy Services Co. Inc. (Ogden), 1996. RFI Work Plan Addendum, Santa Susana Field Laboratory, Ventura County, California, September. HDMS00018939 (VI), HDMS00019266 (VII), HDMS00019681 (VIII).
- Ogden, 2000a. RCRA Facility Investigation Work Plan Addendum Amendment. Santa Susana Field Laboratory, Ventura County, California. June. HDMS00170168.
- Ogden, 2000b. Standardized Risk Assessment Methodology (SRAM) Work Plan, Santa Susana Field Laboratory, Ventura County, California. June. HDMS00177198.
- ORISE, 1997. Verification Survey of the Interim Storage Facility (T654) Santa Susana Field Laboratory Rockwell International Ventura County, California. November 14, 1997. HDMSp00054332.
- ORISE, 2000. Verification Survey of Building 4133 Santa Susana Field Laboratory The Boeing Company Ventura County, California. April 19, 2000. HDMSp00113823.
- Padre Associates, Inc. (Padre), 2005. Letter from C. Dunn to Brian Sujata, Boeing, Report on Biological Surveys of Buildings 29 and 133, and Area 4 Soil Borrow Pit at the Santa Susana Field Laboratory. August 4, 2005. HDMSp00086889.
- Rockwell, 1978. Internal Letter from F. E. Begley to R. J. Tuttle, Unconditional Release of Building T724 for Unrestricted Use. January 18, 1978. HDMSp00101062.

- Rockwell, 1981. Relevant Information to Support RMDF and Interim Storage Facility Decommissioning. November 5, 1981. HDMSp00054164.
- Rockwell, 1984a. Internal Letter from R. D. Rovang to John Page, Summary of Sodium Hydroxide Spill at Bldg. 133. April 18, 1984. HDMSse00375288.
- Rockwell, 1984b. Internal Letter from R. D. Rovang to P. K. Kleinsmith, Cleanup of Bldg. 133 Sodium Hydroxide Spill. April 27, 1984. HDMSse00379377.
- Rockwell, 1985. Interim Storage Facility Decommissioning Final Report. March 15, 1985. HDMSp00017801.
- Rockwell, 1986a. NaOH Spill Bldg. 133 San Su. February 18, 1986. HDMSse00379850.
- Rockwell, 1986b. Spill Log for 1986. HDMSse00725067.
- Rockwell, 1988. Operation Plan Hazardous Waste Management Facility, Energy Technology Engineering Center. December, 1988. HDMSp00121346.
- Rockwell, 1989a. Letter report from S. R. Lafflam, Rockwell International Corp., Rocketdyne Division, Dennis Dickerson, to State of California Department of Health Services. Solid Waste Management Unit (SMWU) Submittal for Santa Susana Field Laboratory, Chatsworth, Ventura County, California. September 14, 1989. HDMSse00240505.
- Rockwell, 1989b. Internal Letter from D. Zweng to L. Auge, Transfer of Operating Responsibility for the Hazardous Waste Treatment Facility, Buildings 133 and 029. September 27, 1989. HDMSse00378303.
- Rockwell, 1990a. Letter from S. R. Lafflam to Florence Pearson, Department of Health Services, EPA ID No. CAD000629972 T/133 Hazardous Waste Treatment Facility. HDMSse00379395.
- Rockwell, 1990b. Letter from S. R. Lafflam to Dennis Dickerson, Department of Health Services, Spill Notification Report. October 15, 1990. HDMSp00016125.
- Rockwell, 1990c. Internal Letter from S. R. Lafflam to J. T. Nagamatsu, Environmental Control and Energy Conservation Activity Report. September 29, 1990. HDMSse00186200.
- Rockwell, 1991a. Operation Plan Hazardous Waste Management Facility, Energy Technology Engineering Center. March 3, 1991. HDMSse00375326.
- Rockwell, 1991b. R. W. Melvold to Gigi Raote, Ventura County, B/133 Breakdown Condition Notification Report. April 19, 1991. HDMSse00377590.
- Rockwell, 1992a. Fire Loss Report – Building 133. January 22, 1992. HDMSse00377666.
- Rockwell, 1992b. Letter from S. R. Lafflam, Rockwell International, to S. Simpson, California EPA, regarding Santa Susana Field Laboratory Environmental Monitoring Quarterly Report. March 20, 1992. HDMSse00669401.
- Rockwell, 1992c. Operation Plan Hazardous Waste Management Facility, Energy Technology Engineering Center. November 6, 1992. HDMSse00378519.

- Rockwell, 1992d. Internal Letter from Majelle to S. R. Lafflam and J. T. Nagamatsu, Report of Incident at Blg 133. January 27, 1992. HDMSe00380264.
- Rockwell, 1993. Letter from M. C. Shoemaker to Florence Pearson, DTSC, CEQA Compliance for Energy Technology Engineering Center, EPA ID# CAD000629972. March 19, 1993. HDMSe00378116.
- Rockwell, 1994a. Internal Letter from J. P. Ampaya to R. Amar, HWMF Tank T-2 Inspection Plan. October 13, 1994. HDMSe00378328.
- Rockwell, 1994b. Area IV Chemical Usage Summary Report. November. HDMSP00041455.
- Rockwell, 1994c. Radiological Characterization Plan, Santa Susana Field Laboratory, Area IV. March 30, 1994. HDMSp00000934.
- Rockwell, 1995a. Letter from P. D. Rutheford, Rockwell International, to Mike Lopez, Department of Energy, Subject: Buildings 030, 019, and 654. July 6, 1995. HDMSe00375498.
- Rockwell, 1995b. Internal Letter from K. T. Knudsen to R. Jassak, Building 133 Treatment Lid and Usefulness of Hydrogen Detectors. August 18, 1995. HDMSe00378797.
- Rockwell, 1996. Area IV Radiological Characterization Survey Final Report. August 15, 1996. HDMSe00030423 (Vol. I), HDMSe00030951 (Vol. II), HDMSe00031374 (Vol. III), and HDMSe00031876 (Vol. IV).
- Sapere Consulting Inc. (Sapere), 2005. Historical Site Assessment of Area IV. Santa Susana Field Laboratory, Ventura County, California. May. HDMSe00032522. HDMSe00032524. HDMSe00032525. HDMSe00032615.
- Science Applications International Corporation (SAIC), 1991. Interim Final RCRA Facility Assessment Report for Rockwell International Corporation, Rocketdyne Division, Santa Susana Field Laboratory, Ventura County, California. July. HDMSe00121141.
- SAIC, 1994. Final RCRA Facility Assessment Report for Rockwell International Corporation, Rocketdyne Division, Santa Susana Field Laboratory, Ventura County, California. May. HDMSe00008191.
- United States Environmental Protection Agency (USEPA), 1992. Guidance for Data Usability in Risk Assessment (Part A), Final. Office of Emergency and Remedial Response. HDMSe00720342.
- USEPA, 1997. Aerial Photographic Analysis of Rockwell Rocketdyne Santa Susana Field Laboratory, Ventura County, California. USEPA Research and Development, Characterization Research Division, EPA Region 9, TS-PIC-9709912R. May. HDMSe00021334 (document), HDMSE00021321 through HDMSE00021333 and HDMSE000221375 through HDMSE00021381 (photographs).

Photographic References:

- Rockwell, 1974. Photograph: Future Building 4133 Location. November 12, 1974. HDMSm000000266.

Rockwell, 1984. Photograph: Building 4654 Excavation. September 4, 1984. HDMSp00014682.

Rockwell, 1988. Photograph: Building 4133 During Neutralizing Pit Excavation. August 18, 1988. HDMSp00061935.

Rockwell, date unknown. Photograph: Building 4133 Showing Temporary Storage Tank. HDMSp00033166.

Rockwell, date unknown. Photograph: Interim Storage Facility. HDMSp00040680.

Rockwell, date unknown. Photograph: Interim Storage Facility Storage Cells. HDMSp00040682.

Unknown, date unknown. Photograph: Building 4133. HDMSp00040431.

Unknown, date unknown. Photograph: Sodium-Potassium Alloy Tank. HDMSp00040432.

Unknown, date unknown. Photograph: Air Scrubber. HDMSp00040433.

Unknown, date unknown. Photograph: Tank T-1. HDMSp00040435.

Facility Drawing References:

NAA, 1977. Santa Susana Facility Plot Plan Drawing No. 303-GEN. C37. November 1, 1977. HDMS00459272.

Rockwell, 1977a. Santa Susana Facility - Bldg. 133 Sodium Burn Facility – Evaluations and Sections Drawing No. 303-133-A2. August 18, 1977. HDMS00731228.

Rockwell, 1977b. Santa Susana Facility - Bldg. 133 Sodium Burn Facility Foundation Plan and Details Drawing No. 303-133-S1. August 18, 1977. HDMS00731229.

Rockwell, 1977c. Santa Susana Facility Bldg. 133 Sodium Burn Facility Piping Plot Plan Drawing No. 303-133-P1. August 18, 1977. HDMS00731219.

Rockwell, 1977d. Santa Susana Facility Bldg. 133 Sodium Burn Facility System Diagram Drawing No. 303-133-P2. August 18, 1977. HDMS00731220.

Rockwell, 1977e. Santa Susana Facility Bldg. 133 Sodium Burn Facility Piping Drawing No. 303-133-P3. August 18, 1977. HDMS00731221.

Rockwell, 1979. Santa Susana Facility Bldg. 133 Sodium Burn Facility Gas Burner Detail Drawing No. 303-133-P4. April 23, 1979. HDMS00731222.

Rockwell, 1987a. SSFL Area IV Bldg. 133 Sump Drain Tank Monitoring Piping Drawing No. M133-68733-M1. July 8, 1987. HDMS00459063.

Rockwell, 1987b. SSFL Area IV Bldg 133 Sump Drain Tank Monitoring Plan Drawing No. M133-68733-MS1. July 8, 1987. HDMS00459065.

Rockwell, 1988a. Building 133 Temporary Drain Line Installation. August 28, 1988. HDMS00379865.

Rockwell, 1988b. SSFL Area IV Bldg 133 Replace Pavement Installation Plan Drawing No. M133-69142-C1. September 13, 1988. HDMS00459064.

Rockwell, 1988c. SSFL Area IV Bldg 133 Trench Installation Plan Drawing No. M133-69239-SM1. November 1, 1988. HDMS00459066.

Rockwell, 1991. Hazardous Waste Treatment Building T133 Plot Plan. August 20, 1991. HDMS00378310.

Rockwell, date unknown. Hazardous Waste Treatment Building (Bldg. 133) Plot Plan. HDMS00383511.

Rockwell, date unknown. Map 3 ESG SS Field Lab 5 ft. Contours Bldg. 133 Sodium Burn Facility Permit Number CAD000629972. HDMS00385879.

Rockwell, date unknown. T-133 Facility Plot Plan. 16 pages. HDMS00388541.

Rockwell, date unknown. T133 Treatment Area. HDMS00379190.

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TABLES

Table B.2-1
B4133 RFI Site Building Inventory
(Page 1 of 1)

Building	Chemical Use Area Location	Use Period	Current / Former Use	Operational Status Existing / Removed	DTSC Site Visit Date	Notes	Reference
Building 4133	1	1978 - 1997	HWMF and HWTF operations. Alkali metal storage and burn facility.	Existing	Not visited	Building originally constructed in the late 50s or early 60s (then referred to as Building 4724 Hot Oil Sodium Cleaning Facility) and moved from SRE to current location in 1977. Prior to being physically moved, Building 4133 was surveyed for radiological contamination by Rockwell employees and released for unrestricted use. Area was used for materials and equipment storage previous to building relocation.	HDMSp00040431 HDMSe00008191 HDMSe00032615 HDMSe00731228 HDMSe00731229 HDMSp00101062
Building 4XXX-1	1	1978 - 1997	Size reduction and kerosene storage area.	Existing	Not visited	Awning south of Building 4133.	HDMSe00032615 HDMSe00378310
Building 4654	6	1958-1985	Interim Storage Facility. Storage of dummy and spent fuel elements, shipping/storage casks, and radiological waste.	Removed	Not visited	Decommissioned, demolished, and contaminated soil removed in 1984-1985. Following Boeing, ORISE, and DHS surveys, DOE declared that the area was suitable for release for unrestricted use.	HDMSe00032615 HDMSp00017801 HDMSe00375498 HDMSp00040680 HDMSe00459272 HDMSp00054078

Notes:

(a) Buildings are often identified with or without the Administrative Area Number followed by the building

Acronyms:

DHS - Department of Health Services
DOE - Department of Energy
DTSC - Department of Toxic Substances Control
HWMF - Hazardous Waste Management Facility
HWTF - Hazardous Waste Treatment Facility
NA - Not Applicable

ORISE - Oak Ridge Institute of Science and Education
RFI - Resource Conservation and Recovery Act Facility Investigation
RMDF - Radioactive Materials Disposal Facility
RMHF - Radioactive Materials Handling Facility
SRE - Sodium Reactor Experiment
USEPA - United States Environmental Protection Agency

Table B.2-2
B4133 RFI Site Tank Inventory
(Page 1 of 2)

Tank Designator ^(a)	Chemical Use Area Location	Use Period	Location	Contents	Tank Size (gallons)	Operational Status Existing / Removed	Notes	Reference
Aboveground Tanks - Other								
T-2	2b	1978 - 1997	W of Building 4133	NaK alloys and argon gas	300	Removed from original location, but still located at the site.	T-2 was inside a carbon steel catch basin of sufficient capacity to contain the entire T-2 inventory (300 gallons) as well as precipitation from a 24 hour, 25 year storm event.	HDMSp00089125 HDMSe00378519 HDMSp00040432 HDMSe00378328 HDMSe00375326
T-3	2c	1990 - 1997	NE of Building 4133	NaOH and KOH	5,190	Existing	T-3 is a portable polyethylene storage tank inside of a secondary containment tank with a 6,600 gallon capacity.	HDMSp00089125 HDMSe00378519 HDMSe00186200 HDMSe00379395 Attachment B-4
T-4A	2d	Unknown	W of Building 4133	NaOH, KOH, sulfuric acid	128	Removed	Small rinse tank used to remove adherant hydroxides from metal components. The exact period of use for this tank is unknown; however, it was only ever mentioned and shown in the facility drawings of the 1991 HWMF Operation Plan.	HDMSe00375326
T-4B	2d	Unknown	W of Building 4133	NaOH, KOH, sulfuric acid	71	Removed	Small rinse tank used to remove adherant hydroxides from metal components. The exact period of use for this tank is unknown; however, it was only ever mentioned and shown in the facility drawings of the 1991 HWMF Operation Plan.	HDMSe00375326

Table B.2-2
B4133 RFI Site Tank Inventory
(Page 2 of 2)

Tank Designator ^(a)	Chemical Use Area Location	Use Period	Location	Contents	Tank Size (gallons)	Operational Status Existing / Removed	Notes	Reference
T-3	2f	1989 - 1990	W of Building 4133	Lithium compounds	540	Removed	Lithium hydride reaction holding vessel. Expected to be put into use early 1989 and used for a six month period.	HDMSp00121346 HDMSe00378310
Underground Tanks - Other								
T-1	2a	1988 - 1997	N of Building 4133	NaOH and KOH	1,318	Existing	T-1 is located inside a below grade, 8 inch thick concrete secondary conatainment pit.	HDMSp00089125 HDMSe00378519 HDMSp00040435 <u>Attachment B-4</u>
V-XXX-2	2a	1978 - 1987	N of Building 4133	NaOH, KOH, acid solution	12 x 6 x 6 (in feet)	Removed	Neutralizing Pit (also refered to as the Sump Pit and the Concrete Pit). Excavated in 1987 and replaced by T-1 in 1988.	HDMSe00378519 HDMSe00011714 HDMSe00731229 HDMSe00731220 HDMSe00459063 HDMSe00731219
V-XXX-1	2e	1987 - 1988	NW of Building 4133, N of fence	NaOH and KOH	Unknown	Removed	Temporary holding tank installed and used during the construction of T-1.	HDMSp00089125 HDMSe00379865

Notes:

(a) Tanks listed by category (fuel, solvent, other). If category not indicated on table, then that type of tank was not present on site

Acronyms:

NA - Not applicable

NaOH - sodium hydroxide

KOH - potassium hydroxide

NaK - sodium-potassium alloy

RFI - Resource Conservation and Recovery Act Facility Investigation

N- North

S - South

E - East

W - West

NE - Northeast

NW - Northwest

SE - Southeast

SW - Southwest

Table B.2-3
B4133 RFI Site Transformer Inventory
(Page 1 of 1)

SSFL Identification Number	Chem Use Area Location	Use Period	Description	Location	Status	Oil Sampled for PCBs (Date/ Results)	Visual Site Inspection (Date/ Findings)	References
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There were no transformers located at the Building 4133 RFI Site

Acronyms:

RFI - Resource Conservation and Recovery Act Facility Investigation

TABLE B.2-4
B4133 RFI Site Other Features Inventory
(Page 1 of 1)

Feature ^(a)	Chem Use Area Location	Use Period	Current / Former Use	Operational Status Existing / Removed	Notes	References
Venturi Scrubber System	1	1978 - 1997	Removal of oxides generated from the waste treatment from the air stream.	Existing	The Venturi Scrubber was licensed to operate by the VCACPD.	HDMSp00121346 HDMSp00040433 Attachment B-4
Northwest Sump	3	Unknown	Collect storm water runoff during rain events.	Existing	This sump was not part of the original facility design.	HDMSp00089125 Attachment B-4
Northeast Sump	3	Unknown	Collect storm water runoff during rain events.	Existing	This sump was not part of the original facility design.	HDMSp00089125 Attachment B-4
Building 4133 Sump	1	Unknown - 1997	Collect waste runoff during metal treatment operations.	Existing	Connected to tank T-1 by a 3-inch cast iron underground pipe. This sump was not part of the original facility design.	HDMSp00089125 HDMSp000459066 Attachment B-4
Treatment room waste drainage	1	1978 - 1997	Drained alkali metal waste from treatment room to sump pit/T-1.	Existing	3-inch drain	HDMSp000459063 HDMSp000731221
Neutralizing Pit drain pipe	3	1978 - 1986	Drainage from the Building 4133 Neutralizing Pit to an asphalt-lined drainage ditch locate east of Building 4133 in the SRE RFI Site, which lead to the SRE Pond.	Existing but inactive	4-inch PVC pipe. This pipe was plugged after approximately 1,000 gallons of sodium hydroxide solution was accidentally released due to the loosening of an expendable plug from its housing in February of 1986.	HDMSp000459063 HDMSp00089125 HDMSp000383185 HDMSp000731219 HDMSp000731221
Spent and dummy fuel storage cells	6	1958 - 1985	Storage of waste from SRE, OMRE, SNAP	Removed	Eight cells, each 20 inch diameter and extending 25 feet bgs.	HDMSp00017801 HDMSp00040682

Notes:

(a) Features listed within this inventory table are features (not included in buildings, tanks, and transformers which are included in other tables) that are of known or suspected chemical use.

Acronyms:

bgs - below ground surface

NA - Not Applicable

OMRE - Organic Moderated Reactor Experiment

RFI - Resource Conservation and Recovery Act Facility Investigation

SRE - Sodium Reactor Experiment

SNAP - Systems for Nuclear Auxiliary Power

VCAPCD - Ventura County Air Pollution Control District

Table B.2-5
B4133 RFI Site Chemicals Used
(Page 1 of 1)

Chemicals Used	Reference
Sodium metal	HDMSse00375326
Sodium hydroxide	HDMSse00375326 HDMSse00669401
Sodium oxide	HDMSse00375326
Sodium-potassium alloy	HDMSse00375326
Sodium carbonate	HDMSse00375326
Potassium metal	HDMSp00121346
Potassium oxide	HDMSse00375326
Potassium hydroxide	HDMSse00375326
Zirconium hydride	HDMSp00089125
Lithium metal	HDMSp00089125
Lithium hydride	HDMSp00089125
Argon	HDMSse00375326
Mercury	HDMSse00724447
Mineral oil or kerosene	HDMSp00089125
Sulfuric acid	HDMSse00375326
Freon-113*	HDMSse00008191
Chlorinated solvents*	HDMSse00008191
Cesium 137	HDMSp00017801

Note:

* - This chemical was only found associate with the B4133 RFI Site in one sentence of the RFA, with no source referenced.

Acronyms:

RFI - Resource Conservation and Recovery Act Facility Investigation

Table B.2-6
B4133 RFI Site Spill Inventory
(Page 1 of 3)

Date of Spill	Material Spilled	Amount Spilled	Unit	Building Number	Location	Description	Reference
1/23/1962	Radioactive contamination	NA	NA	4654	Building 4654	Contamination from equipment stored outside spread from inside the fenced area to outside the fence. Samples indicated contamination ranged from 2 mrad/hr to 17 mrad/hr. No decontamination was conducted.	HDMSse00032615
7/5/1979	Radiation	NA	NA	4654	Building 4654	Contaminated shipping casks stored in the area were found to be emitting high levels of radiation (up to 35 mR/hr).	HDMSse00032615
4/12/1984	Sodium hydroxide	1,500	Gallons	4133	Building 4133	Approximately 1,500 gallons of 12% sodium hydroxide solution was spilled due to a pipe nipple failure in a scrubbing solution storage tank. The spill was contained on Rockwell property and contaminated about 1,500 square feet of soil. Surface samples of the soil were taken and analyzed, showing 2 to 3% alkalinity. Thirteen drums of contaminated soil were removed from the site.	HDMSse000375288 HDMSse000379377 HDMSse000240505
9/27/1985	Caustic Solution	100	Gallons	4133	Building 4133	Approximately 100 gallons of caustic solution was spilled due to a faulty drain line. Reportedly neutralized.	HDMSse00011714 HDMSse000240505
2/18/1986	Sodium hydroxide solution	1,000	Gallons	4133	Building 4133	Approximately 1,000 gallons containing 2.4% sodium hydroxide were spilled due to failure of an expandable plug. The spill drained into an asphalt-lined flood control culvert that extends approximately 300 feet. The culvert is located on the east of Building 4133 at the west side of Building 041 (Group 6), and leads to the SRE Pond. Reportedly neutralized.	HDMSse000379850 HDMSse00011714 HDMSse000725067 HDMSse000240505 HDMSsp000089125

Table B.2-6
B4133 RFI Site Spill Inventory
(Page 2 of 3)

Date of Spill	Material Spilled	Amount Spilled	Unit	Building Number	Location	Description	Reference
11/27/1987	Sodium metal (liquid)	6-30	Gallons	4133	Building 4133	Between six and thirty gallons of liquid sodium metal were accidentally released during routine sampling procedure. According to reviewed records, this spill occurred in the area immediately to the north of the HWMF bermed area, as a temporary tank placed at that location was used while the Neutralizing Pit was being excavated and tank T-1 was being installed. Reportedly, all the sodium was burned.	HDMSse00011714 HDMSse00240505 HDMSp00089125
9/3/1988	Sodium hydroxide solution	60	Gallons	4133	Building 4133	a PVC drain line between the Treatment Room and the hydroxide tank failed. Approximately 60 gallons of aqueous sodium hydroxide drained into a temporary drainage ditch on the north side of Building 4133.	HDMSse00011714 HDMSp00089125
9/23/1988	Sodium hydroxide solution	60	Gallons	4133	Building 4133	Sodium hydroxide solution (6 to 9%); reportedly neutralized.	HDMSse00011714 HDMSse00240505
9/26/1988	Sodium hydroxide solution	25-100	Gallons	4133	Building 4133 pi	25-100 gallons leaked into pit from broken pipe. Reportedly neutralized and pipe repaired.	HDMSse00724447 HDMSse00240505 HDMSse00011714
2/16/1989	Sodium hydroxide solution	10-230	Gallons	4133	Building 4133	Approximately 10 to 230 gallons of caustic solution was accidentally spilled . Reportedly neutralized.	HDMSse00011714 HDMSse00240505
3/8/1989	Sodium hydroxide solution	10-20	Gallons	4133	Building 4133	Sodium hydroxide solution	HDMSse00011714
October 1990	Sodium hydroxide solution	5 - 10	Gallons	4133	Building 4133	Due to a faulty flang at T-3, approximately 5-10 gallons of sodium hydroxide was spilled when caustic solution was being pumped from T-1 into T-3.	HDMSp00089125
10/10/1990	Sodium hydroxide solution	74	Gallons	4133	Building 4133	2-5% Sodium hydroxide solution was released due to flange/valve failure.	HDMSp00016125
4/12/1991	Sodium oxide emissions	~53	pounds	4133	Building 4133	Blower failure	HDMSse00724447 HDMSse00377590
1/22/1992	Sodium metal	<5	Gallons	4133	Building 4133	Breach of cold trap during routine operations.	HDMSse00380264 HDMSse00377666
8/22/1994	Mercury	2	Ounces	4133	Building 4133		HDMSse00724447
8/1/1996	Oil	0.1	Gallons	4133	Yard		HDMSse00021572

Table B.2-6
B4133 RFI Site Spill Inventory
(Page 3 of 3)

Date of Spill	Material Spilled	Amount Spilled	Unit	Building Number	Location	Description	Reference
4/1/1997	Oil	1	Gallons	4133	Outside lab	Contractor truck hydrolic leak	HDMS00021572
4/9/1997	Oil	< 1	Gallons	4133	Unknown	Building 4133 truck	HDMS00724447

Acronyms:

HWMF - Hazardous Waste Management Facility

mrad/hr - millirad per hour

NA - Not applicable

RFI - Resource Conservation and Recovery Act Facility Investigation

SRE - Sodium Reactor Experiment

TABLE B.3-1A
B4133 RFI SITE SAMPLING SUMMARY
(Page 1 of 1)

Sample Type (1,5)	Total Number of Samples (2)	Total QC Samples (3)	Total Agency Samples (4)	Total Validated Samples
Soil Vapor Samples (Table B.3-1B)	35	3	0	38
Soil Matrix Samples (Table B.3-1C)	158	14	0	166
Surface Water Samples (Table B.3-1D)	0	0	0	0

Notes:

1. Detailed sample and analytical program information is contained in Tables B.3-1B , B.3-1C and B.3-1D as indicated above.
2. Total samples = total primary site investigation samples, including historical samples and composite samples.
3. QC samples = Site-specific QC Samples, co-located duplicates and laboratory split samples.
The total QC sample count in this table DOES NOT include Trip Blanks, Equipment Rinsates or Field Blanks.
According to RFI sampling protocols, these types of QC samples are not site-specific and findings will be summarized in the RFI Program report.
4. Agency Samples = DTSC or USEPA split samples.
5. All groundwater data presented in Appendix D of the Group 7 RFI Report.

Acronyms:

DTSC - Department of Toxic Substances Control
QC - Quality control
RFI - Resource Conservation and Recovery Act Facility Investigation
USEPA - United States Environmental Protection Agency

TABLE B.3-1B
B4133 RFI SITE SOIL VAPOR SAMPLING AND ANALYTICAL SUMMARY
 (Page 1 of 2)

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place	Sample Method	Depth (feet bgs)	Sample Type	Validated Yes/No		Rationale ^(b)	Consultant ^(c)	Reference Document ^(d)
								VOC	Validated ^(a)			
HFSV0012	HFSV0012S01	HFSV0012S01	05/07/08	In Place	Active	3.5	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0012	HFSV0012S02	HFSV0012S02	05/07/08	In Place	Active	6.5	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0039	HFSV0039S01	HFSV0039S01	05/06/08	In Place	Active	5	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0039	HFSV0039S02	HFSV0039S02	05/06/08	In Place	Active	7.5	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0043	HFSV0043D01	HFSV0043D01	05/05/08	In Place	Active	5	Field Duplicate	Y	Y	DGA	MWH	This Report
HFSV0043	HFSV0043S01	HFSV0043S01	05/05/08	In Place	Active	5	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0043	HFSV0043S02	HFSV0043S02	05/05/08	In Place	Active	10	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0044	HFSV0044S01	HFSV0044S01	05/05/08	In Place	Active	5	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0044	HFSV0044S02	HFSV0044S02	05/05/08	In Place	Active	10	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0044	HFSV0044S03	HFSV0044S03	05/05/08	In Place	Active	15	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0044	HFSV0044S04	HFSV0044S04	05/05/08	In Place	Active	18	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0045	HFSV0045S01	HFSV0045S01	05/05/08	In Place	Active	5	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0045	HFSV0045S02	HFSV0045S02	05/05/08	In Place	Active	10	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0045	HFSV0045S03	HFSV0045S03	05/06/08	In Place	Active	17	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0047	HFSV0047S01	HFSV0047S01	05/06/08	In Place	Active	5	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0047	HFSV0047S02	HFSV0047S02	05/06/08	In Place	Active	7.5	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0048	HFSV0048D04	HFSV0048D04	05/06/08	In Place	Active	19	Field Duplicate	Y	Y	DGA	MWH	This Report
HFSV0048	HFSV0048S01	HFSV0048S01	05/06/08	In Place	Active	5	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0048	HFSV0048S02	HFSV0048S02	05/06/08	In Place	Active	10	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0048	HFSV0048S03	HFSV0048S03	05/06/08	In Place	Active	15	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0048	HFSV0048S04	HFSV0048S04	05/06/08	In Place	Active	19	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0052	HFSV0052AS003	HFSV0052AS003	11/20/08	In Place	Active	13	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0052	HFSV0052S001	HFSV0052S001	11/19/08	In Place	Active	5.25	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0052	HFSV0052S002	HFSV0052S002	11/19/08	In Place	Active	9.25	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0052	HFSV0052S003	HFSV0052S003	11/19/08	In Place	Active	13	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0083	HFSV0083S001	HFSV0083S001	11/19/08	In Place	Active	5.25	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0083	HFSV0083S002	HFSV0083S002	11/19/08	In Place	Active	9.25	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0083	HFSV0083S003	HFSV0083S003	11/19/08	In Place	Active	12.75	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0085	HFSV0085D001	HFSV0085D001	11/19/08	In Place	Active	4.75	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0085	HFSV0085S001	HFSV0085S001	11/19/08	In Place	Active	4.75	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0086	HFSV0086S001	HFSV0086S001	11/19/08	In Place	Active	5.25	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0086	HFSV0086S002	HFSV0086S002	11/19/08	In Place	Active	9.75	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0091	HFSV0091S001	HFSV0091S001	11/20/08	In Place	Active	5.5	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0092	HFSV0092S001	HFSV0092S001	11/19/08	In Place	Active	4.8	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0092	HFSV0092S002	HFSV0092S002	11/19/08	In Place	Active	7.9	Primary Sample	Y	Y	DGA	MWH	This Report

TABLE B.3-1B
B4133 RFI SITE SOIL VAPOR SAMPLING AND ANALYTICAL SUMMARY
 (Page 2 of 2)

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place	Sample Method	Depth (feet bgs)	Sample Type	Validated Yes/No		Rationale ^(b)	Consultant ^(c)	Reference Document ^(d)
								VOC	Validated ^(a)			
HFSV0200	HFSV0200D02	HFSV0200D02	05/07/08	In Place	Active	7	Field Duplicate	Y	Y	DGA	MWH	This Report
HFSV0200	HFSV0200S01	HFSV0200S01	05/07/08	In Place	Active	4	Primary Sample	Y	Y	DGA	MWH	This Report
HFSV0200	HFSV0200S02	HFSV0200S02	05/07/08	In Place	Active	7	Primary Sample	Y	Y	DGA	MWH	This Report
Total Primary Samples:							Validated:	38				
Total QC (Duplicate) Samples:							Not Validated:	0				
Number of Building 4133 RFI Site Soil Vapor Samples:												38

Notes:

Sample Location Identification - Vapor probe number

Unique Sample ID - Laboratory reporting code

Sample Identification - RFI site and sample identifier code

(a) **Validated** indicates at least one analysis has been validated following RFI protocols; agency split samples were not validated but were reviewed for comparability.

Data collected prior to the RFI were not typically subsequently validated using RFI protocols but were collected and reviewed following QA procedures established for earlier investigation programs.

(b) **Rationale (see below):**

DGA - Indicates samples collected in 2008 as a part of the Data Gaps Analysis to address delineation with stepout samples, elevated detection limit issues, and specific DTSC requests.

(c) **Consultant** - indicates contractor responsible for sampling and reporting for each location.

(d) **Reference Document:** Document containing published data; "This report" includes the B4133 RFI Site appendix and the Group 7 RFI Report. Refer to Section B.6 (References) for complete citation.

Acronyms:

bgs - below ground surface

DTSC - Department of Toxic Substances Control

QA - Quality assurance

QC - Quality control

RFI - Resource Conservation and Recovery Act Facility Investigation

Laboratory Analytical Methods Represented (EPA Method No.)

VOC - 8260B

VOC - Volatile organic compound

TABLE B.3-1C
B4133 RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 1 of 4)

Table B.1-3C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs)	Sample Type	Sample Analyses (Validated Yes/No)									Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)
								Herbicide	Dioxin	Inorganics	Metals	PCBs	Pesticide	SVOCs	TPH	VOCs				
B133-1 (h)	B133-1_2	B133-1_2	08/25/88	In Place	T	2	Primary Sample			N	N			N	N	N	N	WP	Groundwater Resources Consultants, Inc.	GRC, 1989
B133-2 (h)	B133-2_1.2-1.7	B133-2_1.2-1.7	08/25/88	In Place	T	1.7	Primary Sample			N	N			N	N	N	N	WP	Groundwater Resources Consultants, Inc.	GRC, 1989
B133-3 (h)	B133-3_0.3-0.8	B133-3_0.3-0.8	08/25/88	In Place	T	0.8	Primary Sample			N	N			N	N	N	N	WP	Groundwater Resources Consultants, Inc.	GRC, 1989
B133-4 (h)	B133-4_2.5-3.0	B133-4_2.5-3.0	08/25/88	In Place	T	3	Primary Sample			N	N			N	N	N	N	WP	Groundwater Resources Consultants, Inc.	GRC, 1989
B133-5 (h)	B133-5_9.0	B133-5_9.0	08/25/88	In Place	T	9	Primary Sample			N	N			N	N	N	N	WP	Groundwater Resources Consultants, Inc.	GRC, 1989
B133-6 (h)	B133-6_0.0	B133-6_0.0	08/25/88	Removed	G	0	Primary Sample			N	N			N	N	N	N	WP	Groundwater Resources Consultants, Inc.	GRC, 1989
HFBS0001	HFBS0001S01	HFBS0001S01	04/16/08	In Place	HA	1.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0001	HFBS0001S01SP	HFBS0001S01SP	04/16/08	In Place	HA	1.5	Split Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0002	HFBS0002S01	HFBS0002S01	04/16/08	In Place	HA	1	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0002	HFBS0002S02	HFBS0002S02	04/16/08	In Place	HA	4	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0003	HFBS0003S01	HFBS0003S01	04/17/08	In Place	HA	1	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0003	HFBS0003S02	HFBS0003S02	04/21/08	In Place	GP	5.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0004	HFBS0004S01	HFBS0004S01	04/16/08	In Place	HA	1	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0004	HFBS0004S02	HFBS0004S02	04/16/08	In Place	HA	3.75	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0005	HFBS0005D01	HFBS0005D01	04/17/08	In Place	HA	1	Field Duplicate			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0005	HFBS0005S01	HFBS0005S01	04/17/08	In Place	HA	1	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0005	HFBS0005S02	HFBS0005S02	04/21/08	In Place	GP	5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0006	HFBS0006S01	HFBS0006S01	04/17/08	In Place	HA	1	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0006	HFBS0006S02	HFBS0006S02	04/17/08	In Place	HA	3.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0006	HFBS0006S03	HFBS0006S03	04/21/08	In Place	GP	5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0006	HFBS0006S04	HFBS0006S04	04/21/08	In Place	GP	10.5	Primary Sample			Y	Y						Y	DGA(g)	MWH	This Report
HFBS0007	HFBS0007S01	HFBS0007S01	04/16/08	In Place	HA	1	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0007	HFBS0007S02	HFBS0007S02	04/16/08	In Place	HA	2.8	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0008	HFBS0008S01	HFBS0008S01	04/17/08	In Place	HA	1	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0008	HFBS0008S02	HFBS0008S02	04/18/08	In Place	GP	5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0009	HFBS0009S01	HFBS0009S01	04/17/08	In Place	HA	0.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0009	HFBS0009S02	HFBS0009S02	04/21/08	In Place	GP	5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0010	HFBS0010S01	HFBS0010S01	04/18/08	In Place	GP	1.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0010	HFBS0010S02	HFBS0010S02	04/18/08	In Place	GP	5.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0010	HFBS0010S03	HFBS0010S03	04/18/08	In Place	GP	7.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0011	HFBS0011S01	HFBS0011S01	04/23/08	In Place	GP	1.5	Primary Sample			Y	Y			Y	Y	Y	Y	DGA(g)	MWH	This Report
HFBS0011	HFBS0011S02	HFBS0011S02	04/23/08	In Place	GP	5.5	Primary Sample			Y	Y			Y	Y	Y	Y	DGA(g)	MWH	This Report
HFBS0011	HFBS0011S03	HFBS0011S03	04/23/08	In Place	GP	10.5	Primary Sample			Y	Y			Y	Y	Y	Y	DGA(g)	MWH	This Report
HFBS0011	HFBS0011S04	HFBS0011S04	04/23/08	In Place	GP	15.5	Primary Sample			Y	Y			Y	Y	Y	Y	DGA(g)	MWH	This Report
HFBS0011	HFBS0011S05	HFBS0011S05	04/23/08	In Place	GP	19	Primary Sample			Y	Y			Y	Y	Y	Y	DGA(g)	MWH	This Report
HFBS0012	HFBS0012AS002	HFBS0012AS002	11/18/08	In Place	GP	5.5	Primary Sample			N		Y					Y	DGA(g)	MWH	This Report
HFBS0012	HFBS0012S01	HFBS0012S01	04/18/08	In Place	GP	1.5	Primary Sample			Y	Y				Y	Y	Y	DGA(g)	MWH	This Report
HFBS0012	HFBS0012S02	HFBS0012S02	04/18/08	In Place	GP	5.5	Primary Sample			Y	Y			Y	Y	Y	Y	DGA(g)	MWH	This Report
HFBS0012	HFBS0012S03	HFBS0012S03	04/18/08	In Place	GP	10	Primary Sample			Y	Y				Y	Y	Y	DGA(g)	MWH	This Report
HFBS0019	HFBS0019D01	HFBS0019D01	04/24/08	In Place	GP	1.5	Field Duplicate			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0019	HFBS0019S01	HFBS0019S01	04/24/08	In Place	GP	1.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0019	HFBS0019S02	HFBS0019S02	04/24/08	In Place	GP	5.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0019	HFBS0019S03	HFBS0019S03	04/24/08	In Place	GP	10.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0019	HFBS0019S04	HFBS0019S04	04/24/08	In Place	GP	15.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0019	HFBS0019S05	HFBS0019S05	04/24/08	In Place	GP	19	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0022	HFBS0022D01	HFBS0022D01	04/24/08	In Place	GP	1.5	Field Duplicate			Y	Y			Y	Y	Y	Y	DGA(g)	MWH	This Report
HFBS0022	HFBS0022S01	HFBS0022S01	04/24/08	In Place	GP	1.5	Primary Sample			Y	Y			Y	Y	Y	Y	DGA(g)	MWH	This Report
HFBS0022	HFBS0022S02	HFBS0022S02	04/24/08	In Place	GP	5.5	Primary Sample			Y	Y			Y	Y	Y	Y	DGA(g)	MWH	This Report
HFBS0022	HFBS0022S03	HFBS0022S03	04/24/08	In Place	GP	10.5	Primary Sample			Y	Y			Y	Y	Y	Y	DGA(g)	MWH	This Report
HFBS0022	HFBS0022S04	HFBS0022S04	04/24/08	In Place	GP	15.5	Primary Sample			Y	Y			Y	Y	Y	Y	DGA(g)	MWH	This Report
HFBS0022	HFBS0022S05	HFBS0022S05	04/24/08	In Place	GP	19.5	Primary Sample			Y	Y			Y	Y	Y	Y	DGA(g)	MWH	This Report
HFBS0023	HFBS0023D01	HFBS0023D01	04/22/08	In Place	GP	1.5	Field Duplicate			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0023	HFBS0023S01	HFBS0023S01	04/22/08	In Place	GP	1.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0023	HFBS0023S02	HFBS0023S02	04/22/08	In Place	GP	5.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0023	HFBS0023S03	HFBS0023S03	04/22/08	In Place	GP	10.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report

TABLE B.3-1C
B4133 RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 2 of 4)

Table B.1-3C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs)	Sample Type	Sample Analyses (Validated Yes/No)									Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)
								Herbicide	Dioxin	Inorganics	Metals	PCBs	Pesticide	SVOCs	TPH	VOCs				
HFBS0023	HFBS0023S04	HFBS0023S04	04/22/08	In Place	GP	15.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0023	HFBS0023S05	HFBS0023S05	04/22/08	In Place	GP	19.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0024	HFBS0024S01	HFBS0024S01	04/25/08	In Place	GP	1.5	Primary Sample	Y		Y	Y		Y	Y	Y		Y	DGA(g)	MWH	This Report
HFBS0024	HFBS0024S02	HFBS0024S02	04/25/08	In Place	GP	5.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0024	HFBS0024S03	HFBS0024S03	04/25/08	In Place	GP	10.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0024	HFBS0024S04	HFBS0024S04	04/25/08	In Place	GP	15	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0025	HFBS0025S01	HFBS0025S01	04/25/08	In Place	GP	1.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0025	HFBS0025S02	HFBS0025S02	04/25/08	In Place	GP	5.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0025	HFBS0025S03	HFBS0025S03	04/25/08	In Place	GP	10.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0025	HFBS0025S04	HFBS0025S04	04/25/08	In Place	GP	15.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0025	HFBS0025S05	HFBS0025S05	04/25/08	In Place	GP	17	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0026	HFBS0026S01	HFBS0026S01	04/22/08	In Place	GP	1.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0026	HFBS0026S02	HFBS0026S02	04/22/08	In Place	GP	5.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0026	HFBS0026S03	HFBS0026S03	04/22/08	In Place	GP	7	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0027	HFBS0027S01	HFBS0027S01	04/24/08	In Place	GP	1.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0027	HFBS0027S02	HFBS0027S02	04/24/08	In Place	GP	5.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0027	HFBS0027S03	HFBS0027S03	04/24/08	In Place	GP	10.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0027	HFBS0027S04	HFBS0027S04	04/24/08	In Place	GP	13.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0028	HFBS0028S01	HFBS0028S01	04/22/08	In Place	GP	1.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0028	HFBS0028S02	HFBS0028S02	04/22/08	In Place	GP	5.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0028	HFBS0028S03	HFBS0028S03	04/22/08	In Place	GP	10.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0028	HFBS0028S04	HFBS0028S04	04/22/08	In Place	GP	15.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0029	HFBS0029S01	HFBS0029S01	04/25/08	In Place	GP	1.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0029	HFBS0029S01SP	HFBS0029S01SP	04/25/08	In Place	GP	1.5	Split Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0029	HFBS0029S02	HFBS0029S02	04/25/08	In Place	GP	5.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0029	HFBS0029S03	HFBS0029S03	04/25/08	In Place	GP	9.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0030	HFBS0030S01	HFBS0030S01	04/18/08	In Place	GP	1.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0030	HFBS0030S02	HFBS0030S02	04/18/08	In Place	GP	5.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0031	HFBS0031S01	HFBS0031S01	04/18/08	In Place	GP	1.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0031	HFBS0031S02	HFBS0031S02	04/18/08	In Place	GP	5.5	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0031	HFBS0031S03	HFBS0031S03	04/18/08	In Place	GP	8	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0032	HFBS0032S01	HFBS0032S01	04/18/08	In Place	GP	1.5	Primary Sample			Y	Y				Y		Y	DGA	MWH	This Report
HFBS0032	HFBS0032S02	HFBS0032S02	04/18/08	In Place	GP	5.5	Primary Sample			Y	Y				Y		Y	DGA	MWH	This Report
HFBS0032	HFBS0032S03	HFBS0032S03	04/18/08	In Place	GP	7	Primary Sample			Y	Y				Y		Y	DGA	MWH	This Report
HFBS0033	HFBS0033S01	HFBS0033S01	04/23/08	In Place	GP	1	Primary Sample			Y	Y				Y		Y	DGA	MWH	This Report
HFBS0034	HFBS0034S01	HFBS0034S01	04/23/08	In Place	GP	1	Primary Sample			Y	Y				Y		Y	DGA	MWH	This Report
HFBS0035	HFBS0035S01	HFBS0035S01	04/23/08	In Place	GP	0.5	Primary Sample			Y	Y				Y		Y	DGA	MWH	This Report
HFBS0037	HFBS0037S01	HFBS0037S01	04/23/08	In Place	GP	1	Primary Sample			Y	Y				Y		Y	DGA	MWH	This Report
HFBS0039	HFBS0039S01	HFBS0039S01	04/23/08	In Place	GP	1.5	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0040	HFBS0040S01	HFBS0040S01	04/23/08	In Place	GP	1.5	Primary Sample			Y	Y	Y		Y	Y	Y	Y	DGA	MWH	This Report
HFBS0040	HFBS0040S01SP	HFBS0040S01SP	04/23/08	In Place	GP	1.5	Split Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0041	HFBS0041S01	HFBS0041S01	04/22/08	In Place	GP	1	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0042	HFBS0042S01	HFBS0042S01	04/28/08	In Place	HA	1	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0043	HFBS0043AS002	HFBS0043AS002	11/17/08	In Place	GP	5	Primary Sample			N		Y					Y	DGA	MWH	This Report
HFBS0043	HFBS0043S01	HFBS0043S01	04/30/08	In Place	GP	1.5	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0044	HFBS0044S01	HFBS0044S01	04/28/08	In Place	GP	1.5	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0045	HFBS0045S01	HFBS0045S01	04/28/08	In Place	GP	1.5	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0047	HFBS0047S01	HFBS0047S01	04/22/08	In Place	GP	1.5	Primary Sample			N		Y		Y			Y	DGA	MWH	This Report
HFBS0048	HFBS0048S01	HFBS0048S01	04/24/08	In Place	GP	1	Primary Sample			N		Y		Y			Y	DGA	MWH	This Report
HFBS0049	HFBS0049D01	HFBS0049D01	04/18/08	In Place	GP	1.5	Field Duplicate			Y	Y	Y		Y	Y	Y	Y	DGA	MWH	This Report
HFBS0049	HFBS0049S01	HFBS0049S01	04/18/08	In Place	GP	1.5	Primary Sample			Y	Y	Y		Y	Y	Y	Y	DGA	MWH	This Report
HFBS0051	HFBS0051S01	HFBS0051S01	04/17/08	In Place	HA	1	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0051	HFBS0051S02	HFBS0051S02	04/17/08	In Place	HA	4.5	Primary Sample			Y	Y						Y	DGA	MWH	This Report
HFBS0052	HFBS0052AS001	HFBS0052AS001	11/14/08	In Place	HA	1	Primary Sample			N		Y		Y			Y	DGA	MWH	This Report
HFBS0052	HFBS0052AS001SP	HFBS0052AS001SP	11/14/08	In Place	HA	1	Split Sample			N		Y		Y			Y	DGA	MWH	This Report

TABLE B.3-1C
B4133 RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 3 of 4)

Table B.1-3C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs)	Sample Type	Sample Analyses (Validated Yes/No)									Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)
								Herbicide	Dioxin	Inorganics	Metals	PCBs	Pesticide	SVOCs	TPH	VOCs				
HFBS0052	HFBS0052S01	HFBS0052S01	04/17/08	In Place	HA	1	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0052	HFBS0052S02	HFBS0052S02	04/17/08	In Place	HA	5	Primary Sample			Y	Y						Y	DGA	MWH	This Report
HFBS0053	HFBS0053AS001	HFBS0053AS001	11/18/08	In Place	GP	1	Primary Sample			N		Y		Y			Y	DGA	MWH	This Report
HFBS0053	HFBS0053S01	HFBS0053S01	04/17/08	In Place	HA	1	Primary Sample			Y	Y				Y		Y	DGA	MWH	This Report
HFBS0053	HFBS0053S02	HFBS0053S02	04/21/08	In Place	GP	5	Primary Sample			Y	Y						Y	DGA	MWH	This Report
HFBS0054	HFBS0054AS001	HFBS0054AS001	11/18/08	In Place	GP	1	Primary Sample			N		Y		Y			Y	DGA	MWH	This Report
HFBS0054	HFBS0054S01	HFBS0054S01	04/17/08	In Place	HA	0.5	Primary Sample			Y	Y				Y		Y	DGA	MWH	This Report
HFBS0054	HFBS0054S02	HFBS0054S02	04/21/08	In Place	GP	5	Primary Sample			Y	Y						Y	DGA	MWH	This Report
HFBS0054	HFBS0054S03	HFBS0054S03	04/21/08	In Place	GP	16	Primary Sample			Y	Y						Y	DGA	MWH	This Report
HFBS0055	HFBS0055AS001	HFBS0055AS001	11/18/08	In Place	GP	1	Primary Sample			N		Y		Y			Y	DGA	MWH	This Report
HFBS0055	HFBS0055D01	HFBS0055D01	04/18/08	In Place	GP	1	Field Duplicate			Y	Y				Y		Y	DGA	MWH	This Report
HFBS0055	HFBS0055S01	HFBS0055S01	04/18/08	In Place	GP	1	Primary Sample			Y	Y				Y		Y	DGA	MWH	This Report
HFBS0055	HFBS0055S02	HFBS0055S02	04/18/08	In Place	GP	3	Primary Sample			Y	Y						Y	DGA	MWH	This Report
HFBS0057	HFBS0057S01	HFBS0057S01	05/06/08	In Place	HA	1	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0058	HFBS0058S01	HFBS0058S01	05/06/08	In Place	HA	0.75	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0059	HFBS0059S01	HFBS0059S01	05/06/08	In Place	HA	0.3	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0060	HFBS0060S01	HFBS0060S01	05/06/08	In Place	HA	1	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0060	HFBS0060S01SP	HFBS0060S01SP	05/06/08	In Place	HA	1	Split Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0061	HFBS0061S01	HFBS0061S01	05/06/08	In Place	HA	0.3	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0062	HFBS0062AS001	HFBS0062AS001	11/21/08	In Place	HA	0.75	Primary Sample			N						Y	Y	DGA	MWH	This Report
HFBS0062	HFBS0062S01	HFBS0062S01	05/06/08	In Place	HA	1	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0063	HFBS0063AS001	HFBS0063AS001	11/21/08	In Place	HA	1	Primary Sample			Y	Y						Y	DGA	MWH	This Report
HFBS0063	HFBS0063S01	HFBS0063S01	05/07/08	In Place	HA	0.75	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0064	HFBS0064S01	HFBS0064S01	05/06/08	In Place	HA	1	Primary Sample		Y	Y	Y	Y		Y	Y	Y	Y	DGA	MWH	This Report
HFBS0065	HFBS0065S01	HFBS0065S01	05/05/08	In Place	Trowel	0.3	Primary Sample		Y	Y	Y	Y		Y	Y	Y	Y	DGA	MWH	This Report
HFBS0072	HFBS0072S01	HFBS0072S01	04/28/08	In Place	GP	1	Primary Sample			Y	Y				Y		Y	DGA	MWH	This Report
HFBS0073	HFBS0073S01	HFBS0073S01	04/28/08	In Place	GP	1.5	Primary Sample			Y	Y				Y		Y	DGA	MWH	This Report
HFBS0074	HFBS0074AS001	HFBS0074AS001	11/21/08	In Place	HA	0.75	Primary Sample			N						Y	Y	DGA	MWH	This Report
HFBS0074	HFBS0074S01	HFBS0074S01	05/06/08	In Place	HA	0.75	Primary Sample			Y	Y	Y		Y	Y		Y	DGA	MWH	This Report
HFBS0075	HFBS0075AS001	HFBS0075AS001	11/24/08	In Place	HA	1	Primary Sample			N						Y	Y	DGA	MWH	This Report
HFBS0075	HFBS0075S01	HFBS0075S01	05/06/08	In Place	HA	1	Primary Sample			Y	Y	Y		Y	Y	Y	Y	DGA	MWH	This Report
HFBS0076	HFBS0076S001	HFBS0076S001	11/20/08	In Place	HA	1	Primary Sample			Y	Y	Y		Y	Y	Y	Y	DGA	MWH	This Report
HFBS0077	HFBS0077S001	HFBS0077S001	11/20/08	In Place	HA	1	Primary Sample			Y	Y	Y		Y	Y	Y	Y	DGA	MWH	This Report
HFBS0078	HFBS0078S001	HFBS0078S001	11/20/08	In Place	GP	1	Primary Sample			Y	Y						Y	DGA	MWH	This Report
HFBS0079	HFBS0079D001	HFBS0079D001	11/19/08	In Place	HA	0.75	Field Duplicate			Y	Y						Y	DGA	MWH	This Report
HFBS0079	HFBS0079S001	HFBS0079S001	11/19/08	In Place	HA	0.75	Primary Sample			Y	Y						Y	DGA	MWH	This Report
HFBS0080	HFBS0080S001	HFBS0080S001	11/19/08	In Place	HA	1	Primary Sample			Y	Y						Y	DGA	MWH	This Report
HFBS0081	HFBS0081S001	HFBS0081S001	11/20/08	In Place	HA	1	Primary Sample			N		Y					Y	DGA	MWH	This Report
HFBS0082	HFBS0082D001	HFBS0082D001	11/17/08	In Place	GP	1	Field Duplicate			N		Y					Y	DGA	MWH	This Report
HFBS0082	HFBS0082S001	HFBS0082S001	11/17/08	In Place	GP	1	Primary Sample			N		Y					Y	DGA	MWH	This Report
HFBS0083	HFBS0083S001	HFBS0083S001	11/17/08	In Place	GP	1	Primary Sample			N				Y	Y		Y	DGA	MWH	This Report
HFBS0083	HFBS0083S001SP	HFBS0083S001SP	11/17/08	In Place	GP	1	Split Sample			N				Y	Y		Y	DGA	MWH	This Report
HFBS0083	HFBS0083S002	HFBS0083S002	11/17/08	In Place	GP	5	Primary Sample			N				Y	Y		Y	DGA	MWH	This Report
HFBS0084	HFBS0084S001	HFBS0084S001	11/13/08	In Place	HA	1	Primary Sample			N				Y	Y		Y	DGA	MWH	This Report
HFBS0084	HFBS0084S002	HFBS0084S002	11/13/08	In Place	HA	2.25	Primary Sample			N				Y	Y	Y	Y	DGA	MWH	This Report
HFBS0085	HFBS0085S001	HFBS0085S001	11/13/08	In Place	HA	1.25	Primary Sample			N				Y	Y		Y	DGA	MWH	This Report
HFBS0085	HFBS0085S002	HFBS0085S002	11/13/08	In Place	HA	4	Primary Sample			N				Y	Y		Y	DGA	MWH	This Report
HFBS0086	HFBS0086S001	HFBS0086S001	11/17/08	In Place	GP	1	Primary Sample			N				Y	Y		Y	DGA	MWH	This Report
HFBS0086	HFBS0086S002	HFBS0086S002	11/17/08	In Place	GP	5	Primary Sample			N				Y	Y		Y	DGA	MWH	This Report
HFBS0093	HFBS0093S001	HFBS0093S001	11/24/08	In Place	HA	1	Primary Sample			N		Y					Y	DGA	MWH	This Report
HFBS0094	HFBS0094S001	HFBS0094S001	11/19/08	In Place	GP	1	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0094	HFBS0094S002	HFBS0094S002	11/19/08	In Place	GP	3	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0095	HFBS0095S001	HFBS0095S001	11/19/08	In Place	GP	1	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0096	HFBS0096S001	HFBS0096S001	11/19/08	In Place	GP	1	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report
HFBS0097	HFBS0097S001	HFBS0097S001	11/18/08	In Place	GP	1	Primary Sample			Y	Y				Y		Y	DGA(g)	MWH	This Report

TABLE B.3-1C
B4133 RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 4 of 4)

Table B.1-3C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs)	Sample Type	Sample Analyses (Validated Yes/No)								Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)
								Herbicide	Dioxin	Inorganics	Metals	PCBs	Pesticide	SVOCs	TPH				
HFBS0098	HFBS0098S001	HFBS0098S001	11/19/08	In Place	GP	1	Primary Sample			Y	Y				Y	Y	DGA(g)	MWH	This Report
HFBS0099	HFBS0099S001	HFBS0099S001	11/19/08	In Place	GP	1	Primary Sample			Y	Y				Y	Y	DGA(g)	MWH	This Report
HFBS0100	HFBS0100S001	HFBS0100S001	11/18/08	In Place	GP	1	Primary Sample			Y	Y				Y	Y	DGA(g)	MWH	This Report
HFBS0100	HFBS0100S002	HFBS0100S002	11/18/08	In Place	GP	5	Primary Sample			Y	Y					Y	DGA(g)	MWH	This Report
HFBS0101	HFBS0101AS001	HFBS0101AS001	12/03/08	In Place	HA	0.75	Primary Sample									Y	DGA	MWH	This Report
HFBS0101	HFBS0101S001	HFBS0101S001	11/20/08	In Place	HA	0.75	Primary Sample			Y	Y	Y		Y	Y		DGA	MWH	This Report
HFTS0001	HFTS0001S01	HFTS0001S01	04/18/08	In Place	T	1.5	Primary Sample			Y	Y	Y		Y	Y		DGA	MWH	This Report
Total Primary Samples: 158 Total QC (Duplicate, Split) Samples: 14 Total Number of Building 4133 RFI Site Soil Samples: 172							Validated:	1	2	140	140	41	1	57	136	27	166		
							Not Validated:	0	0	31	6	0	0	6	6	6	6		

Notes:

Sample Location Identification - Boring or trench number

Unique Sample ID - Laboratory reporting code

Sample Identification - RFI site and sample identifier code

(a) Sample Method:

GP = Geoprobe - using direct push core barrel.
HA = Hand Auger sample

Trowel = Hand trowel or scoop.
T = Trench sample

G = Grab sample

(b) Validated: "Y" indicates that a minimum of one analysis has been validated following RFI protocols; agency split samples were not validated but were reviewed for comparability.
Data collected prior to the RFI were not typically subsequently validated using RFI protocols but were collected and reviewed following QA procedures established for earlier investigation programs.

(c) Rationale (see below):
DGA - Indicates samples collected in 2008 as a part of the Data Gaps Analysis to address delineation with stepout samples, elevated detection limit issues, and specific DTSC resquests.
WP - Indicates samples collected based on DTSC-approved Work Plan scope.

(d) Consultant: Contractor responsible for sampling and reporting for each location.

(e) Reference Document: Document containing published data; "This report" includes the B4133 RFI site appendix and the Group 7 RFI Report. Refer to Section B.6 (References) for complete citation.

(f) Removed or in-place sample status: Status as of date of this report.

(g) Indicates a sample collected at a location identified in the DTSC-approved HWMF Closure Plan (MWH, 2003)

(h) Sample locations B133-1 to B133-6 are identified as B-133-1 to B-133-6 in the source document (GRC, 1989). Sample location and sample idenfications were revised for database management purposes.

Laboratory Analytical Methods Represented (EPA Method No.)

Herbicide - 8151A
Dioxin - 1613B
Inorganics - D2216M, 160.3 MOD, 2540G, 9045C, 300.0, 9045
Metals - 6010B, 6020, 7196A, 7471A, 7610, 7770
PCB - 8082
Pesticide - 8081A
SVOCs - 8270, 8270C, 8270C SIM
TPH - 8015B, 8015
VOCs - 8240, 8260B

Inorganics - % Moisture, pH and Fluoride
PCB - Polychlorinated biphenyls
Inorganics - % Moisture, pH and Fluoride
SVOC - Semivolatile organic compound
TPH - Total petroleum hydrocarbons
VOC - Volatile organic compound

Acronyms:

bgs - below ground surface
DTSC - Department of Toxic Substances Control
HWMF - Hazardous Waste Mangement Facility
RFI - Resource Conservation and Recovery Act Facility Investigation
QA - Quality assurance
QC - Quality control

TABLE B.3-1D
B4133 RFI SITE SURFACE WATER SAMPLING AND ANALYTICAL SUMMARY
 (Page 1 of 1)

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place	Sample Method	Depth (feet bgs)	Sample Type	Sample Analyses (Validated Yes/No)			Validated	Rationale	Consultant	Reference Document
								SVOCs	TPH	VOCs				
No RFI surface water samples collected for this site.														
Total Primary Samples:				0	Validated:			0			0			
Total QC (Duplicate, Split) Samples:				0	Not Validated:			0			0			
Number of Building 4133 RFI Site Surface Water Samples				0										

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
(Page 1 of 19)

Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
1	Building 4133 Treatment Building, Southern Concrete Pad, and Size Reduction Area Building 4133 consists of a 460 square foot building, concrete foundation, air scrubber system, and the Size Reduction Area. The building was active from 1978 to 1997 for the purposes of treating waste reactive metals and contaminated equipment by converting the waste metals to caustic solutions through oxidation. The building contains two rooms: the Treatment Room (where reactive metals were oxidized in a 6 square foot burnpan) and the Control Room (where treatment operations were overseen). The building was equipped with an overhead monorail, used to move heavy pieces of equipment from the Size Reduction Area to the Treatment Room. The Treatment Room and monorail were relocated from the former Building 4724 (Group 6), the Hot Oil Sodium Cleaning Facility, in 1977. The Treatment Room used in the treatment process of contaminated waste sodium from the Sodium Reactor Experiment (SRE). Prior to being moved, the Treatment Room was surveyed for radioactive contamination and cleaned. The concrete pad also has sections extending to the west and south of the building. An air scrubber is mounted on the pad west of the building which was used to remove gaseous sodium and potassium oxides from the exhaust leaving the Treatment Room. This was also the location of several caustic solution spills through the course of operations at the RFI site. The concrete pad south of Building 4133 connects the Treatment Room to the Size Reduction Area. The Size Reduction Area was used to cut equipment in order to exposed contaminated areas and reduce its size to fit in the Treatment Room burnpan. The area consisted of a metal cutting location, covered by an awning, and on top of a metal secondary containment unit. The area was	VOCs VOC use and/or storage not documented at the B4133 RFI Site.	<u>Soil Vapor</u> Collected four soil vapor samples at one location targeting downslope (west) of Building 4133 (HFSV0048) at depths of 5, 10, 15, and 19 feet bgs. <u>Soil Matrix</u> Two historical samples were collected in 1988 to characterize soil conditions at locations targeting the downslope former piping leading from the Treatment Room to the Neutralizing Pit (B133-1 and B133-2 at 2 and 1.7 feet bgs, respectively). Note: The HWMF Closure Plan specifies two sampling locations for VOC analysis following site demolition, one each centered in the Treatment Room and Treatment Room Sump (MWH, 2003b).	VOC results area shown on Figure B.3-1. <u>Soil Vapor</u> Benzene was detected at low, consistent concentrations in three of four samples at the targeted location (HFSV0048) - up to 0.04 µg/L, below Res and EcoRBSLs (0.095 and 0.57 µg/L, respectively). No other VOCs were detected. <u>Soil Matrix</u> Methyl ethyl ketone (MEK) and acetone were detected at both historical sampling locations up to 0.09 mg/kg (MEK, B133-2, 1.7 feet bgs). MEK and acetone detections were well below ResRBSLs (62 and 480 mg/kg, respectively) and EcoRBSLs (2,540 and 42.7 mg/kg, respectively). No other VOCs were detected at either of the historical sampling locations. Based on sampling results, indicating VOCs present at low concentrations below RBSLs, no further characterization is necessary.	Yes VOCs were detected at low concentrations below RBSLs at targeted sampling locations.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results. Site action recommendations will be revised as appropriate based on Closure Plan (CP) sampling and risk assessment results.
		SVOCs Kerosene and mineral oils used during cutting operations, and stored at this location.	Two historical samples were collected in 1988 to characterize soil conditions at locations targeting the former piping leading from the Treatment Room to the Neutralizing Pit (B133-1 and B133-2) at 2 and 1.7 feet bgs, respectively. Collected soil samples from two locations at the Building 4133 area: - One location at the southern concrete pad targeting the Treatment Room door (HFBS0024) at a depth of 1.5 feet bgs - One location targeting downslope (west) of Building 4133 (HFBS0048) at a depth of 1 foot bgs Note: Two locations will be sampled, and analyzed for SVOCs, after the RFI site demolition for additional characterization, per the HWMF Closure Plan. The locations will target the center of the Treatment Room and the Treatment Room Sump (MWH, 2003b).	SVOC results area shown on Figures B.3-2A and B.3-2B. No SVOCs were detected at the targeted sampling locations. Based sampling results, indicating SVOCs not detected, no further characterization is necessary.	Yes SVOCs were not detected at targeted and representative sampling locations.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results. Site action recommendations will be revised as appropriate based on CP sampling and risk assessment results.

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
	also used to store kerosene and mineral oil, which were used as lubricants in the cutting process. Surface water in the Building 4133 area flows via sheet flow to the northeast and northwest corners of the paved area where it is collected in stormwater collection sumps, which would have to be periodically emptied with mechanical pumps. It is unknown how this collected water was disposed. The Building 4133 area consists of a concrete paved area surrounded by an asphalt paved area. Under paved areas, alluvium is composed mainly of silty sand soils with occasionally occurring clayey sand. Soil depths at this area range from 9.8 to 19 feet bgs.	TPH Kerosene and mineral oils used during cutting operations, and stored at this location.	Two historical samples were collected in 1988 to characterize soil conditions at locations targeting the former piping leading from the Treatment Room to the Neutralizing Pit (B133-1 and B133-2) at 2 and 1.7 feet bgs, respectively. Collected soil samples at five locations: - One location at the western concrete area targeting the air scrubber (HFBS0019) at up to 19 feet bgs - One location at the southern concrete pad targeting the Treatment Room door (HFBS0024) at a depth of 1.5 feet bgs - Three representative locations at the southern concrete pad and Size Reduction Area (HFBS0025, HFBS0027, and HFBS0029) at depths ranging from 1.5 to 17 feet bgs Note: Five locations will be sampled, and analyzed for TPH, after the RFI site demolition for additional characterization, per the HWMF Closure Plan. The locations will target the center of the Treatment Room, the Treatment Room Sump, the scrubber location, under the pipes which connect the Treatment Room to T-1, and under the pipes which connect the scrubber to T-1 (MWH, 2003b).	TPH results area shown on Figures B.3-3A and B.3-3B. In the 1988 sampling “gasoline range organics (C9-C22)” were detected up to 0.9 mg/kg (B-133-2, 1.7 feet bgs), below the ResRBSLs for gasoline range and diesel/kerosene range organics (1.1 mg/kg and 1,400 mg/kg, respectively). Lubricant oil range organics (C21-C30) were detected at two of five RFI locations up to 177 mg/kg (HFBS0019, 10.5 feet bgs). No other TPH ranges were detected at the targeted and representative sampling locations. Detected concentrations were below the ResRBSL (1,400 mg/kg) for kerosene/diesel/ lubricant oil range organics (C12 - C30). Based on targeted and representative sampling results, indicating TPH detected at concentrations below RBSLs, no further characterization is necessary.	Yes TPH were detected at low concentrations at targeted and representative sampling locations.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results. Site action recommendations will be revised as appropriate based on CP sampling and risk assessment results.
		Metals Metals potentially present due to reactive metals treatment process and contaminated equipment treatment.	Two historical samples were collected in 1988 to characterize soil conditions at locations targeting the former piping leading from the Treatment Room to the Neutralizing Pit (B133-1 and B133-2) at 2 and 1.7 feet bgs, respectively. Collected soil samples at five locations: - One location at the western concrete area targeting the air scrubber (HFBS0019) at up to 19 feet bgs - One location at the southern concrete pad targeting the Treatment Room door (HFBS0024) at a depth of 1.5 feet bgs - Three representative locations at the southern concrete pad and Size Reduction Area (HFBS0025, HFBS0027, and HFBS0029) at depths ranging from 1.5 to 17 feet bgs	Metals results area shown on Figures B.3-6A and B.3-6B. In the 1988 sampling sodium and potassium (only metals analyzed for in these samples) were detected above background ranges: - Sodium at 5,900 mg/kg (background 110 mg/kg) - Potassium at 11,000 mg/kg (background 6,400 mg/kg) There are no RBSLs established for sodium and potassium (no associated risk). Sodium was detected up to 1,940 mg/kg in recent sampling adjacent to the historical sampling (HFBS0019, 5.5 feet bgs). Sodium was detected above background concentrations to the southwest and southeast (HFBS0022 and HFBS0024), and not detected further to	Yes Metals detected below or slightly above background concentrations at targeted and representative sampling locations.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results. Site action recommendations will be revised as appropriate based on CP sampling and risk assessment results.

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
			Five locations will be sampled, and analyzed for metals/inorganics, after the RFI site demolition for additional characterization, per the HWMF Closure Plan. The locations will target the center of the Treatment Room, the Treatment Room Sump, the scrubber location, under the pipes which connect the Treatment Room to T-1, and under the pipes which connect the scrubber to T-1 (MWH, 2003b).	the south and southeast (HFBS0028 and HFBS0025). Sodium concentrations decreased to within background down-slope to the northwest (HFBS0011). Potassium was not detected above background concentration in the recent sampling adjacent to the historical sample locations. Barium and selenium were detected above background ranges at two of the five locations: • Barium at 162 mg/kg (background 140 mg/kg) • Selenium at 0.85 mg/kg (background 0.655 mg/kg) Metals detected above background were below ResRBSLs. EcoRBSLs for barium and selenium (14.6 and 0.17 mg/kg, respectively) are below maximum background concentrations. Barium concentrations decreased to below background concentrations down-slope to the northwest (HFBS0011). Selenium concentrations decreased to below background ranges down-slope to the north and northwest (HFBS0027 and HFBS0028). Hexavalent chromium was detected at three locations at the Building 4133 area up to 0.368 mg/kg at the Size Reduction Area (HFBS0027) at a depth of 4.5-5.5 ft. bgs, above EcoRBSL (0.2 mg/kg) and below ResRBSL (110 mg/kg). Hexavalent chromium was not detected above RBSLs in any sample. Detected pH levels ranged up to 11.8 in historical sampling. All detected pH ranges in recent sampling were within normal soil ranges. Based on representative and targeted sampling results, indicating isolated metals detections below or near background ranges (with the exception of sodium), no further characterization is necessary.		
		Herbicides/Pesticides Herbicide/pesticide use and/or storage not documented at the B4133 RFI Site.	Building 4133 screened for herbicides/pesticides. One representative sample was collected at one location near Building 4133 area (HFBS0024) at a depth of 1.5 feet bgs.	No herbicides/pesticides were detected at the Building 4133 area; no further characterization is necessary.	Yes Herbicides/pesticides not detected at representative sampling location.	Yes Area not recommended for further evaluation in CMS based on

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
						sampling and risk assessment results. Site action recommendations will be revised as appropriate based on CP sampling and risk assessment results.
2a	Caustic Solution Tank T-1 From 1978 to 1987, the T-1 location was the location of the Neutralizing Pit, a 12 x 6 x 6 foot below-grade concrete pit used to collect caustic solution waste and neutralize it using an acid solution. After neutralization, a plug in the pit would be pulled, and the contents drained to an asphalt-lined drainage ditch (located to the east within the SRE RFI Site, Group 6) east of the B4133 RFI Site which ultimately drained to the SRE Pond. The drain pipe was permanently plugged in 1986 after the plug came loose and approximately 1,000 gallons of sodium hydroxide solution was released to the asphalt-lined drainage. The Neutralizing Pit and surrounding soil was excavated in 1987. T-1 is a 1,300-gallon steel underground storage tank (UST) and is located inside a below-grade, 8-inch thick concrete secondary containment pit. The UST was used to store caustic solution wastes generated by Building 4133 metal treatment process from its installation in 1988 to the end of operations at the facility in 1997. Surface water in the tank T-1 area flows via sheet flow to the northeast and northwest where it is collected in stormwater collection sumps, which would have to be periodically emptied with mechanical pumps. It is unknown how this collected water was disposed. The tank T-1 area consists of a below-grade tank surrounded by an asphalt paved area. Under paved areas, alluvium is composed mainly of silty	VOCs VOC use and/or storage not documented at the B4133 RFI Site.	One historical sample was collected in 1988 to characterize soil removed during the Neutralizing Pit excavation (B133-6) at 0 feet bgs.	VOC results area shown on Figure B.3-1. No VOCs were detected in the removed soil. Based on sampling results, indicating VOCs not detected, no further VOC characterization is necessary.	Yes VOCs were not detected at the representative sampling location.	--- Site action recommendations for Tank T-1 will be made following implementation of CP sampling.
		SVOCs Petroleum oils associated with use of mechanical pumps. Kerosene and mineral oils used during cutting operations.	One historical sample was collected in 1988 to characterize soil removed during the Neutralizing Pit excavation (B133-6) at 0 feet bgs.	Di-n-butyl phthalate was detected in the removed soil at 40 µg/kg, well below ResRBSL (5,700,000 µg/kg) and EcoRBSL (488.2 µg/kg). No other SVOCs were detected in the soil. Based on sampling results, indicating detected phthalates well below RBSLs, no further SVOC characterization is necessary.	Yes Phthalates were detected at low concentrations at the representative sampling location.	--- Site action recommendations for Tank T-1 will be made following implementation of CP sampling.
		TPH Petroleum oils associated with use of mechanical pumps. Kerosene and mineral oils used during cutting operations.	One historical sample was collected in 1988 to characterize soil removed during the Neutralizing Pit excavation (B133-6) at 0 feet bgs. Additionally, soil samples were collected from 14 locations within (HFBS0094 through HFBS0100) and adjacent (HFBS0032 through HFBS0035, HFBS0037, HFBS0072, HFBS0073) to the asphalt-lined ditch east of the B4133 RFI Site at the neighboring SRE RFI Site (Group 6). Samples were collected at depths ranging from 0.5 to 7 feet bgs. Three locations will be sampled, and analyzed for TPH, after the RFI site demolition for additional characterization, per the HWMF Closure Plan. The locations will target the former location of tank T-1, and two locations along the PVC Neutralizing Pit Drain Line (MWH, 2003b).	TPH results area shown on Figure B.3-3A. “Gasoline range organics (C9-C22)” were detected at 0.3 mg/kg in the removed soil, below the ResRBSLs for gasoline range and diesel/kerosene range organics (1.1 mg/kg and 1,400 mg/kg, respectively). Lubricant oil range organics (C21-C30) were detected up to 717 mg/kg (HFBS0100, 1 foot bgs) at the far east end of the asphalt-lined ditch. All detected lubricant oil range organics were below the ResRBSL (1,400 mg/kg) for kerosene/diesel/ lubricant oil range organics (C12 - C30). No other TPH ranges were detected within ditch. Further TPH characterization will be conducted per the Closure Plan post tank removal. Based on lubricant oil range organic concentrations detected in the asphalt ditch, no further characterization	T-1 No Additional sampling will be conducted per the CP after tank removal. <u>Asphalt-Lined Ditch</u> Yes TPH were detected at concentrations below RBSLs at extensive representative locations; however, characterization will continue at SRE per the Group 6 Sampling and Analysis Plan (SAP).	T-1 --- Site action recommendations for Tank T-1 will be made following implementation of CP sampling. <u>Asphalt-Lined Ditch</u> --- Site Action recommendations for the asphalt-lined ditch will be made

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
	sand soils. Soil depth at this area is approximately 19 feet bgs.		Further characterization of the SRE RFI Site is ongoing.	is necessary. As previously noted, additional characterization is planned for the SRE RFI Site.		pending completion of RFI sampling associated with the SRE RFI Site and included in the Group 6 Report.
		Metals Tanks used to store waste solutions generated during a metals treatment operation. Also metals potentially present in waste due to acid use.	One historical sample was collected in 1988 to characterize soil removed during the Neutralizing Pit excavation (B133-6) at 0 feet bgs. Additionally, soil samples were collected from 14 locations within (HFBS0094 through HFBS0100) and adjacent (HFBS0032 through HFBS0035, HFBS0037, HFBS0072, HFBS0073) to the asphalt-lined ditch east of the B4133 RFI Site at the neighboring SRE RFI Site (Group 6). Samples were collected at depths ranging from 0.5 to 7 feet bgs. Three locations will be sampled, and analyzed for metals/inorganics, after the RFI site demolition for additional characterization, per the HWMF Closure Plan. The locations will target the former location of tank T-1, and two locations along the PVC Neutralizing Pit Drain Line (MWH, 2003b).	Metals results area shown on Figure B.3-6A. In the removed soil (B-133-6), sodium was detected at 6,900 mg/kg, above background (110 mg/kg). There are no RBSLs set for sodium. No other metals were analyzed in this sample. Cadmium, cobalt, copper, lead, zinc, and sodium were detected above background ranges at 12 of 14 sample locations in the asphalt-lined drainage: • Cadmium up to 2.3 mg/kg (background 1 mg/kg) • Cobalt at 94.3 mg/kg (background 21 mg/kg) • Copper at 44.8 mg/kg (background 29 mg/kg) • Lead at 52 mg/kg (background 34 mg/kg) • Zinc up to 792 mg/kg (background 110 mg/kg) • Sodium up to 413 mg/kg (background 110 mg/kg) Cadmium, copper, lead, and zinc were detected below ResRBSLs. Cobalt was detected above ResRBSL (22.8 mg/kg). EcoRBSLs for cadmium, cobalt, copper, lead, and zinc (0.02, 8.9, 1.1, 0.06, and 20.8 mg/kg, respectively) are below maximum background concentrations. There are no established RBSLs for sodium. Based on metals concentrations detected in the asphalt ditch, no further characterization is necessary. As previously noted, additional characterization is planned for the SRE RFI Site.	T-1 No. Additional sampling will be conducted per the CP after tank removal. <u>Asphalt-Lined Ditch</u> Yes Metals adequately characterized within the asphalt lined drainage ditch based on extensive representative sampling; however, additional characterization of the SRE RFI Site will be conducted per the Group 6 SAP.	T-1 --- Site action recommendations for Tank T-1 will be made following implementation of CP sampling. <u>Asphalt-Lined Ditch</u> --- Site Action recommendations for the asphalt-lined ditch will be made pending completion of RFI sampling associated with the SRE RFI Site and included in the Group 6 Report.
2b	Sodium-Potassium Alloy Tank T-2 T-2 is a 300-gallon metal aboveground storage tank (AST) surrounded by a carbon steel catch basin (secondary containment). The AST was used as a temporary storage unit for sodium-potassium alloy (NaK), and as a feeder system for that NaK to the Treatment Room. Due to the reactivity of NaK with air, the contents of the tank were kept under a cover of argon gas. The tank	VOCs VOC use and/or storage not documented at the B4133 RFI Site.	Collected soil samples at one location targeting the former location of tank T-2 (HFBS0022) at depths ranging from 1.5 to 19.5 feet bgs.	VOC results area shown on Figure B.3-1. Acetone, MEK, and xylenes were detected at the former location of tank T-2, up to 31.5 µg/kg (acetone, 15.5 feet bgs). All detected VOCs were below respective RBSLs. Based on sampling results, indicating VOCs present at concentrations below RBSLs, no further characterization is necessary.	Yes VOCs detected at low concentrations at targeted sampling location.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
	was used from beginning of Hazardous Waste Management Facility (HWMF) operations in 1978 to the end of operations in 1997. Surface water in the tank T-2 area flows via sheet flow to the northeast and northwest where it is collected in stormwater collection sumps, which would have to be periodically emptied with mechanical pumps. It is unknown how this collected water was disposed. The tank T-2 area consists of an aboveground tank surrounded by an asphalt paved area. Under paved areas, alluvium is composed mainly of silty sand soils. Soil depth at this area is approximately 19.5 feet bgs.	SVOCs Petroleum oils associated with use of mechanical pumps. Kerosene and mineral oils used during cutting operations.	Collected soil samples at one location targeting the former location of tank T-2 (HFBS0022) at depths ranging from 1.5 to 19.5 feet bgs.	SVOC results area shown on Figure B.3-2B. Bis(2-ethylhexyl) phthalate was detected at 100 µg/kg at one depth (1.5 feet bgs) at the former location of tank T-2, below Res and EcoRBSL (250,000 and 4,900 µg/kg, respectively). No other SVOCs were detected at the targeted sampling location. Based on sampling results, indicating SVOCs present at concentrations below RBSLs, no further characterization is necessary.	Yes SVOCs detected at low concentrations at targeted sampling location.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
		TPH Petroleum oils associated with use of mechanical pumps. Kerosene and mineral oils used during cutting operations.	Collected soil samples at one location targeting the former location of tank T-2 (HFBS0022) at depths ranging from 1.5 to 19.5 feet bgs.	TPH results area shown on Figure B.3-3B. Lubricant oil range organics (C21-C30) were detected at all five depths up to 390 mg/kg (max at 1.5 feet bgs). Concentrations generally decreased with depth. Detected concentrations were below the ResRBSL (1,400 mg/kg) for kerosene/diesel/ lubricant oil range organics (C12 - C30). No other TPH ranges were detected at the targeted sampling location. Based on sampling results, indicating TPH present at concentrations below RBSLs, no further characterization is necessary.	Yes TPH detected at low concentrations at targeted sampling location.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
		Metals/Inorganics Tank used to store a reactive metal compound (NaK).	Collected soil samples at one location targeting the former location of tank T-2 (HFBS0022) at depths ranging from 1.5 to 19.5 feet bgs.	Metals/inorganics results area shown on Figure B.3-6B. Hexavalent chromium was detected at 0.524 mg/kg (10.5 feet bgs), above the EcoRBSL (0.2 mg/kg) and below the ResRBSL (110 mg/kg). Hexavalent chromium was not detected at any of the other depths, and concentrations decreased to below RBSLs down-slope to the west (HFBS0023) and were not detected down-slope to the northwest (HFBS0011). Sodium was detected above background (110 mg/kg) in the two shallow depths up to 491 mg/kg (1.5 feet bgs). There are no established Res or EcoRBSLs for sodium. Sodium concentrations decrease to below background range to down-slope to the west and northwest (HFBS0023 and HFBS0011). Based on sampling results indicating hexavalent chromium at isolated sample at relatively low concentration further characterization is necessary. Sodium above background does not have associated risk.	Yes Elevated metals limited to hexavalent chromium (low) and sodium at targeted location. Sodium does not have associated risk.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
2c	Caustic Solution Tank T-3 T-3 is a 5,190-gallon polyethylene AST located inside of a 6,600-gallon secondary containment tank. T-3 was used to store caustic solution wastes generated at the B4133 RFI Site until they could be transported offsite for disposal or reused at another SSFL facility. When tank T-1 was reaching its capacity, caustic solution wastes were pumped from tank T-1 into T-3 with a portable mechanical pump. T-3 was used from 1990 to the end of HWMF operations in 1997. Prior to its installation in 1990, the T-3 location (northeast corner of the Building 4133 asphalt paved area) was used as a drum storage area. Characterization of this location as a drum storage area is included in the CUA 3 discussion. Surface water in the tank T-3 area flows via sheet flow to the northeast where it is collected in a stormwater collection sump, which would have to be periodically emptied with a mechanical pump. It is unknown how this collected water was disposed. The tank T-3 area consists of an aboveground tank surrounded by an asphalt paved area. Under paved areas, alluvium is composed mainly of silty sand with occasionally occurring clayey sand soils. Soil depth at this area is approximately 12 feet bgs.	Metals Tanks used to store waste generated due to a metals treatment operation.	Collected soil samples from one representative location to the northeast of T-3 (HFBS0012) at depths ranging from of 1.5 to10.5 feet bgs. One location will be sampled, and analyzed for metals/inorganics, after the RFI site demolition for additional characterization, per the HWMF Closure Plan. The location will target the former location of tank T-3 (MWH, 2003b).	Metals/inorganics results area shown on Figure B.3-6A. Sodium was detected above background (110 mg/kg) at 383 mg/kg (10.5 feet bgs). Sodium was not detected at either of the shallower depths. There are no established Res or EcoRBSLs for sodium. Only sodium detected above background (no associated risk); metals data do not indicate need for further characterization. However, a sample will be collected from the tank footprint post removal per the CP.	No Metals above background limited to sodium; however, additional sampling will be conducted after tank removal and will provide more targeted results. Area recommended for further evaluation in CMS based on VOC and TPH concentrations, and risk assessment results. Current metals results do not drive risk.	Yes Volume based on VOCs and TPH as described below in CUA 3.
2d	Rinse Tanks T-4A and T-4B T-4A and T-4B were 130 and 70-gallon stainless steel ASTs respectively, which both sat in a large carbon steel secondary containment catch tank. The ASTs were used to store wastes generated from the acid solution cleaning of contaminated equipment that had already undergone the thermal treatment process. When nearing capacity, waste solutions contained in T-4A and T-4B would be pumped into tank T-1. The exact period of use for these tanks is unknown; however, they were included in the facility drawings of the 1991	TPH Petroleum oils associated with use of mechanical pumps.	Collected soil samples from targeted location at the former tanks T-4A and T-4B (HFBS0023), at depths ranging from 1.5 to 19.5 feet bgs.	TPH results area shown on Figure B.3-3B. Lubricant oil range organics (C21-C30) were detected at all five depths up to 34.9 mg/kg (1.5 feet bgs). Detected concentrations were below the ResRBSL (1,400 mg/kg) for kerosene/diesel/ lubricant oil range organics (C12 - C30). No other TPH ranges were detected at the targeted sampling location. Based on sampling results, indicating lubricant oil range organics below RBSL, no further characterization is necessary.	Yes Lubricant oil range organics detected at concentrations below RBSL at targeted sampling location near tank.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
	HWMF Operation Plan (Rockwell, 1991a). Surface water in the rinse tank area flows via sheet flow to the north where it is collected in a stormwater collection sump, which would have to be periodically emptied with a mechanical pump. It is unknown how this collected water was disposed. The rinse tank area consists of an two aboveground tanks surrounded by an asphalt paved area. Under paved areas, alluvium is composed mainly of silty sand soils. Soil depth at this area is approximately 19.5 feet bgs.	Metals Tanks used to store waste solutions generated due to a metals treatment operation. Also, metals potentially present in waste due to acid use.	Collected soil samples from targeted location at the former tanks T-4A and T-4B (HFBS0023), at depths ranging from 1.5 to 19.5 feet bgs.	Metals/inorganics results area shown on Figure B.3-6B. Hexavalent chromium was detected at 0.184 mg/kg (15.5 feet bgs) below both the EcoRBSL (0.2 mg/kg) and ResRBSL (110 mg/kg). Hexavalent chromium was not detected at any of the other depths. No other metals were detected above background ranges at the representative sampling location. Based on low detected hexavalent chromium concentration at one depth, no further characterization is necessary.	Yes Hexavalent chromium detected at low concentration below RBSLs at one depth; all other metals detected within background range at targeted sampling location near tank.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
2e	Temporary Holding Tank The temporary holding tank was an UST of unknown capacity, which used to store caustic solution wastes generated by HWMF operations. This tank was briefly utilized following the excavation of the Neutralizing Pit in 1987 until the completion of installation of tank T-1 in 1988. The UST was located northwest of Building 4133 in the unpaved area north of the asphalt berm. Surface water in the former temporary holding tank area flows via sheet flow to the east-northeast into an east-west trending canyon north of RMHF, and continues in natural drainages offsite through NPDES Outfall 003. The former temporary holding tank area is an unpaved area consisting of silty sand soils. Soil depth at this area is approximately 4 feet bgs.	TPH Kerosene and mineral oils used as cutting lubricants in the reactive metals treatment process.	Collected soil samples from two targeted locations at the east and west ends of the former holding tank area (HFBS0004 and HFBS0002, respectively) at depths ranging from 1 to 4 feet bgs.	TPH results area shown on Figure B.3-3B. Lubricant oil range organics (C21-C30) were detected up to 83.4 mg/kg (HFBS0004, 1 foot bgs). Detected concentrations were below the ResRBSL (1,400 mg/kg) for kerosene/diesel/ lubricant oil range organics (C12 - C30). No other TPH ranges were detected at the targeted sampling location. Based on sampling results, indicating lubricant oil range organics at concentrations below RBSL, no further characterization is necessary.	Yes Lubricant oil range organics detected at concentrations below RBSL at targeted sampling locations.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
		Metals Tank used to store waste solutions generated during reactive metals treatment process.	Collected soil samples from two targeted locations at the east and west ends of the former holding tank area (HFBS0004 and HFBS0002, respectively) at depths ranging from 1 to 4 feet bgs.	Metals/inorganics results area shown on Figure B.3-6B. Sodium was detected above background (110 mg/kg) up to 1,210 mg/kg (HFBS0004, 1 foot bgs). There are no established RBSLs for sodium. Concentrations decrease to below background down-slope to the north (HFBS0007) and increase down-slope to the northwest (HFBS0001) and from there decrease to below background to the north, east, and west (HFBS0053, HFBS0054, HFBS0007, and HFBS0045). No other metals were detected above background ranges. Based on sampling results, indicating only sodium detected above background, with highest concentrations in targeted samples; no further characterization is necessary.	Yes Only sodium detected above background (no associated risk) in targeted locations near tank.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
2f	Lithium Hydride Reaction Vessel The lithium hydride reaction vessel, also known as T-3 prior to the installation of the caustic solution tank T-3 (CUA 2c), was a 540-gallon AST used to convert lithium hydride to a caustic waste solution. The tank stored the caustic solution until it could be disposed of offsite. According to the 1988 HWMF Operation Plan, the AST was expected to be put into use in 1989 and used for an approximately 6-month period (Rockwell, 1988).	TPH Kerosene and mineral oils used as cutting lubricants in the reactive metals treatment process.	Collected soil samples from one targeted location adjacent to the former lithium hydride reaction vessel area (HFBS0019) at depths ranging from 1 to 19 feet bgs.	TPH results area shown on Figure B.3-3B. Lubricant oil range organics (C21-C30) were detected at four of the five depths up to 177 mg/kg (10.5 feet bgs). Detected concentrations were below the ResRBSL (1,400 mg/kg) for kerosene/diesel/ lubricant oil range organics (C12 - C30). No other TPH ranges were detected at the targeted sampling location. Based on sampling results indicating TPH present at concentrations below RBSLs, no further characterization is necessary.	Yes TPH detected at concentrations below RBSLs at targeted sampling location.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
	Surface water in the tank area flows via sheet flow to the northeast and northwest where it is collected in stormwater collection sumps, which would have to be periodically emptied with mechanical pumps. It is unknown how this collected water was disposed. The former tank area is an asphalt paved area underneath which the alluvium is composed of silty sand soils. Soil depth at this area is approximately 19 feet bgs.	Metals Tank used to store/treat reactive metals.	Collected soil samples from one targeted location adjacent to the former lithium hydride reaction vessel area (HFBS0019) at depths ranging from 1 to 19 feet bgs.	Metals/inorganics results area shown on Figure B.3-6B. Barium and sodium were detected above background at the targeted sampling location: - Barium at 162 mg/kg (background 140 mg/kg) - Sodium up to 1,940 mg/kg (background 110 mg/kg) Barium was detected below ResRBSL (15,000 mg/kg) and the EcoRBSL (14.6 mg/kg) is below background concentration. There are no established RBSLs for sodium. Sodium was detected above background range to the southwest and southeast (HFBS0022 and HFBS0024); reporting limits were elevated (> 250 mg/kg) further south and southeast (HFBS0028 and HFBS0025) and downslope to the northwest (HFBS0011) – indicating sodium is widespread. Based on sampling results indicating primarily sodium above background, no further characterization is necessary.	Yes Metals above background range primarily sodium (no associated risk) at targeted sampling location.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
3	Building 4133 Storage and Staging Area The Building 4133 storage and staging area included the area surrounding Building 4133 and extends RFI boundary to the east, west and north. The storage and staging area consists of both paved and unpaved portions. The paved area is an approximately 6,000 square foot area immediately surrounding Building 4133, that was used as a	VOCs Potentially associated with use as a drum, materials, and equipment storage area.	<u>Soil Vapor</u> Collected soil vapor samples from 12 representative locations within the Building 4133 storage and staging area: - Two locations in the Building 4133 paved area, to the west of Building 4133 (HFSV0048) and to the east of Building 4133 (HFSV0047) at 5 to 19 feet bgs - Five locations in the unpaved area to the east	VOC results area shown on Figure B.3-1. <u>Soil Vapor</u> BTEX constituents were detected in soil vapor at 6 of 12 representative locations around the Building 4133 storage and staging area up to 0.49 µg/L (m- and p-xylenes, HFSV0012, 6.5 feet bgs). Benzene was detected at four locations up to 0.11 µg/L	Yes VOCs detected at highest concentrations northeast of Building 4133, decreasing at adjacent sample locations. The northeast asphalt	Yes Volume is delineated by nearby sampling results and site topography.

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
	tank staging area and storage area for drums and equipment. The unpaved area, outside of the Building 4133 fenced area, is an approximately 24,000 square foot area used to store building materials, excavated soils, and equipment. Aside from kerosene and mineral oil, chemicals stored at the paved and unpaved storage areas were not documented. Additionally, the storage and staging area contains two small (less than 5 cubic yards in volume) locations identified in the 2008 Debris Survey; one approximately 110 feet to the west-southwest of Building 4133, and the other approximately 80 feet to the south of Building 4133. Materials identified at the locations consisted of soil piles intermixed with concrete, asphalt, clay pipe, steel tubing, broken glass, and a cylindrical equipment air filter. The storage and staging area is also the known or suspected location for numerous spills including: caustic solutions (most likely sodium hydroxide and/or potassium hydroxide), liquid sodium metal, and oils. The storage and staging area was used as a storage area prior to HWMF operations in the 1960s (when it was used to store equipment for and debris from other SSFL programs [specific programs unknown]) and is currently active as a storage area. The storage and staging area is generally delineated by the bedrock outcropping to the south of Building 4133. Surface water in the paved area flows via sheet flow to the northeast and northwest corners of the paved area where it is collected in stormwater collection sumps, which would have to be periodically emptied. Surface water in the unpaved area flows to the east-northeast via sheet flow into an east-west trending canyon north of RMHF, and continues in natural drainages offsite through NPDES Outfall 003. The storage and staging area consists of asphalt paved and unpaved areas consisting of mainly silty sand soils with occasionally occurring clayey sand. Soil depths at this area range from 0 to 19.5 feet bgs.		of Building 4133 (HFSV0012, HFSV0085, HFSV0086, HFSV0091 and HFSV0200) at 3.5 to 9.75 feet bgs - Three locations in the unpaved area to the west of Building 4133 (HFSV0043 through HFSV0045) at 5 to 18 feet bgs - Two locations in the unpaved area to the north of Building 4133 (HFSV0052 and HFSV0083) at 5.25 to 13 feet bgs <u>Soil Matrix</u> Three historical samples were collected in 1988 to characterize soil conditions in the unpaved area north of Building 4133 just north of the fence (B133-3, B133-4, and B133-5) at 0.8 to 9 feet bgs. Collected soil matrix samples from two representative locations within the Building 4133 storage and staging area: - One location in the Building 4133 paved area to the west of Building 4133 (HFBS0011) at 1.5 to 19 feet bgs - One location in the unpaved area to the east of Building 4133 (HFBS0012) at 1.5 to 10.5 feet bgs - One location in the unpaved area to the north of Building 4133 (HFBS0084) at 2.25 feet bgs	(HFSV0012, 6.5 feet bgs). Detected benzene and toluene were above ResRBSL and EcoRBSL, respectively, at HFSV0012 (6.5 feet bgs) and decrease to ND or below RBSLs to the north, south, east, and west (HFBS0084/HFSV0092, HFSV0085, HFSV0200, HFSV0086, and HFSV0083). No other VOCs were detected in soil vapor. <u>Soil Matrix</u> Acetone and total xylenes were detected in two of the three historical soil sampling locations at 10 µg/kg for each constituent (acetone at B133-3 and total xylenes at B133-5). Both were detected at concentrations below respective RBSLs. No other VOCs were detected at the historical sampling locations. During the RFI, the highest VOCs were also detected in soil at HFBS0012, collocated with HFSV0012. VOCs were detected at two of three locations up to 92,500 µg/kg (naphthalene, HFBS0012, 1.5 feet bgs). 1,2,4- and 1,3,5-trimethylbenzene, cumene, and n-propylbenzene, were all detected at HFBS0012 at concentrations above respective ResRBSLs - up to 19,200 µg/kg (1,2,4-trimethylbenzene at 1.5 feet bgs, decreasing to 1,300 µg/kg at 10.5 feet bgs). No other VOCs were detected above RBSLs below 1.5 feet bgs at HFBS0012, or at other sampling locations. VOC concentrations decrease to ND or below RBSLs to the north, south, east, and west from HFBS0012 (HFBS0084, HFSV0085, HFSV0200, HFSV0086, and HFSV0083). Based on representative sampling results indicating the highest detected VOCs above RBSLs in the vicinity of HFSV0012/HFBS0012 decreasing in adjacent samples in all directions, no further characterization is necessary.	paved area and adjacent unpaved areas just northeast of Building 4133 are recommended for further evaluation in CMS based on VOC and TPH concentrations and risk assessment results. An unpaved area approximately 50 feet north of Building 4133 is also recommended for evaluation in the CMS based on PCBs as described below.	
		SVOCs Potentially associated with use as a drum, materials, and equipment storage area or with kerosene and	Three historical samples were collected in 1988 to characterize soil conditions in the unpaved area north of Building 4133 just north of the fence (B133-3, B133-4, and B133-5) at 0.8 to 9 feet bgs.	SVOC results area shown on Figures B.3-2A and B.3-2B. No SVOCs were detected in historical samples.	Yes SVOCs detected below RBSLs at representative locations.	Yes Volume delineated as described in respective chemical

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
		mineral oils used during waste treatment operations.	Collected soil samples from 19 representative locations around the Building 4133 storage and staging area: - Three locations in the Building 4133 paved area, to the west of Building 4133 (HFBS0011 and HFBS0048) and to the east of Building 4133 (HFBS0047) at 1 to 19 feet bgs - Four locations in the unpaved area to the east of Building 4133 (HFBS0012, HFBS0055, HFBS0085, and HFBS0086) at 1 to 5 feet bgs - Two locations in the unpaved area to the south of Building 4133 (HFBS0041 and HFBS0042) at 1 foot bgs - Four locations in the unpaved area to the west of Building 4133 (HFSV0043 through HFSV0045 and HFTS0001) at 1.5 feet bgs - Six locations in the unpaved area to the north of Building 4133 (HFBS0051 through HFBS0054, HFBS0083, and HFBS0084) at 1 to 5 feet bgs	SVOCs were detected at 11 of the 19 representative sample locations up to 71.1 µg/kg (bis[2-ethylhexyl] phthalate at HFBS0055, 1 foot bgs) in the unpaved area east of Building 4133. PAHs were detected up to 6.25 µg/kg (pyrene at HFBS0086, 1 foot bgs) in the unpaved area east of Building 4133. Benzo(a)pyrene was detected at one location at 1.7 µg/kg (HFBS0083, 1 foot bgs) in the unpaved area to the north of Building 4133. No SVOCs were detected above respective RBSLs. Based on representative sampling results, indicating SVOCs detected below RBSLs, no further characterization is necessary.	Two areas recommended for further consideration in the CMS based on sampling and risk assessment results as described in respective chemical sections; area not recommended for CMS based on SVOC sampling results.	sections (VOCs, TPH, and PCBs).
		TPH Potentially associated with use as a drum, materials, and equipment storage area. Kerosene and mineral oils used during waste treatment operations.	Three historical samples were collected in 1988 to characterize soil conditions in the unpaved area north of Building 4133 just north of the fence (B133-3, B133-4, and B133-5) at 0.8 to 9 feet bgs. Collected soil samples from 31 representative locations around the Building 4133 storage and staging area: - Three locations in the Building 4133 paved area, to the west of Building 4133 (HFBS0011 and HFBS0028) and to the east of Building 4133 (HFBS0026) at 1 to 19 feet bgs - Six locations in the unpaved area to the east of Building 4133 (HFBS0012, HFBS0030, HFBS0031, HFBS0055, HFBS0085, and HFBS0086) at 1 to 10.5 feet bgs - Two locations in the unpaved area to the south of Building 4133 (HFBS0041 and HFBS0042) at 1 foot bgs - Four locations in the unpaved area to the west of Building 4133 (HFSV0043 through HFSV0045 and HFTS0001) at 1.5 feet bgs	TPH results area shown on Figures B.3-3A and B.3-3B. In the 1988 samples, “gasoline range organics (C9 – C22)” were detected in all three samples up to 0.7 mg/kg at B133-3 and B133-5. All detected concentrations are below the ResRBSLs for gasoline range and diesel/kerosene range organics (1.1 mg/kg and 1,400 mg/kg, respectively). Lubricant oil range organics (C21 – C30) were detected at 29 of 31 sampled locations up to 267 mg/kg (HFBS0086, 1 foot bgs) in the unpaved area east of Building 4133. Kerosene range organics (C12 – C14) were detected at two locations up to 2,460 mg/kg (HFBS0012, 5.5 feet bgs), above the ResRBSL (1,400 mg/kg) for kerosene/diesel/ lubricant oil range organics (C12 - C30). Kerosene range organics were not detected in adjacent sampling to the north, south, and east from HFBS0012 (HFBS0010, HFBS0030, HFBS0085, HFBS0086) and was detected below the ResRBSL or ND to the west (HFBS0008 and HFBS0083). Diesel range organics (C15-C20) were not detected at	Yes TPH detected at high concentrations coincide with elevated VOCs and decrease in adjacent samples. The northeast asphalt paved area and adjacent unpaved areas just northeast of Building 4133 are recommended for further evaluation in CMS based on VOC and TPH concentrations and risk assessment results. An unpaved area approximately 50 feet north of Building 4133 is also recommended for evaluation in the CMS	Yes Volume is delineated by nearby sampling results and site topography.

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
			Sixteen locations in the unpaved area to the north of Building 4133 (HFBS0001 through HFBS0010, HFBS0051 through HFBS0054, HFBS0083, and HFBS0084) at 0.5 to 7.5 feet bgs	any of the representative sampling locations. Gasoline range organics (C08 – C11) were detected at one location at 1,410 mg/kg (HFBS0012) above the ResRBSL (1.1 mg/kg). Gasoline range organics (C08-C11) concentrations decrease to ND to the north, south, east, and west (HFBS0010, HFBS0030, HFBS0085, HFBS0086, HFBS0008). Based on representative sampling results, indicating TPH present at concentrations above RBSLs – coinciding with elevated VOCs – and decreasing in adjacent samples, no further characterization is necessary.	based on PCBs as described below.	
		PCBs PCB use and/or storage not documented at the B4133 RFI Site.	Collected soil samples from 16 representative locations around the Building 4133 storage and staging area: - Two locations in the Building 4133 paved area, to the west of Building 4133 (HFBS0048) and to the east of Building 4133 (HFSB0047) at 1 and 1.5 feet bgs respectively - Two locations in the unpaved area to the east of Building 4133 (HFBS0012 and HFBS0055) at 5.5 and 1 feet bgs, respectively - Two locations in the unpaved area to the south of Building 4133 (HFBS0041 and HFBS0042) at 1 foot bgs - Six locations in the unpaved area to the west of Building 4133 (HFSV0043 through HFSV0045, HFBS0082, HFBS0093, and HFTS0001) at 1 to 5 feet bgs - Four locations in the unpaved area to the north of Building 4133 (HFBS0051 through HFBS0054) at 1 foot bgs	PCB results shown on Figure B.3-4. PCBs were detected at 9 of the 16 representative sampling locations around the storage and staging area up to 380 µg/kg (Aroclor 1254, HFBS0052, 1 foot bgs) in the unpaved area approximately 50 feet north of Building 4133. PCBs in this area are above both Res and EcoRBSLs (140 and 78 µg/kg, respectively). Aroclor 1254 concentrations decrease to ND at locations to the south (HFBS0053 and HFBS0054) and are bounded by bedrock outcrop upslope to the northeast. Aroclor 1254 was also detected at 87.8 µg/kg (HFBS0055, 1 foot bgs), in the unpaved area to the east of Building 4133, just above the EcoRBSL. Detected concentrations decrease to below RBSLs or ND to the south, west, and northwest (HFBS0049, HFBS0047, and HFBS0012), and are bound by a surface water divide upslope to the east and north. Aroclor 1248 was detected at 62.6 µg/kg (HFBS0043, 1.5 feet bgs) in the unpaved area west of Building 4133, above EcoRBSL (11.4 µg/kg). Concentrations decrease to ND to the southeast, west, south, and north (HFTS0001, HFBS0081, HFBS0083, and HFBS0093). Representative sampling results indicate the highest detected PCBs above RBSLs located north of Building 4133, decreasing in adjacent samples. Bedrock outcrop and surface water flow (divide) limit extent. No further characterization is necessary.	Yes PCBs detected at highest concentrations above RBSLs north of Building 4133. An unpaved area approximately 50 feet north of Building 4133 is recommended for evaluation in the CMS based on PCB concentrations and risk assessment results. The northeast asphalt paved area and adjacent unpaved areas just northeast of Building 4133 are also recommended for further evaluation in CMS based on VOC and TPH concentrations.	Yes Volume is delineated by surrounding results, topography, and bedrock outcrop.

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
(Page 13 of 19)

Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
		Metals/Inorganics Potentially associated with use as a drum, materials, and equipment storage area.	Three historical samples were collected in 1988 to characterize soil conditions in the unpaved area north of Building 4133 just north of the fence (B133-3, B133-4, and B133-5) at 0.8 to 9 feet bgs. Collected soil samples from 27 representative locations around the Building 4133 storage and staging area: • Three locations in the Building 4133 paved area, to the west of Building 4133 (HFBS0011 and HFBS0028) and to the east of Building 4133 (HFBS0026) at 1 to 19 feet bgs • Four locations in the unpaved area to the east of Building 4133 (HFBS0012, HFBS0030, HFBS0031, HFBS0055) at 1 to 8 feet bgs • Two locations in the unpaved area to the south of Building 4133 (HFBS0041 and HFBS0042) at 1 foot bgs • Four locations in the unpaved area to the west of Building 4133 (HFSV0043 through HFSV0045 and HFTS0001) at 1.5 feet bgs. • Fourteen locations in the unpaved area to the north of Building 4133 (HFBS0001 through HFBS0010, HFBS0051 through HFBS0054) at 0.5 to 16 feet bgs Two locations will be sampled, and analyzed for metals/inorganics, after the RFI site demolition for additional characterization, per the HWMF Closure Plan. The locations will target the former locations of the collection sumps at the northeast and northwest corners of the asphalt area (MWH, 2003b).	Metals/inorganics results area shown on Figures B.3-6A through B.3-6C. In the 1988 samples sodium was detected above background concentration at two of three locations, up to 2,400 mg/kg (max at B133-3, 0.8 feet bgs), decreasing to within background at the down-slope sample location (B133-5). Sodium was detected above background (110 mg/kg) in 9 of 27 samples around the Building 4133 storage and staging area, up to 2,280 mg/kg (HFBS0001, 1.5 feet bgs) and is likely above background throughout most of the RFI site based on detected concentrations and sample reporting limits (for NDs). Sodium decreases to within background downslope to the west. Arsenic and selenium were detected slightly above background at 2 of 27 representative sampling locations: • Arsenic at 17.5 mg/kg (background 15 mg/kg) • Selenium at 0.85 mg/kg (background 0.655 mg/kg) Selenium was detected below the ResRBSL (380 mg/kg). The EcoRBSL for selenium (0.17 mg/kg) is below maximum background. The Res and EcoRBSLs for arsenic (0.095 and 1.92 mg/kg, respectively) are below background concentration. There are no established Res or EcoRBSLs for sodium. Selenium and arsenic were each detected above background at one or two isolated locations, with remaining samples within background range. Based on representative sampling results indicating isolated metals detections near background (with the exception of sodium), no further characterization is necessary.	Yes Metals detected slightly above background at isolated locations among extensive samples; sodium above background throughout area (no associated risk). Two areas recommended for further consideration in the CMS based on sampling and risk assessment results as described in respective chemical sections (VOCs, TPH, and PCBs); area not recommended for CMS based on metals concentrations.	Yes Volume delineated as described in respective chemical sections (VOCs, TPH, and PCBs).

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
(Page 14 of 19)

Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
4	Western Drainage Debris Area The western drainage debris area comprises several small debris areas west and downslope from the B4133 RFI Site. Debris noted in the area consisted mainly of concrete, scrap metal, and empty drums. Surface water in the western debris area flows via sheet flow to the west into an east-west trending drainage north of RMHF, and continues offsite through NPDES Outfall 003. The debris area is unpaved and soil is composed mainly of silty sands approximately 1 to over 2 feet thick.	VOCs VOCs potentially associated with debris.	Collected soil samples from five representative locations at the Western Drainage Debris Area: - Three locations from the southern section of the debris area east of the RMHF RFI Site boundary (from north to south: HFBS0062, HFBS0074, HFBS0075) at depths ranging from 0.75 to 1 feet bgs - Two locations from the northern section of the debris area north of the RMHF RFI Site boundary (HFBS0076 and HFBS0077) at 1 foot bgs Collected soil samples from two locations west of the debris area (HFBS0064 and HFBS0065) at 1 and 0.3 feet bgs, respectively.	VOC results area shown on Figure B.3-1. VOCs were detected at the debris area up to 20.8 µg/kg (p-cymene, HFBS0074). There are no established Res or EcoRBSLs for p-cymene. Methylene chloride was detected up to 8.41 µg/kg in HFBS0076 and HFBS0077), in the western portion of the debris area, just above the ResRBSL (4 µg/kg) and below the EcoRBSL (25,000 µg/kg). Methylene chloride was detected below RBSLs just west of the debris area, but was not detected in any other samples, including samples down-stream from the debris area within the drainage (RMBS0034 and RMBS0036). No other VOCs were detected above RBSLs. Sampling results indicate detected methylene chloride just above RBSLs is limited to a few samples representative of the main debris area and was not detected adjacent/downstream sampling locations; no further characterization is necessary.	Yes Representative sampling indicates limited concentrations of methylene chloride detected in main debris area.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
		SVOCs SVOCs assessed to characterize debris area.	Collected soil samples from seven representative locations at the Western Drainage Debris Area: - Four locations from the southern section of the debris area east of the RMHF RFI Site boundary (from north to south: HFBS0062, HFBS0074, HFBS0061, HFBS0075) at depths ranging from 0.3 to 1 feet bgs - Three locations from the northern section of the debris area north of the RMHF RFI Site boundary (HFBS0058, HFBS0076 and HFBS0077) at depths ranging from 0.75 to 1 foot bgs. Four soil samples were also collected on the slope above the debris area to the north and west (HFBS0057, HFBS0059, HFBS0064 and HFBS0065 at depths between 0.3 and 1 foot bgs).	SVOC results area shown on Figure B.3-2B. SVOCs were detected at three of the seven debris area locations up to 20.8 µg/kg (benzo[b]fluoranthene). Benzo(a)pyrene was detected at the southern tip of the debris area at 11.7 µg/kg. No SVOCs were detected above respective RBSLs. Based on representative sampling results indicating low detected SVOCs below RBSLs, no further characterization is necessary.	Yes SVOCs below RBSLs at representative sampling locations.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
		TPH TPH assessed to characterize debris area.	Collected soil samples from seven representative locations at the Western Drainage Debris Area: Four locations from the southern section of the debris area east of the RMHF RFI Site boundary (from north to south: HFBS0062, HFBS0074, HFBS0061, HFBS0075) at depths ranging from 0.3 to 1 feet bgs	TPH results area shown on Figure B.3-3B. Gasoline range organics (C08-C11) were detected at four of seven sampling locations in the debris area up to 4.81 mg/kg at the center of the southern section of the debris area (HFBS0074), with remaining samples ranging from 1.33 to 1.53 mg/kg - all above the ResRBSL of 1.1 mg/kg. Benzene was not detected in VOC analyses at	Yes TPH ranges detected at low levels below or slightly above RBSLs, and ND in down-drainage samples.	Yes Area not recommended for further evaluation in CMS based on sampling and risk

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
			Three locations from the northern section of the debris area north of the RMHF RFI Site boundary (HFBS0058, HFBS0076 and HFBS0077) at depths ranging from 0.75 to 1 foot bgs Four soil samples were also collected on the slope above the debris area to the north and west (HFBS0057, HFBS0059, HFBS0064 and HFBS0065 at depths between 0.3 and 1 foot bgs).	any of these locations. Kerosene, diesel, and lubricant oil range organics were detected at all seven debris area sampling locations up to 38.5 mg/kg (lubricant oil range organics [C21-C30], HFBS0062). All were below the ResRBSL (1,400 mg/kg) for kerosene/diesel/ lubricant oil range organics (C12 - C30). Gasoline and lubricant oil range organics were not detected at down-drainage sample locations RMBS0034 and RMBS0036. Lubricant oil range organics (C21 – C30) were detected up-slope north of the debris area at 5.58 mg/kg, well below the ResRBSL. In the sampling west of the debris area gasoline range organics (C08-C11) were detected at one location at 2.36 mg/kg (HFBS0065). Gasoline range organics (C08 – C11) were not detected at the down-drainage sample location (RMBS0036). Kerosene, diesel, and lubricant oil range organics were detected at both sampling locations up to 29 mg/kg (lubricant oil range organics [C21-C30], HFBS0065). All detections were below the ResRBSL (1,400 mg/kg) for kerosene/diesel/ lubricant oil range organics (C12 - C30). Based on representative sampling results indicating TPH detected below or slightly above RBSLs, no further characterization is necessary.		assessment results.
		PCBs PCBs assessed to characterize debris area.	Collected soil samples from seven representative locations at the Western Drainage Debris Area: - Four locations from the southern section of the debris area east of the RMHF RFI Site boundary (from north to south: HFBS0062, HFBS0074, HFBS0061, HFBS0075) at depths ranging from 0.3 to 1 feet bgs - Three locations from the northern section of the debris area north of the RMHF RFI Site boundary (HFBS0058, HFBS0076 and HFBS0077) at depths ranging from 0.75 to 1 foot bgs Four soil samples were also collected on the slope above the debris area to the north and west (HFBS0057, HFBS0059, HFBS0064 and HFBS0065 at depths between 0.3 and 1 foot bgs).	PCB results shown on Figure B.3-4. Aroclors 1242, 1248, 1254, and 1260, were detected at five of seven debris area locations, with the highest concentrations in the southern debris area (HFBS0061) up to: 62.7 µg/kg Aroclor 1254 14 µg/kg Aroclor 1242 3.8 µg/kg Aroclor 1248 55.5 µg/kg Aroclor 1260 All detected PCB were below respective RBSLs. Based on representative sampling results indicating PBCs present at concentrations below RBSLs, no further characterization is necessary.	Yes PCBs not detected or detected at concentrations below RBSLs at representative sampling locations.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
		Dioxins Dioxins assessed to characterize debris area.	Collected soil samples from two locations west of the debris area (HFBS0064 and HFBS0065) at 1 and 0.3 feet bgs, respectively.	One dioxin congener was detected above background range in the debris area drainage at 165 ng/kg (octachlorodibenzo-p-dioxin, HFBS0064) below both Res and EcoRBSL (23,000 and 38,700 ng/kg, respectively). However, calculated 2,3,7,8 TCDD TEQs ranged up to 0.135 ng/kg at HFBS0064; below background. Based on representative sampling results indicating dioxins within background, no further characterization is necessary.	Yes Dioxins detected within background at representative sampling locations.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
		Metals Metals assessed to characterize debris area.	Collected soil samples from seven representative locations at the Western Drainage Debris Area: - Four locations from the southern section of the debris area east of the RMHF RFI Site boundary (from north to south: HFBS0062, HFBS0074, HFBS0061, HFBS0075) at depths ranging from 0.3 to 1 feet bgs - Three locations from the northern section of the debris area north of the RMHF RFI Site boundary (HFBS0058, HFBS0076 and HFBS0077) at depths ranging from 0.75 to 1 foot bgs Four soil samples were also collected on the slope above the debris area to the north and west (HFBS0057, HFBS0059, HFBS0064 and HFBS0065 at depths between 0.3 and 1 foot bgs).	Metals/inorganics results area shown on Figure B.3-6C. Zinc was detected up to 143 mg/kg, above background (110 mg/kg) at one location (HFBS0061) in the southern portion of the debris area - below the ResRBSL (23,000 mg/kg), EcoRBSL (20.8 mg/kg) is below maximum background concentration. Zinc was not detected above background in any other samples, and no other metals were detected above background range at the representative sampling locations. Based on representative sampling results indicating zinc slightly above background range at one location among representative samples, no further characterization is necessary.	Yes Metals detected below or slightly above background concentrations at representative sampling locations.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
5	Northwest Excavation Area The Northwest Excavation Area is a 15 x 15 foot area excavated in 2003to a depth of 1 foot to remove elevated cesium-137. Surface water in the excavation area flows via sheet flow to the west into an east-west trending drainage north of RMHF, and continues offsite through NPDES Outfall 003. The excavation area is unpaved and soil consists of silty sands and sandy silts up to approximately 1 foot deep.	VOCs Documentation does not indicate VOC release at the Northwest Excavation Area.	Collected soil sample from one location targeting the excavation area center (HFBS0042 at 0.75 feet bgs).	VOC results area shown on Figure B.3-1. Methylene chloride was detected at 2.32 µg/kg, below both Res and EcoRBSLs (4 and 25,000 µg/kg, respectively). No other VOCs were detected; no further characterization is necessary.	Yes VOCs detected below RBSLs at targeted location.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
		SVOCs Documentation does not indicate SVOC release at the Northwest Excavation Area.	Collected soil sample from one location targeting the excavation area center (HFBS0042 at 0.75 feet bgs).	SVOC results area shown on Figure B.3-2B. No SVOCs were detected; no further characterization is necessary.	Yes SVOCs not detected at targeted location.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
		TPH Documentation does not indicate fuel/oil release at the Northwest Excavation Area.	Collected soil sample from one location targeting the excavation area center (HFBS0042 at 0.75 feet bgs).	TPH results area shown on Figure B.3-3B. TPH were not detected; no further characterization is necessary.	Yes TPH not detected at targeted sampling location.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
		PCBs Documentation does not indicate fuel/oil/PCB release at the Northwest Excavation Area.	Collected soil sample from one location targeting the excavation area center (HFBS0042 at 0.75 feet bgs).	PCB results shown on Figure B.3-4. Aroclors 1254, 1242, and 1260 were detected up to 14.2 µg/kg (Aroclor 1254). All detected PCBs were well below ResRBSL (140 µg/kg) and EcoRBSLs (78 and 79 µg/kg). Based on targeted sampling results indicating PCBs detected well below RBSLs, no further characterization is necessary.	Yes PCBs well below RBSLs at targeted location.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
		Metals Documentation does not indicate non-radioactive metals release at the Northwest Excavation Area.	Collected soil sample from one location targeting the excavation area center (HFBS0042 at 0.75 feet bgs).	Metals results area shown on Figure B.3-6C. Metals detected within background ranges; no further characterization is necessary.	Yes Metals within background at targeted location.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
6	Former Building 4654 Interim Storage Facility (ISF) The ISF was an uncovered concrete pad which consisted of a storage area and eight spent and dummy fuel cells, 20 inch in diameter cylinder extending 25 feet into the ground. The ISF was used to store dummy and spent fuel elements, shipping and storage casks, equipment, and hot waste generated at the SRE, Organic Moderated Reactor Experiment (OMRE), and Systems for Nuclear Auxiliary Power (SNAP), from 1958 to 1984. The ISF was decommissioned and demolished in 1984-1985. Following the demolition, radioactively contaminated soils were excavated and the area was backfilled (partially from soils excavated from the ISF site which were	VOCs Potentially associated with storage.	<u>Soil Vapor</u> Collected soil vapor samples from one location targeting the center of former Building 4654 area (HFSV0039 at 5 and 7.5 feet bgs). <u>Soil matrix</u> Collected soil samples from two representative locations down drainage from the former Building 4654 (HFBS0040 and HFBS0049, both at 1.5 feet bgs).	VOC results area shown on Figure B.3-1. No VOCs were detected at the targeted soil vapor and down drainage soil matrix sampling locations; no further characterization is necessary.	Yes VOCs not detected at targeted and representative locations.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
		SVOCs Potentially associated with storage.	Collected soil samples from three locations: - One location targeting the center of former Building 4654 area (HFBS0039 at 1.5 feet bgs) - Two locations down drainage to the east of former Building 4654 (HFBS0040 and HFBS0049, both at 1.5 feet bgs)	SVOC results area shown on Figure B.3-2A. Di-n-butyl phthalate and butyl benzyl phthalate were detected at up to 7.26 µg/kg (di-n-butyl phthalate, HFBS0039). Both detected phthalates were below respective RBSLs and no other SVOCs were detected at	Yes Low phthalates concentrations detected below RBSLs at targeted and representative	Yes Area not recommended for further evaluation in CMS based on

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Map Key ¹	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored ²	Sampling Scope and Rationale ² [See Figure B.2-2 for sampling locations]	Sampling Results ³ Chemical concentrations detected greater than background and/or risk screening levels? ⁴	Potential concentration gradients sufficiently characterized for risk assessment? ⁵	Is delineation sufficient to estimate soil volume in CMS? ^{6,7} (see Figure B.5-1 for CMS areas)
	deemed free of radioactive contamination) and returned to natural grade. Surface water at the former ISF area flows via sheet flow to the west-northwest, around the bedrock outcrop to the north of the ISF, and continues on to the northwest into an east-west trending canyon north of RMHF, and continues in natural drainages offsite through NPDES Outfall 003. The former ISF area is unpaved and soil is comprised of silty sands up to 8 feet thick.			the targeted or representative sampling locations. Based on representative sampling results, indicating SVOCs present at concentrations below RBSLs, no further characterization is necessary.	locations.	sampling and risk assessment results.
		TPH Potentially associated with storage.	Collected soil samples from three locations: - One location targeting the center of former Building 4654 area (HFBS0039) at 1.5 feet bgs - Two locations down drainage to the east of former Building 4654 (HFBS0040 and HFBS0049, both at 1.5 feet bgs)	TPH results area shown on Figure B.3-3. No TPH ranges were detected; no further characterization is necessary.	Yes TPH not detected at targeted and representative locations.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
		PCBs PCB use and/or storage not documented.	Collected soil samples from three locations: - One location in the center of the former Building 4654 area (HFBS0039) at 1.5 feet bgs - Two locations down-slope to the east of former Building 4654 (HFBS0040nd HFBS0049, both at 1.5 feet bgs)	TPH results area shown on Figure B.3-3A. No PCBs were detected; no further characterization is necessary.	Yes PCBs not detected at targeted and representative locations.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
		Metals Potentially associated with storage.	Collected soil samples from three locations: - One location in the center of the former Building 4654 area (HFBS0039) at 1.5 feet bgs - Two locations down-slope to the east of former Building 4654 (HFBS0040nd HFBS0049, both at 1.5 feet bgs)	Metals results area shown on Figure B.3-6A. Boron and selenium were detected slightly above background ranges at one of the three locations: - Boron at 10 mg/kg (background 9.7 mg/kg) - Selenium at 0.89 mg/kg (background 0.655 mg/kg) Detected boron and selenium were below ResRBSLs (15,000 and 380 mg/kg, respectively) and EcoRBSLs for both (6.76 and 0.17 mg/kg, respectively) are below maximum background concentrations. Based on targeted and representative sampling results indicating two metals detected slightly above background range; no further characterization is necessary.	Yes Metals detected slightly above background at targeted and representative locations.	Yes Area not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE B.3-2A
DRAFT DESCRIPTION OF CHEMICAL USE AREAS AT THE B4133 RFI SITE AND SOIL SAMPLING RESULTS SUMMARY
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Notes:

1. Map Key refers to numbered chemical use area as shown on Figure B.2-1.
2. Where historical records and physical characteristics do not suggest the presence of a chemical group, that chemical group was not analyzed in samples from the respective chemical use area and is not reflected in this table.
3. Complete sample analytical results are presented in Attachment B-3.
4. The use of the SRAM-based screening levels for comparison purposes does not serve as a risk assessment. These screening levels are not used to determine if a chemical use area will be recommended for further consideration in the CMS, but only as a tool to evaluate the characterization data. The SRAM-based screening levels represent conservative concentrations that pose a low level of risk.
5. Concentration gradients must be defined such that the risk assessment reflects the approximate maximum analyte concentration OR a concentration sufficiently high to result in risk requiring a recommendation for evaluation during CMS. .
6. Chemicals listed as a basis for CMS recommendations include both chemical drivers (above 1 x 10-6 risk and HI of 1.0) and significant chemical contributors to overall risk.
7. Volumes for CMS evaluation must be estimable within a factor of ten for comparison of remedial alternatives.
8. A location (G07-3021) identified in the 2008 Waste Debris Survey, approximately 140 feet to the west of Building 4133, was not characterized due to contents (soil pile intermixed with concrete) and size (less than 5 cubic yards).

ACRONYMS:

AST - aboveground storage tank
bgs - below ground surface
BTEX - benzene, toluene, ethylbenzene, and xylene
CMS - Corrective Measures Study
CP - Closure Plan
CUA - Chemical Use Area
DTSC - Department of Toxic Substances Control
EcoRBSL - ecological risk-based screening level
HI - Hazard Index
HWMF - Hazardous Waste Management Facility
ISF - Interim Storage Facility
MEK - methyl ethyl ketone
mg/kg - milligrams per kilogram
NaK - sodium-potassium alloy
ND - non-detect
ng/kg - nanograms per kilogram
OMRE - Organic Moderated Reactor Experiment
PAH - polynuclear aromatic hydrocarbon
PCB - polychlorinated biphenyl
RBSLs - risk based screening levels
ResRBSL - residential risk-based screening level
RFI - Resource Conservation and Recovery Act (RCRA)
Facility Investigation
SNAP - Systems for Nuclear Auxiliary Power
SRAM - Standardized Risk Assessment Methodology
SRE - Sodium Reactor Experiment
SSFL - Santa Susana Field Laboratory
SVOC - semivolatile organic compound
TCDD – 2,3,7,8-tetrachlorodibenzo-p-dioxin
TEQ - Total Equivalency Quotient (normalized to 2,3,7,8 TCDD)
TPH - total petroleum hydrocarbons
µg/kg - micrograms per kilogram
µg/L - micrograms per liter
UST - underground storage tank
VOC - volatile organic compound

TABLE B.3-2B
B4133 RFI SITE SUMMARY AND EVALUATION OF GROUNDWATER SAMPLING RESULTS
(PAGE 1 OF 5)

Analytical Group	Site Soil Impacts? (Summary of Relevant Impacts) ¹	Monitored in Groundwater? (Number of Samples/Date Range) ²	Constituents Detected in Groundwater? (Above GWCC or Regulatory Criteria?) ³	RFI Site Related?	Groundwater Characterized Sufficiently for Risk Assessment?
VOC	YES VOCs were detected at the B4133 RFI Site, most prominently: - Northeast of Building 4133 , 1,2,4- and 1,3,5-trimethylbenzene, cumene, naphthalene, n-butylbenzene, and n-propylbenzene were detected, with the largest detections occurring at HFBS0012 at a depth of 1.5 feet bgs; concentrations decreased with depth. BTEX constituents were also detected at this location with benzene up to 0.11 µg/L (HFSV0012, 6.5 feet bgs). - East of Building 4133 benzene and toluene were detected at low concentrations; benzene was detected up to 0.048 µg/L (HFSV0047) at a depth of 7.5 ft. bgs. - At the Building 4133 western debris area methylene chloride, styrene, and toluene were detected up to 8.41 µg/kg (max = methylene chloride, HFBS0077, 1 foot bgs). Due to shallow soils at this location no sampling was conducted at depths greater than 1 foot bgs. TCE was not detected in any of the sampling conducted at the B4133 RFI Site.	YES 75 groundwater samples were collected and analyzed for VOCs at three Building 4133 groundwater monitoring locations (including RD-85) between 1989 and 2008.	YES TCE, chloromethane, and methylene chloride have been occasionally detected at RD-19. TCE is the only VOC detected above its respective MCL (5 µg/L), but this result is not considered representative of groundwater conditions; TCE was not detected in an associated duplicate sample or in any of the 53 other samples collected from this location. Chloromethane and methylene chloride detects were near the detection limit, below established MCLs (no MCL exists for chloromethane), and not replicated in over 50 other samples collected from RD-19. Acetone, benzene, and carbon disulfide were detected below established MCLs in a sample collected from RD-85 following its installation. These compounds were not detected in a subsequent sample collected from RD-85. Benzene was not detected in samples from RD-19 and RS-28.	NO Based on soil data and VOC detects in groundwater in the vicinity of Building 4133, groundwater VOCs are not considered related to current conditions observed at this site. VOCs may be due to small, incidental releases in the vicinity, not associated with recent site activities.	YES
SVOCs	YES SVOC use/generation was not documented; however, SVOCs were detected at low concentrations throughout the B4133 RFI Site. PAHs were detected up to 20.8 µg/kg (max = benzo(b)fluoranthene, HFBS0075, 1 foot bgs) at the southern tip of the Western Drainage Debris Area. Benzo(a)pyrene was detected up to 11.7 µg/kg at the same location (HFBS0075). Phthalates were detected up to 100 µg/kg (bis[2-ethylhexyl] phthalate, HFBS0022, 1.5 feet bgs) at the asphalt paved area west of Building 4133. Di-n-butyl phthalate was detected at 5.87 µg/kg (HFBS0011, 15.5 feet bgs) at the northwest corner of the Building 4133 paved area. Other than the di-n-butyl phthalate detection at HFBS0011, no SVOCs were detected at depths greater than 5.5 feet bgs.	YES One groundwater sample was collected from RD-19 and analyzed for SVOCs in 1989.	NO SVOCs were not detected at B4133 groundwater monitoring locations.	NO Although only one SVOC analysis has been performed on groundwater samples collected near Building 4133, SVOC migration to groundwater is unlikely due to low solubility in water and low concentrations in soil.	YES

TABLE B.3-2B
B4133 RFI SITE SUMMARY AND EVALUATION OF GROUNDWATER SAMPLING RESULTS
(PAGE 2 OF 5)

Analytical Group	Site Soil Impacts? (Summary of Relevant Impacts) ¹	Monitored in Groundwater? (Number of Samples/Date Range) ²	Constituents Detected in Groundwater? (Above GWCC or Regulatory Criteria?) ³	RFI Site Related?	Groundwater Characterized Sufficiently for Risk Assessment?
TPH	YES Kerosene and mineral oil were used and stored at the B4133 RFI Site for use as a lubricant in metal cutting operations at the Size Reduction Area, south of Building 4133. Petroleum hydrocarbons were detected throughout the site, usually at low levels, but were detected at higher concentrations at several locations, including: - Outside of the northeast corner of the Building 4133 paved area gasoline range organics (C08-C11) were detected at 1,410 mg/kg (HFBS0012, 5.5 feet bgs) and kerosene range organics (C12-C15) were detected at 2,460 mg/kg (HFBS0012, 5.5 feet bgs). Gasoline and kerosene range organics were not detected in either the shallower sample or the deeper sample at this location. Lubricant oil range organics (C21-C30) were detected up to 197 mg/kg (max at HFBS0030, 5.5 feet bgs). TPH concentrations in this area generally increased with depth. - Inside the paved area west of Building 4133 lubricant oil range organics (C21-C30) were detected up to 390 mg/kg (max at HFBS0022, 1.5 feet bgs). Other TPH ranges were not detected in this area; lubricant oil range organics (C21-C30) concentrations in this area varied independent of depth. - Western Drainage Debris Area – gasoline range organics (C08-C11) were detected up to 4.81 mg/kg (max at HFBS0074, 0.75 feet bgs), diesel range organics (C15-C20) were detected up to 5.7 mg/kg (max at HFBS0065, 0.3 feet bgs), kerosene range organics (C12-C15) were detected up to 7.71 mg/kg (max at HFBS0074, 0.75 feet bgs), and lubricant oil range organics (C21-C30) were detected up to 61.7 mg/kg (max at HFBS0063, 0.75 feet bgs). Samples deeper than 1 foot bgs were not collected at the Western Drainage Debris Area due to shallow soils. - The asphalt-lined drainage ditch east of the B4133 RFI Site lubricant oil range organics (C21-C30) were detected up to 717 mg/kg (max at HFBS0100, 1 foot bgs). Lubricant oil range organics (C21-C30) were generally not detected at depths below 1.5 feet bgs. Other TPH ranges were not detected in this area.	YES One groundwater sample was collected from RD-19 and analyzed for petroleum hydrocarbons in 2008.	NO Petroleum hydrocarbons were not detected at RD-19. However, TPH has not been analyzed at RS-25, immediately adjacent to identified gasoline, kerosene and lubricant oil range organics impacts northeast of Building 4133. As noted above for VOCs, benzene was not detected in samples from RD-19 and RS-28 suggesting gasoline range impacts to groundwater are limited.	Unknown TPH not analyzed in RS-25.	NO TPH analysis is recommended at RS-25
PCBs	YES There was no documented PCB use at the B4133 RFI Site; however, PCBs were detected throughout the site, mostly at low concentrations but were detected at higher concentrations several locations: - The unpaved area north of Building 4133 Aroclor 1254 was detected at 380 µg/kg and Aroclor 1260 was detected at 4.5 µg/kg (HFBS0052, 1 foot bgs). - The unpaved area east of Building 4133 Aroclor 1254 was detected at 87.8 µg/kg and Aroclor 1260 was detected at 20.6 µg/kg (HFBS0055, 1 foot bgs). - The unpaved area southwest of Building 4133; Aroclor 1248 was detected at 62.6 µg/kg (HFBS0043, 1.5 feet bgs), Aroclor 1254 was detected up to 74.9 µg/kg (max at HFBS0093, 1 foot bgs), and Aroclor 1260 was detected up to 24.5 µg/kg (max at HFBS0093, 1 foot bgs). No PCBs were detected in the deeper sample collected in this area.	YES One groundwater sample was collected from RD-19 and analyzed for PCBs in 2008.	NO PCBs were not detected at RD-19.	NO Based on low mobility of PCBs and generally low concentrations detected in soil.	YES

TABLE B.3-2B
B4133 RFI SITE SUMMARY AND EVALUATION OF GROUNDWATER SAMPLING RESULTS
(PAGE 3 OF 5)

Analytical Group	Site Soil Impacts? (Summary of Relevant Impacts) ¹	Monitored in Groundwater? (Number of Samples/Date Range) ²	Constituents Detected in Groundwater? (Above GWCC or Regulatory Criteria?) ³	RFI Site Related?	Groundwater Characterized Sufficiently for Risk Assessment?
Dioxins	NO Dioxins were sampled for at two locations in the drainage area down-slope from the Western Drainage Debris Area. All detected congeners were at low concentrations, and only one, octachlorodibenzo-p-dioxin, was detected above background ranges. Calculated 2,3,7,8-TCDD TEQs were up to 0.135 pg/g – within background (maximum background TEQ 0.87 pg/g).	NO Groundwater samples have not been analyzed for dioxins at the B4133 RFI Site.	N/A	NO Dioxins are naturally occurring (background) in soil.	YES
Metals	YES Reactive metals, such as sodium, potassium, lithium, and zirconium, and contaminated equipment, were treated at the B4133 RFI Site through oxidation and conversion of those materials to caustic solutions. The caustic solutions were stored onsite in an underground tank (T-1) and an aboveground tank (T-3) until they could be transported offsite for disposal. • Arsenic was detected above background in 1 of 125 samples, at 17.5 mg/kg (max at HFBS0055, 1 foot bgs) in the unpaved area east of Building 4133. • Cadmium was detected above background in 3 of 125 samples, up to 2.3 mg/kg (max at HFBS0097, 1 foot bgs) in the asphalt-lined drainage to the east of the B4133 RFI Site. Cadmium was not detected above background at a depth greater than 1 foot bgs. • Cobalt was detected above background in 1 of 122 samples, at 94.3 mg/kg (max at HFBS0099) in the asphalt-lined drainage to the east of the Building 4133RFI site. • Copper was detected above background in 1 of 125 samples, at 44.8 mg/kg (max at HFBS0034, 1 foot bgs) in the asphalt-lined drainage to the east of the B4133 RFI Site. • Lead was detected above background in 1 of 125 samples, at 52 mg/kg (max at HFBS0034, 1 foot bgs) in the asphalt-lined drainage to the east of the B4133 RFI Site. • Mercury was detected above background in 2 of 120 samples, up to 0.22 mg/kg (max at HFBS0063, 0.75 feet bgs) south of the debris area west of Building 4133. Both mercury detections were at this location. • Potassium was detected above background in 2 of 128 samples, up to 11,000 mg/kg (max at B133-1, 2 feet bgs) adjacent to the air scrubber in 1988. Potassium was not detected above background ranges in recent sampling. • Sodium was detected above background in 35 of 134 samples, up to 6,900 mg/kg (max at B133-6, 0 feet bgs) in the now removed soil pile excavated from the site of the former Neutralizing Pit in 1988. In samples that have not been removed, sodium was detected up to 5,900 mg/kg (max at B133-2, 1.7 feet bgs) adjacent to the air scrubber in 1988. In recent sampling, sodium was detected up to 2,660 mg/kg (max at HFBS0079, 0.75 feet bgs) north of the Building 4133 RFI boundary. Detected sodium concentrations varied independent of depth. • Zinc was detected above background in 10 of 128 samples, up to 493 mg/kg (max at HFBS0100, 1 foot bgs) in the asphalt-lined drainage to the east of the B4133 RFI Site. Zinc was not detected above background at a depth greater than 1.5 ft. bgs.	YES Nine groundwater samples were collected and analyzed for metals at two B4133 RFI Site area groundwater monitoring locations (including RD-19 and SRE well RD-85 at) between 1989 and 2008.	YES Copper, manganese, and selenium were detected above respective GWCCs.	NO Copper was detected at a concentration less than 2x background in one soil sample at Building 4133, and copper concentrations at RD-19 were approximately 2% higher than the GWCC. Detections of manganese and selenium were followed by one or more samples below respective GWCCs, and these metals were not detected significantly above background in soil at the B4133 RFI Site. Other metals detected above background in soil were either not detected or detected below GWCCs.	YES

TABLE B.3-2B
B4133 RFI SITE SUMMARY AND EVALUATION OF GROUNDWATER SAMPLING RESULTS
(PAGE 4 OF 5)

Analytical Group	Site Soil Impacts? (Summary of Relevant Impacts) ¹	Monitored in Groundwater? (Number of Samples/Date Range) ²	Constituents Detected in Groundwater? (Above GWCC or Regulatory Criteria?) ³	RFI Site Related?	Groundwater Characterized Sufficiently for Risk Assessment?
	Barium, boron, and selenium were also detected around the B4133 RFI Site at concentrations slightly above background ranges.				
Inorganic Compounds	NO Fluoride was not detected above background range in any of the soil sampling conducted in and around the B4133 RFI Site.	YES One groundwater sample was collected from RD-19 and analyzed for inorganic compounds in 1989.	YES Several inorganic compounds were detected at RD-19, but none were detected above established MCLs.	NO	YES
Perchlorate	N/A Perchlorate was not analyzed for in samples at the B4133 RFI Site.	YES 10 groundwater samples were collected and analyzed for perchlorate at 2 B4133 RFI Site groundwater monitoring locations between 1999 and 2004.	YES Perchlorate was detected in one sample collected from RS-25 at a concentration below the reporting limit. Subsequent sampling included duplicate and split analyses to confirm the presence of perchlorate at RS-25, but perchlorate was not detected in any of these samples.	NO	YES
NDMA and formaldehyde (indicators of hydrazine)	NO NDMA was not detected in the sampling, and formaldehyde was not sampled for at the B4133 RFI Site.	YES One groundwater sample was collected from RD-19 and analyzed for NDMA in 1989.	NO NDMA was not detected, but it should be noted that the detection limit for this analysis was well above the screening level of 0.01 µg/L.	NO	YES Soil results do not warrant additional groundwater analyses for NDMA.
1,4-Dioxane	N/A 1,4-Dioxane was not sampled for at the B4133 RFI Site. 1,4-dioxane has historically been used as a stabilizer for 1,1,1-trichloroethane (TCA), which was not detected in any of the samples analyzed for VOCs.	YES Two groundwater samples were collected from RD-19 and analyzed for 1,4-dioxane in 1996 and 1997.	NO 1,4-dioxane was not detected in either of the samples collected. It should be noted that detection limits for these analyses were well above the screening level of 3 µg/L.	NO	YES The absence of 1,1,1-TCA in soil and groundwater does not warrant further sampling for 1,4-dioxane at the B4133 RFI Site.

Notes:

¹ See Table B.3-2A for a complete summary of soil impacts.
² All B4133 RFI Site groundwater monitoring locations are shown on Figure D-4 in Appendix D.
³ See Tables D-8 through D-25 for Groundwater Results.

TABLE B.3-2B
B4133 RFI SITE SUMMARY AND EVALUATION OF GROUNDWATER SAMPLING RESULTS
(PAGE 5 OF 5)

Acronyms:
bgs - below ground surface
BTEX - benzene, toluene, ethylbenzene, xylenes
CFGW - Chatsworth Formation groundwater
GWCC - Groundwater Comparison Concentrations
mg/kg - milligrams per kilogram
NDMA – nitrosodimethylamine
NSGW - near surface groundwater
PCB - polychlorinated biphenyl
pg/g – picograms per gram
RFI - Resource Conservation and Recovery Act (RCRA) Facility Investigation
SVOC - semivolatile organic compound
TCA - trichloroethane
TCE - trichloroethene
TEQ - Toxicity Equivalency Quotient
TPH - total petroleum hydrocarbons
VOC - volatile organic compound
µg/kg - micrograms per kilogram
µg/L - micrograms per liter

Reported B4133 RFI Site Removed Soil Maximum Concentrations
(Page 1 of 2)

Analyte (all concentrations are in mg/kg unless indicated)	Chemical Group	Neutraling Pit excavated soil August 25, 1988		Max Conc ¹	Analyte (all concentrations are in mg/kg unless indicated)	Chemical Group	Neutraling Pit excavated soil August 25, 1988		Max Conc ¹
		Max Conc ¹	Location ²				Max Conc ¹	Location ²	
Acetone	VOC	--	soil pile	ND	2,4-Dimethylphenol	SVOC	--	soil pile	ND
1,1,1-Trichloroethane	VOC	--	soil pile	ND	1,4-Dichlorobenzene	SVOC	--	soil pile	ND
Freon 113	VOC	--	soil pile	ND	2,4-Dinitrotoluene	SVOC	--	soil pile	ND
Methylene chloride	VOC	--	soil pile	ND	2,6-Dinitrotoluene	SVOC	--	soil pile	ND
1,1,2,2-Tetrachloroethane	VOC	--	soil pile	ND	2-Chloronaphthalene	SVOC	--	soil pile	ND
1,1,2-Trichloroethane	VOC	--	soil pile	ND	2-Chlorophenol	SVOC	--	soil pile	ND
1,1-Dichloroethane	VOC	--	soil pile	ND	2-Nitrophenol	SVOC	--	soil pile	ND
1,1-Dichloroethene	VOC	--	soil pile	ND	3,3'-Dichlorobenzidine	SVOC	--	soil pile	ND
1,2-Dichlorobenzene	VOC	--	soil pile	ND	4,6-Dinitro-o-cresol	SVOC	--	soil pile	ND
1,2-Dichloroethane	VOC	--	soil pile	ND	4-Bromophenyl phenyl ether	SVOC	--	soil pile	ND
1,2-Dichloropropane	VOC	--	soil pile	ND	4-Chlorophenylphenyl ether	SVOC	--	soil pile	ND
1,3-Dichlorobenzene	VOC	--	soil pile	ND	4-Nitrophenol	SVOC	--	soil pile	ND
1,4-Dichlorobenzene	VOC	--	soil pile	ND	Acenaphthene	SVOC	--	soil pile	ND
Benzene	VOC	--	soil pile	ND	Acenaphthylene	SVOC	--	soil pile	ND
Bromomethane	VOC	--	soil pile	ND	Anthracene	SVOC	--	soil pile	ND
Chloroethane	VOC	--	soil pile	ND	Benzidine	SVOC	--	soil pile	ND
Chloromethane	VOC	--	soil pile	ND	Benzo(a)anthracene	SVOC	--	soil pile	ND
Vinyl chloride	VOC	--	soil pile	ND	Benzo(a)pyrene	SVOC	--	soil pile	ND
1,1,1-Trichloroethane	VOC	--	soil pile	ND	Benzo(b)fluoranthene	SVOC	--	soil pile	ND
1,1,2,2-Tetrachloroethane	VOC	--	soil pile	ND	Benzo(ghi)perylene	SVOC	--	soil pile	ND
1,1,2-Trichloroethane	VOC	--	soil pile	ND	Benzo(k)fluoranthene	SVOC	--	soil pile	ND
1,1-Dichloroethane	VOC	--	soil pile	ND	bis(2-Chloroethoxy)methane	SVOC	--	soil pile	ND
1,1-Dichloroethene	VOC	--	soil pile	ND	bis(2-Chloroethyl) ether	SVOC	--	soil pile	ND
1,2-Dichloroethane	VOC	--	soil pile	ND	bis(2-Chloroisopropyl) ether	SVOC	--	soil pile	ND
1,2-Dichloropropane	VOC	--	soil pile	ND	bis(2-Ethylhexyl) phthalate	SVOC	--	soil pile	ND
1,3-Dichloropropene	VOC	--	soil pile	ND	Butyl benzyl phthalate	SVOC	--	soil pile	ND
Benzene	VOC	--	soil pile	ND	Chrysene	SVOC	--	soil pile	ND
Bromodichloromethane	VOC	--	soil pile	ND	Dibenzo(a,h)anthracene	SVOC	--	soil pile	ND
Bromoform	VOC	--	soil pile	ND	Diethyl phthalate	SVOC	--	soil pile	ND
Carbon Tetrachloride	VOC	--	soil pile	ND	Dimethyl phthalate	SVOC	--	soil pile	ND
Chlorobenzene	VOC	--	soil pile	ND	Di-n-butyl phthalate	SVOC	40 µg/kg	soil pile	40 µg/kg
Chloroform	VOC	--	soil pile	ND	Di-n-octyl phthalate	SVOC	--	soil pile	ND
Dibromochloromethane	VOC	--	soil pile	ND	Fluoranthene	SVOC	--	soil pile	ND
Ethylbenzene	VOC	--	soil pile	ND	Fluorene	SVOC	--	soil pile	ND
Methylene chloride	VOC	--	soil pile	ND	Hexachlorobenzene	SVOC	--	soil pile	ND
Tetrachloroethene	VOC	--	soil pile	ND	Hexachlorobutadiene	SVOC	--	soil pile	ND
Toluene	VOC	--	soil pile	ND	Hexachlorocyclopentadiene	SVOC	--	soil pile	ND
trans-1,2-Dichloroethene	VOC	--	soil pile	ND	Hexachloroethane	SVOC	--	soil pile	ND
Trichloroethene	VOC	--	soil pile	ND	Indeno(1,2,3-cd)pyrene	SVOC	--	soil pile	ND
Gasoline Range Organics (C9-C22)	TPH	0.3 mg/kg	soil pile	0.3 mg/kg	Isophorone	SVOC	--	soil pile	ND
Sodium	Metals	6,900 mg/kg	soil pile	6,900 mg/kg	Naphthalene	SVOC	--	soil pile	ND
Potassium	Metals	3,300 mg/kg	soil pile	3,300 mg/kg	Nitrobenzene	SVOC	--	soil pile	ND
pH	pH	9.6	soil pile	9.6	n-Nitrosodimethylamine	SVOC	--	soil pile	ND
2,4-Dinitrophenol	SVOC	--	soil pile	ND	n-Nitrosodi-n-propylamine	SVOC	--	soil pile	ND
Pentachlorophenol	SVOC	--	soil pile	ND	n-Nitrosodiphenylamine	SVOC	--	soil pile	ND
1,2,4-Trichlorobenzene	SVOC	--	soil pile	ND	p-Chloro-m-cresol	SVOC	--	soil pile	ND
1,2-Dichlorobenzene	SVOC	--	soil pile	ND	2,4,6-Trichlorophenol	SVOC	--	soil pile	ND
1,2-Diphenylhydrazine	SVOC	--	soil pile	ND	Phenanthrene	SVOC	--	soil pile	ND
1,3-Dichlorobenzene	SVOC	--	soil pile	ND	Phenol	SVOC	--	soil pile	ND
2,4-Dichlorophenol	SVOC	--	soil pile	ND	Pyrene	SVOC	--	soil pile	ND

Table B.3-2D

Reported B4133 RFI Site Removed Soil Maximum Concentrations

(Page 2 of 2)

Analyte (all concentrations are in mg/kg unless indicated)	Chemical Group	Neutraling Pit excavated soil August 25, 1988		Max Conc ¹	Analyte (all concentrations are in mg/kg unless indicated)	Chemical Group	Neutraling Pit excavated soil August 25, 1988		Max Conc ¹
		Max Conc ¹	Location ²				Max Conc ¹	Location ²	

Acronyms:

Max Conc - Maximum Concentration

mg/kg - miligrams per kilogram

ND - non-detection

RFI - Resource Conservation and Recovery Act Facility Investigation

SVOC - semivolatile organic compound

TPH - total petroleum hydrocarbon

VOC - volatile organic compound

µg/kg - micrograms per kilogram

Notes:

'--' Indicates parameter not applicable or sample not analyzed.

¹ Concentrations indicated are the maximum concentrations reported in removed soil at the Building 4133 RFI site.

² The sample was collected from a soil pile north of Building 4133; however, the soil pile was excavated from the area around the former Neutralizing Pit..

TABLE B.3-3A
B4133 RFI SITE ANALYTICAL DATA SCREENING SUMMARY AND DATA QUALITY (SOIL)
(Page 1 of 4)

TABLE B.3-3A

Analyte Group	Constituent	Units	Screening Levels (1)			Total Number Samples Analyzed	Detect Data Summary						Non-Detect Data Summary						Data Issue (5)	Issue Resolution (6)	
			Residential (ResRBSL)	Ecological (EcoRBSL)	Background (2)		Total Samples w/ Detections	Minimum Detected Concentration	Maximum Detected Concentration	Number of Detected Concentrations > Res RBSL	Number of Detected Concentrations > Eco RBSL	Number of Detected Concentrations > Background	Total Samples ND	Minimum Detection Limit	Maximum Detection Limit	Number DLs > ResRBSL	NumberDL > EcoRBSL	Number DL > Background			
Dioxin/Furan (ng/kg)																					
	1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	2500000	1121	2.5	2	2	0.356	0.619	0	0	0	0	0	0	0	0	0	--	--	
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	13000000	959	13	2	1	3.24	3.24	0	0	0	1	4.36	4.36	0	0	0	--	--	
	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	190000	427	0.19	2	0	0	0	0	0	0	2	0.0968	0.112	0	0	0	--	--	
	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	730000	47	0.73	2	0	0	0	0	0	0	2	0.0461	0.0572	0	0	0	--	--	
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	340000	45	0.34	2	0	0	0	0	0	0	2	0.0468	0.0642	0	0	0	--	--	
	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	300000	54	0.30	2	1	0.167	0.167	0	0	0	1	0.0434	0.0434	0	0	0	--	--	
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	950000	106	0.95	2	2	0.082	0.0953	0	0	0	0	0	0	0	0	0	--	--	
	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	430000	43	0.43	2	1	0.114	0.114	0	0	0	1	0.0616	0.0616	0	0	0	--	--	
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	1100000	44	1.1	2	1	0.0903	0.0903	0	0	0	1	0.0506	0.0506	0	0	0	--	--	
	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	590000	169	0.59	2	0	0	0	0	0	0	2	0.0599	4.36	0	0	1	--	--	
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	180000	4.4	0.18	2	0	0	0	0	0	0	2	0.0415	0.113	0	0	0	--	--	
	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	450000	49	0.45	2	0	0	0	0	0	0	2	0.0461	0.0555	0	0	0	--	--	
	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	640000	16	0.64	2	0	0	0	0	0	0	2	0.0639	4.36	0	0	1	--	--	
	2,3,7,8-TCDD	ng/kg	500000	4.3	0.50	2	0	0	0	0	0	0	2	0.0202	0.0706	0	0	0	--	--	
	2,3,7,8-Tetrachlorodibenzofuran	ng/kg	1800000	43	1.8	2	0	0	0	0	0	0	2	0.836	0.872	0	0	0	--	--	
	Heptachlorodibenzofurans	ng/kg	NA (4)	NA (4)	NA (3)	2	2	0.656	1.15	NA (4)	NA (4)	NA (3)	0	0	0	NA (4)	NA (4)	NA (3)	--	--	
	Heptachlorodibenzo-p-dioxins	ng/kg	NA (4)	NA (4)	NA (3)	2	2	3.19	7.15	NA (4)	NA (4)	NA (3)	0	0	0	NA (4)	NA (4)	NA (3)	--	--	
	Hexachlorodibenzofurans	ng/kg	NA (4)	NA (4)	NA (3)	2	2	0.462	1.38	NA (4)	NA (4)	NA (3)	0	0	0	NA (4)	NA (4)	NA (3)	--	--	
	Hexachlorodibenzo-p-dioxins	ng/kg	NA (4)	NA (4)	NA (3)	2	1	0.415	0.415	NA (4)	NA (4)	NA (3)	1	0.375	0.375	NA (4)	NA (4)	NA (3)	--	--	
	Octachlorodibenzofuran	ng/kg	8100000	32363	8.1	2	0	0	0	0	0	0	2	8.36	8.72	0	0	2	--	--	
	Octachlorodibenzo-p-dioxin	ng/kg	140000000	38660	140	2	1	165	165	0	0	1	1	12.1	12.1	0	0	0	--	--	
Pentachlorodibenzofurans	ng/kg	NA (4)	NA (4)	NA (3)	2	2	0.386	0.551	NA (4)	NA (4)	NA (3)	0	0	0	NA (4)	NA (4)	NA (3)	--	--		
Pentachlorodibenzo-p-dioxins	ng/kg	NA (4)	NA (4)	NA (3)	2	0	0	0	NA (4)	NA (4)	NA (3)	2	0.075	0.113	NA (4)	NA (4)	NA (3)	--	--		
TCDD TEQ (ND = 0) 2005 WHO	ng/kg	NA (4)	NA (4)	NA (3)	2	2	0.01176	0.13475	NA (4)	NA (4)	NA (3)	0	0	0	NA (4)	NA (4)	NA (3)	--	--		
Tetrachlorodibenzofurans	ng/kg	NA (4)	NA (4)	NA (3)	2	1	0.858	0.858	NA (4)	NA (4)	NA (3)	1	0.836	0.836	NA (4)	NA (4)	NA (3)	--	--		
Tetrachlorodibenzo-p-dioxins	ng/kg	NA (4)	NA (4)	NA (3)	2	1	0.232	0.232	NA (4)	NA (4)	NA (3)	1	0.0202	0.0202	NA (4)	NA (4)	NA (3)	--	--		
Herbicide (µg/kg)																					
	2,4,5-T	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	55.4	55.4	NA (4)	NA (4)	NA (3)	--	--	
	2,4,5-Trichlorophenoxypropionic acid	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	55.4	55.4	NA (4)	NA (4)	NA (3)	--	--	
	2,4-Dichlorophenoxyacetic Acid (2,4-D)	µg/kg	686090	NA (4)	NA (3)	1	0	0	0	0	NA (4)	NA (3)	1	55.4	55.4	0	NA (4)	NA (3)	--	--	
Inorganics																					
	% Solids	%	NA (4)	NA (4)	NA (3)	4	4	91	97	NA (4)	NA (4)	NA (3)	0	0	0	NA (4)	NA (4)	NA (3)	--	--	
	Fluoride	mg/kg	NA (4)	NA (4)	NA (3)	11	10	0.918	3.98	NA (4)	NA (4)	NA (3)	1	0.34	0.34	NA (4)	NA (4)	NA (3)	--	--	
	Moisture	%	NA (4)	NA (4)	NA (3)	161	161	1.11	31.7	NA (4)	NA (4)	NA (3)	0	0	0	NA (4)	NA (4)	NA (3)	--	--	
	pH	pH Units	NA (4)	NA (4)	NA (3)	146	146	6.12	11.8	NA (4)	NA (4)	NA (3)	0	0	0	NA (4)	NA (4)	NA (3)	--	--	
METALS (mg/kg)																					
	Aluminum	mg/kg	75000	12	20000	132	132	6430	15000	0	132	0	0	0	0	0	0	0	--	--	
	Antimony	mg/kg	30	0.095	8.7	132	24	0.33	5.3	0	24	0	108	0.304	5.35	0	108	0	Elevated DL	b	
	Arsenic	mg/kg	0.095	1.9	15	137	137	1.8	17.5	137	136	1	0	0	0	0	0	0	--	--	
	Barium	mg/kg	15000	15	140	136	136	35.5	162	0	136	1	0	0	0	0	0	0	--	--	
	Beryllium	mg/kg	150	5.1	1.1	132	132	0.32	0.98	0	0	0	0	0	0	0	0	0	--	--	
	Boron	mg/kg	15000	6.8	9.7	132	66	1.1	10	0	2	1	66	0.994	5.87	0	0	0	--	--	
	Cadmium	mg/kg	78	0.021	1	136	129	0.047	2.3	0	129	3	7	0.0984	0.215	0	7	0	Elevated DL	b	
	Chromium	mg/kg	114000	930	37	132	132	9	34.9	0	0	0	0	0	0	0	0	0	--	--	
	Cobalt	mg/kg	23	8.9	21	132	132	2.7	94.3	1	8	1	0	0	0	0	0	0	--	--	
	Copper	mg/kg	3000	1.1	29	136	136	4.1	44.8	0	136	1	0	0	0	0	0	0	--	--	
	Hexavalent Chromium	mg/kg	110	0.20	NA (3)	71	12	0.0506	0.524	0	3	NA (3)	59	0.0213	0.555	0	5	NA (3)	Elevated DL	a, c	
	Lead	mg/kg	150	0.063	34	136	136	3	52	0	136	1	0	0	0	0	0	0	--	--	
	Lithium	mg/kg	152.2	10	37	132	132	13.4	33.9	0	132	0	0	0	0	0	0	0	--	--	
	Mercury	mg/kg	23	0.10	0.09	129	120	0.0017	0.22	0	2	2	9	0.00141	0.0061	0	0	0	--	--	
	Molybdenum	mg/kg	380	0.11	5.3	132	55	0.2	5	0	55	0	77	0.16	1.1	0	77	0	Elevated DL	b	
	Nickel	mg/kg	1500	0.10	29	132	132	5.2	21.2	0	132	0	0	0	0	0	0	0	--	--	
	Potassium	mg/kg	NA (4)	NA (4)	6400	138	138	673	11000	NA (4)	NA (4)	2	0	0	0	0	NA (4)	NA (4)	0	--	--
	Selenium	mg/kg	380	0.17	0.66	136	4	0.38	0.89	0	4	3	132	0.49	2.76	0	132	14	Elevated DL	b, c	
	Silver	mg/kg	380	0.54	0.79	132	51	0.019	0.12	0	0	0	81	0.0393	0.0455	0	0	0	--	--	
	Sodium	mg/kg	NA (4)	NA (4)	110	145	46	68.3	6900	NA (4)	NA (4)	42	99	55.2	322	NA (4)	NA (4)	76	--	--	
	Thallium	mg/kg	4.9	2.9	0.46	132	125	0.15	0.33	0	0	0	7	0.197	0.24	0	0	0	--	--	
	Vanadium	mg/kg	369	1.5	62	132	132	18.9	58.1	0	132	0	0	0	0	0	0	0	--	--	
	Zinc	mg/kg	23000	21	110	137	137	30.4	792	0	137	10	0	0	0	0	0	0	--	--	
	Zirconium	mg/kg	NA (4)	7.4	8.6	126	122	0.95	5.8	NA (4)	0	0	4	0.64	1.3	NA (4)	0	0	--	--	
PCB (µg/kg)																					
	Aroclor 1016	µg/kg	140	1563	NA (3)	41	0	0	0	0	0	NA (3)	41	3.36	88	0	0	NA (3)	--	--	
	Aroclor 1221	µg/kg	140	1563	NA (3)	41	0	0	0	0	0	NA (3)	41								

TABLE B.3-3A
B4133 RFI SITE ANALYTICAL DATA SCREENING SUMMARY AND DATA QUALITY (SOIL)
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TABLE B.3-3A

Analyte Group	Constituent	Units	Screening Levels (1)			Total Number Samples Analyzed	Detect Data Summary						Non-Detect Data Summary						Data Issue (5)	Issue Resolution (6)
			Residential (ResRBSL)	Ecological (EcoRBSL)	Background (2)		Total Samples w/ Detections	Minimum Detected Concentration	Maximum Detected Concentration	Number of Detected Concentrations > Res RBSL	Number of Detected Concentrations > Eco RBSL	Number of Detected Concentrations > Background	Total Samples ND	Minimum Detection Limit	Maximum Detection Limit	Number DLs > ResRBSL	NumberDL > EcoRBSL	Number DL > Background		
	Aroclor 1260	µg/kg	140	78	NA (3)	41	17	2.1	55.5	0	0	NA (3)	24	3.36	88	0	1	NA (3)	Elevated DL	a
Pesticide (µg/kg)																				
	4,4'-DDD	µg/kg	3573	12	NA (3)	1	0	0	0	0	0	NA (3)	1	1.48	1.48	0	0	NA (3)	--	--
	4,4'-DDE	µg/kg	2522	12	NA (3)	1	0	0	0	0	0	NA (3)	1	1.48	1.48	0	0	NA (3)	--	--
	4,4'-DDT	µg/kg	2522	12	NA (3)	1	0	0	0	0	0	NA (3)	1	1.48	1.48	0	0	NA (3)	--	--
	a-Chlordane	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	0.74	0.74	NA (4)	NA (4)	NA (3)	--	--
	Aldrin	µg/kg	50	427	NA (3)	1	0	0	0	0	0	NA (3)	1	0.74	0.74	0	0	NA (3)	--	--
	alpha-BHC	µg/kg	318	214	NA (3)	1	0	0	0	0	0	NA (3)	1	0.74	0.74	0	0	NA (3)	--	--
	beta-BHC	µg/kg	572	214	NA (3)	1	0	0	0	0	0	NA (3)	1	0.74	0.74	0	0	NA (3)	--	--
	delta-BHC	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	0.74	0.74	NA (4)	NA (4)	NA (3)	--	--
	Dieldrin	µg/kg	54	85	NA (3)	1	0	0	0	0	0	NA (3)	1	1.48	1.48	0	0	NA (3)	--	--
	Endosulfan I	µg/kg	411654	641	NA (3)	1	0	0	0	0	0	NA (3)	1	0.74	0.74	0	0	NA (3)	--	--
	Endosulfan II	µg/kg	411654	641	NA (3)	1	0	0	0	0	0	NA (3)	1	1.48	1.48	0	0	NA (3)	--	--
	Endosulfan sulfate	µg/kg	411654	641	NA (3)	1	0	0	0	0	0	NA (3)	1	1.48	1.48	0	0	NA (3)	--	--
	Endrin	µg/kg	20583	44	NA (3)	1	0	0	0	0	0	NA (3)	1	1.48	1.48	0	0	NA (3)	--	--
	Endrin aldehyde	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	1.48	1.48	NA (4)	NA (4)	NA (3)	--	--
	Endrin ketone	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	1.48	1.48	NA (4)	NA (4)	NA (3)	--	--
	gamma-BHC	µg/kg	780	214	NA (3)	1	0	0	0	0	0	NA (3)	1	0.74	0.74	0	0	NA (3)	--	--
	gamma-Chlordane	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	0.74	0.74	NA (4)	NA (4)	NA (3)	--	--
	Heptachlor	µg/kg	209	555	NA (3)	1	0	0	0	0	0	NA (3)	1	0.74	0.74	0	0	NA (3)	--	--
	Heptachlor epoxide	µg/kg	156	5.3	NA (3)	1	0	0	0	0	0	NA (3)	1	0.74	0.74	0	0	NA (3)	--	--
	p,p'-Methoxychlor	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	7.4	7.4	NA (4)	NA (4)	NA (3)	--	--
	Toxaphene	µg/kg	715	34168	NA (3)	1	0	0	0	0	0	NA (3)	1	37	37	0	0	NA (3)	--	--
SVOC (µg/kg)																				
	1,2,4-Trichlorobenzene	µg/kg	142	20000	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	4	0	NA (3)	Elevated DL	a, d
	1,2-Dichlorobenzene	µg/kg	1800	370000	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	0	0	NA (3)	--	--
	1,2-Diphenylhydrazine	µg/kg	NA (4)	NA (4)	NA (3)	7	0	0	0	NA (4)	NA (4)	NA (3)	7	30	369	NA (4)	NA (4)	NA (3)	--	--
	1,3-Dichlorobenzene	µg/kg	1700	160165	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	0	0	NA (3)	--	--
	1,4-Dichlorobenzene	µg/kg	5.6	20000	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	7	0	NA (3)	Elevated DL	d, f
	1-Methyl naphthalene	µg/kg	NA (4)	NA (4)	NA (3)	57	2	1.4	67.7	NA (4)	NA (4)	NA (3)	55	1.8	74.7	NA (4)	NA (4)	NA (3)	--	--
	2,4,5-Trichlorophenol	µg/kg	5700000	9000	NA (3)	1	0	0	0	0	0	NA (3)	1	369	369	0	0	NA (3)	--	--
	2,4,6-Trichlorophenol	µg/kg	10000	10000	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	0	0	NA (3)	--	--
	2,4-Dichlorophenol	µg/kg	170000	1281	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	0	0	NA (3)	--	--
	2,4-Dimethylphenol	µg/kg	1100000	110000	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	0	0	NA (3)	--	--
	2,4-Dinitrophenol	µg/kg	110000	590	NA (3)	7	0	0	0	0	0	NA (3)	7	200	739	0	1	NA (3)	Elevated DL	a
	2,4-Dinitrotoluene	µg/kg	NA (4)	NA (4)	NA (3)	7	0	0	0	NA (4)	NA (4)	NA (3)	7	30	369	NA (4)	NA (4)	NA (3)	--	--
	2,6-Dinitrotoluene	µg/kg	NA (4)	NA (4)	NA (3)	7	0	0	0	NA (4)	NA (4)	NA (3)	7	30	369	NA (4)	NA (4)	NA (3)	--	--
	2-Chloronaphthalene	µg/kg	4600000	530000	NA (3)	7	0	0	0	0	0	NA (3)	7	30	300	0	0	NA (3)	--	--
	2-Chlorophenol	µg/kg	290000	21355	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	0	0	NA (3)	--	--
	2-Methylnaphthalene	µg/kg	230000	210000	NA (3)	57	2	1.9	148	0	0	NA (3)	55	1.8	74.7	0	0	NA (3)	--	--
	2-Nitroaniline	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	369	369	NA (4)	NA (4)	NA (3)	--	--
	2-Nitrophenol	µg/kg	NA (4)	11532	NA (3)	7	0	0	0	NA (4)	0	NA (3)	7	30	369	NA (4)	0	NA (3)	--	--
	3,3'-Dichlorobenzidine	µg/kg	NA (4)	NA (4)	NA (3)	7	0	0	0	NA (4)	NA (4)	NA (3)	7	60	600	NA (4)	NA (4)	NA (3)	--	--
	3-Nitroaniline	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	369	369	NA (4)	NA (4)	NA (3)	--	--
	4,6-Dinitro-o-cresol	µg/kg	NA (4)	NA (4)	NA (3)	7	0	0	0	NA (4)	NA (4)	NA (3)	7	200	369	NA (4)	NA (4)	NA (3)	--	--
	4-Bromophenyl phenyl ether	µg/kg	NA (4)	NA (4)	NA (3)	7	0	0	0	NA (4)	NA (4)	NA (3)	7	30	369	NA (4)	NA (4)	NA (3)	--	--
	4-Chlorophenylphenyl ether	µg/kg	NA (4)	NA (4)	NA (3)	7	0	0	0	NA (4)	NA (4)	NA (3)	7	30	369	NA (4)	NA (4)	NA (3)	--	--
	4-Nitrophenol	µg/kg	NA (4)	7000	NA (3)	7	0	0	0	NA (4)	0	NA (3)	7	200	369	NA (4)	0	NA (3)	--	--
	Acenaphthene	µg/kg	3400000	2456	NA (3)	63	0	0	0	0	0	NA (3)	63	1.7	300	0	0	NA (3)	--	--
	Acenaphthylene	µg/kg	3400000	270384	NA (3)	63	1	2.1	2.1	0	0	NA (3)	62	1.7	300	0	0	NA (3)	--	--
	Aniline	µg/kg	130000	10678	NA (3)	1	0	0	0	0	0	NA (3)	1	369	369	0	0	NA (3)	--	--
	Anthracene	µg/kg	17000000	2384	NA (3)	63	1	1.1	1.1	0	0	NA (3)	62	1.7	300	0	0	NA (3)	--	--
	Benzidine	µg/kg	NA (4)	NA (4)	NA (3)	7	0	0	0	NA (4)	NA (4)	NA (3)	7	200	2000	NA (4)	NA (4)	NA (3)	--	--
	Benzo(a)anthracene	µg/kg	600	1418	NA (3)	63	2	0.19	1.5	0	0	NA (3)	61	1.7	300	0	0	NA (3)	--	--
	Benzo(a)pyrene	µg/kg	60	5595	NA (3)	63	3	0.43	11.7	0	0	NA (3)	60	1.7	300	4	0	NA (3)	Elevated DL	a, d
	Benzo(b)fluoranthene	µg/kg	600	4360	NA (3)	63	5	0.63	20.8	0	0	NA (3)	58	16.8	300	0	0	NA (3)	--	--
	Benzo(ghi)perylene	µg/kg	NA (4)	NA (4)	NA (3)	63	2	0.27	2.6	NA (4)	NA (4)	NA (3)	61	1.7	300	NA (4)	NA (4)	NA (3)	--	--
	Benzo(k)fluoranthene	µg/kg	600	5763	NA (3)	62	1	0.88	0.88	0	0	NA (3)	61	1.7	300	0	0	NA (3)	--	--
	Benzoic acid	µg/kg	230000000	4438	NA (3)	1	0	0	0	0	0	NA (3)	1	739	739	0	0	NA (3)	--	--
	Benzyl alcohol	µg/kg	17000000	4438	NA (3)	1	0	0	0	0	0	NA (3)	1	369	369	0	0	NA (3)	--	--
	bis(2-Chloroethoxy)methane	µg/kg	NA (4)	150000	NA (3)	7	0	0	0	NA (4)	0	NA (3)	7	30	369	NA (4)	0	NA (3)	--	--
	bis(2-Chloroethyl) ether	µg/kg	NA (4)	NA (4)	NA (3)	7	0	0	0	NA (4)	NA (4)	NA (3)	7	30	369	NA (4)	NA (4)	NA (3)	--	--
	bis(2-Chloroisopropyl) ether	µg/kg	NA (4)	NA (4)	NA (3)	7	0	0	0	NA (4)	NA (4)	NA (3)	7	30	369	NA (4)	NA (4)	NA (3)	--	--
	bis(2-Ethylhexyl) phthalate	µg/kg	NA (4)	NA (4)	NA (3)	63	15	5.84	100	NA (4)	NA (4)	NA (3)	48	17.3	300	NA (4)	NA (4)	NA (3)	--	--
	Butyl benzyl phthalate	µg/kg	377249	339549	NA (3)	63	4	0.65	20.2	0	0	NA (3)	59	16.8	369	0	0	NA (3)	--	--
	Chrysene	µg/kg	6000	2359	NA (3)	63	4	0.31	12.4	0	0	NA (3)	59	16.8	300	0	0	NA (3)	--	--
	Dibenzo(a,h)anthracene	µg/kg	NA (4)	NA (4)	NA (3)	63	0	0	0	NA (4)	NA (4)	NA (3)	63	1.7	300	NA (4)	NA (4)	NA (3)	--	--
	Dibenzofuran	µg/kg	110000	62000	NA (3)	1	0	0	0	0	0	NA (3)	1	369	369	0	0	NA (3)	--	--
	Diethyl phthalate	µg/kg	NA (4)	NA (4)	NA (3)	63	2	6.38	7.97	NA (4)	NA (4)	NA (3)	61	16.8	369	NA (4)	NA (4)	NA (3)	--	--
	Dimethyl phthalate	µg/kg	570000000	4438	NA (3)	63	1	7.72	7.72	0	0	NA (3)	62	16.8	369	0	0	NA (3)	--	--

TABLE B.3-3A
B4133 RFI SITE ANALYTICAL DATA SCREENING SUMMARY AND DATA QUALITY (SOIL)
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TABLE B.3-3A

Analyte Group	Constituent	Units	Screening Levels (1)			Total Number Samples Analyzed	Detect Data Summary						Non-Detect Data Summary						Data Issue (5)	Issue Resolution (6)
			Residential (ResRBSL)	Ecological (EcoRBSL)	Background (2)		Total Samples w/ Detections	Minimum Detected Concentration	Maximum Detected Concentration	Number of Detected Concentrations > Res RBSL	Number of Detected Concentrations > Eco RBSL	Number of Detected Concentrations > Background	Total Samples ND	Minimum Detection Limit	Maximum Detection Limit	Number DLs > ResRBSL	NumberDL > EcoRBSL	Number DL > Background		
	Di-n-butyl phthalate	µg/kg	NA (4)	NA (4)	NA (3)	63	9	1.1	40	NA (4)	NA (4)	NA (3)	54	16.9	369	NA (4)	NA (4)	NA (3)	--	--
	Di-n-octyl phthalate	µg/kg	2300000	13000	NA (3)	63	1	4.9	4.9	0	0	NA (3)	62	16.8	369	0	0	NA (3)	--	--
	Diphenylamine	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	369	369	NA (4)	NA (4)	NA (3)	--	--
	Fluoranthene	µg/kg	2300000	38000	NA (3)	63	7	0.25	17.8	0	0	NA (3)	56	16.8	300	0	0	NA (3)	--	--
	Fluorene	µg/kg	2300000	1646	NA (3)	63	0	0	0	0	0	NA (3)	63	1.7	300	0	0	NA (3)	--	--
	Hexachlorobenzene	µg/kg	400	342	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	0	1	NA (3)	Elevated DL	a
	Hexachlorobutadiene	µg/kg	9200	854	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	0	0	NA (3)	--	--
	Hexachlorocyclopentadiene	µg/kg	340000	12813	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	0	0	NA (3)	--	--
	Hexachloroethane	µg/kg	18000	2136	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	0	0	NA (3)	--	--
	Indeno(1,2,3-cd)pyrene	µg/kg	600	5821	NA (3)	63	1	0.93	0.93	0	0	NA (3)	62	1.7	300	0	0	NA (3)	--	--
	Isophorone	µg/kg	750000	320329	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	0	0	NA (3)	--	--
	Naphthalene	µg/kg	1146591	210000	NA (3)	63	5	0.38	537	0	0	NA (3)	58	16.8	300	0	0	NA (3)	--	--
	Nitrobenzene	µg/kg	29000	1965	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	0	0	NA (3)	--	--
	n-Nitrosodimethylamine	µg/kg	45	20000	NA (3)	63	0	0	0	0	0	NA (3)	63	1.7	369	5	0	NA (3)	Elevated DL	a, d, f
	n-Nitrosodi-n-propylamine	µg/kg	100	27762	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	4	0	NA (3)	Elevated DL	a, d
	n-Nitrosodiphenylamine	µg/kg	80000	20000	NA (3)	6	0	0	0	0	0	NA (3)	6	30	300	0	0	NA (3)	--	--
	o-Cresol	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	369	369	NA (4)	NA (4)	NA (3)	--	--
	p-Chloroaniline	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	369	369	NA (4)	NA (4)	NA (3)	--	--
	p-Chloro-m-cresol	µg/kg	NA (4)	NA (4)	NA (3)	7	0	0	0	NA (4)	NA (4)	NA (3)	7	30	369	NA (4)	NA (4)	NA (3)	--	--
	p-Cresol	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	369	369	NA (4)	NA (4)	NA (3)	--	--
	Pentachlorophenol	µg/kg	8800	6000	NA (3)	7	0	0	0	0	0	NA (3)	7	200	369	0	0	NA (3)	--	--
	Phenanthrene	µg/kg	17000000	1314	NA (3)	63	2	1.2	2.4	0	0	NA (3)	61	16.8	300	0	0	NA (3)	--	--
	Phenol	µg/kg	18000000	5015	NA (3)	7	0	0	0	0	0	NA (3)	7	30	369	0	0	NA (3)	--	--
	p-Nitroaniline	µg/kg	NA (4)	NA (4)	NA (3)	1	0	0	0	NA (4)	NA (4)	NA (3)	1	369	369	NA (4)	NA (4)	NA (3)	--	--
	Pyrene	µg/kg	1700000	18000	NA (3)	63	8	0.21	15.8	0	0	NA (3)	55	16.8	300	0	0	NA (3)	--	--
TPH (mg/kg)																				
	Diesel Range Organics (C15-C20)	mg/kg	1400	NA (4)	NA (3)	136	2	2.04	5.7	0	NA (4)	NA (3)	134	3.37	356	0	NA (4)	NA (3)	--	--
	Gasoline Range Organics (C08-C11)	mg/kg	1.1	NA (4)	NA (3)	136	6	1.33	1410	6	NA (4)	NA (3)	130	3.37	356	130	NA (4)	NA (3)	Elevated DL	a, d, f
	Gasoline Range Organics (C9-C22)	mg/kg	1400	NA (4)	NA (3)	6	6	0.2	0.9	0	NA (4)	NA (3)	0	0	0	0	NA (4)	NA (3)	--	--
	Kerosene Range Organics (C12-C14)	mg/kg	1400	NA (4)	NA (3)	136	5	1.19	2460		NA (4)	NA (3)	131	3.37	356	0	NA (4)	NA (3)	--	--
	Lubricant Oil Range Organics (C21-C30)	mg/kg	1400	NA (4)	NA (3)	136	99	1.36	717	0	NA (4)	NA (3)	37	3.37	191	0	NA (4)	NA (3)	--	--
VOC (µg/kg)																				
	1,1,1,2-Tetrachloroethane	µg/kg	2.0	76281	NA (3)	25	0	0	0	0	0	NA (3)	25	0.914	860	1.0	0	NA (3)	Elevated DL	e
	1,1,1-Trichloroethane	µg/kg	1114	4300000	NA (3)	31	0	0	0	0	0	NA (3)	31	0.914	860	0	0	NA (3)	--	--
	1,1,2,2-Tetrachloroethane	µg/kg	1.4	5979	NA (3)	31	0	0	0	0	0	NA (3)	31	0.914	860	10	0	NA (3)	Elevated DL	a, d, e
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/kg	16000	582999	NA (3)	25	0	0	0	0	0	NA (3)	25	4.57	4300	0	0	NA (3)	--	--
	1,1,2-Trichloroethane	µg/kg	1.2	8329	NA (3)	31	0	0	0	0	0	NA (3)	31	0.914	860	12	0	NA (3)	Elevated DL	a, d, e
	1,1-Dichloroethane	µg/kg	1.6	210000	NA (3)	31	0	0	0	0	0	NA (3)	31	0.914	860	8	0	NA (3)	Elevated DL	a, d, e
	1,1-Dichloroethene	µg/kg	8.0	10678	NA (3)	31	0	0	0	0	0	NA (3)	31	0.914	860	1	0	NA (3)	Elevated DL	e
	1,1-Dichloropropene	µg/kg	NA (4)	NA (4)	NA (3)	25	0	0	0	NA (4)	NA (4)	NA (3)	25	0.914	860	NA (4)	NA (4)	NA (3)	--	--
	1,2,3-Trichlorobenzene	µg/kg	142	20000	NA (3)	25	0	0	0	0	0	NA (3)	25	0.914	860	1	0	NA (3)	Elevated DL	e
	1,2,3-Trichloropropane	µg/kg	66	12194	NA (3)	25	0	0	0	0	0	NA (3)	25	0.914	860	1	0	NA (3)	Elevated DL	e
	1,2,4-Trichlorobenzene	µg/kg	142	20000	NA (3)	25	0	0	0	0	0	NA (3)	25	0.914	860	1	0	NA (3)	Elevated DL	e
	1,2,4-Trimethylbenzene	µg/kg	41	64066	NA (3)	25	2	1300	19200	2	0	NA (3)	23	0.914	1.6	0	0	NA (3)	--	--
	1,2-Dibromo-3-chloropropane	µg/kg	29	21782	NA (3)	25	0	0	0	0	0	NA (3)	25	0.914	860	1	0	NA (3)	Elevated DL	e
	1,2-Dibromoethane	µg/kg	0.24	25000	NA (3)	25	0	0	0	0	0	NA (3)	25	0.914	860	25	0	NA (3)	Elevated DL	a, d, e
	1,2-Dichlorobenzene	µg/kg	1800	370000	NA (3)	25	0	0	0	0	0	NA (3)	25	0.914	860	0	0	NA (3)	--	--
	1,2-Dichloroethane	µg/kg	0.50	76337	NA (3)	31	0	0	0	0	0	NA (3)	31	0.914	860	31	0	NA (3)	Elevated DL	a, d, e
	1,2-Dichloropropane	µg/kg	0.57	25000	NA (3)	31	0	0	0	0	0	NA (3)	31	0.914	860	31	0	NA (3)	Elevated DL	a, d, e
	1,3,5-Trimethylbenzene	µg/kg	36	64066	NA (3)	25	2	35.4	6170	1	0	NA (3)	23	0.914	1.6	0	0	NA (3)	--	--
	1,3-Dichlorobenzene	µg/kg	1700	160165	NA (3)	25	0	0	0	0	0	NA (3)	25	0.914	860	0	0	NA (3)	--	--
	1,3-Dichloropropane	µg/kg	NA (4)	NA (4)	NA (3)	25	0	0	0	NA (4)	NA (4)	NA (3)	25	0.914	860	NA (4)	NA (4)	NA (3)	--	--
	1,3-Dichloropropene	µg/kg	NA (4)	NA (4)	NA (3)	6	0	0	0	NA (4)	NA (4)	NA (3)	6	5	5	NA (4)	NA (4)	NA (3)	--	--
	1,4-Dichlorobenzene	µg/kg	5.6	20000	NA (3)	25	0	0	0	0	0	NA (3)	25	0.914	860	1	0	NA (3)	Elevated DL	e
	2-Chloro-1,1,1-trifluoroethane	µg/kg	NA (4)	NA (4)	NA (3)	7	0	0	0	NA (4)	NA (4)	NA (3)	7	9.62	16	NA (4)	NA (4)	NA (3)	--	--
	2-Chloroethylvinyl ether	µg/kg	0.010	726	NA (3)	25	0	0	0	0	0	NA (3)	25	4.57	4300	25	1	NA (3)	Elevated DL	d, e
	2-Hexanone	µg/kg	NA (4)	1220000	NA (3)	25	0	0	0											

TABLE B.3-3A
B4133 RFI SITE ANALYTICAL DATA SCREENING SUMMARY AND DATA QUALITY (SOIL)
(Page 4 of 4)

TABLE B.3-3A

Analyte Group	Constituent	Units	Screening Levels (1)			Total Number Samples Analyzed	Detect Data Summary						Non-Detect Data Summary						Data Issue (5)	Issue Resolution (6)
			Residential (ResRBSL)	Ecological (EcoRBSL)	Background (2)		Total Samples w/ Detections	Minimum Detected Concentration	Maximum Detected Concentration	Number of Detected Concentrations > Res RBSL	Number of Detected Concentrations > Eco RBSL	Number of Detected Concentrations > Background	Total Samples ND	Minimum Detection Limit	Maximum Detection Limit	Number DLs > ResRBSL	NumberDL > EcoRBSL	Number DL > Background		
	cis-1,2-Dichloroethene	µg/kg	14	68337	NA (3)	25	0	0	0	0	0	NA (3)	25	0.914	860	1	0	NA (3)	Elevated DL	e
	cis-1,3-Dichloropropene	µg/kg	NA (4)	NA (4)	NA (3)	25	0	0	0	NA (4)	NA (4)	NA (3)	25	0.914	860	NA (4)	NA (4)	NA (3)	--	--
	Cumene	µg/kg	NA (4)	NA (4)	NA (3)	25	1	684	684	NA (4)	NA (4)	NA (3)	24	0.914	1.6	NA (4)	NA (4)	NA (3)	--	--
	Dibromochloromethane	µg/kg	NA (4)	NA (4)	NA (3)	31	0	0	0	NA (4)	NA (4)	NA (3)	31	0.914	860	NA (4)	NA (4)	NA (3)	--	--
	Dibromomethane	µg/kg	NA (4)	NA (4)	NA (3)	25	0	0	0	NA (4)	NA (4)	NA (3)	25	0.914	860	NA (4)	NA (4)	NA (3)	--	--
	Dichlorodifluoromethane	µg/kg	15	64066	NA (3)	25	0	0	0	0	0	NA (3)	25	0.914	860	1	0	NA (3)	Elevated DL	e
	Ethylbenzene	µg/kg	4.6	210000	NA (3)	33	0	0	0	0	0	NA (3)	33	0.914	860	7	0	NA (3)	Elevated DL	d, e
	Hexachlorobutadiene	µg/kg	9200	854	NA (3)	25	0	0	0	0	0	NA (3)	25	0.914	860	0	1	NA (3)	Elevated DL	e
	Methyl ethyl ketone	µg/kg	NA (4)	NA (4)	NA (3)	27	5	0.01	10.6	NA (4)	NA (4)	NA (3)	22	4.57	4300	NA (4)	NA (4)	NA (3)	--	--
	Methyl isobutyl ketone (MIBK)	µg/kg	NA (4)	NA (4)	NA (3)	25	0	0	0	NA (4)	NA (4)	NA (3)	25	4.57	4300	NA (4)	NA (4)	NA (3)	--	--
	Methyl tert-butyl ether	µg/kg	NA (4)	NA (4)	NA (3)	25	0	0	0	NA (4)	NA (4)	NA (3)	25	0.914	860	NA (4)	NA (4)	NA (3)	--	--
	Methylene chloride	µg/kg	4.0	24986	NA (3)	31	5	2.02	8.41	2	0	NA (3)	26	4.6	4300	26	0	NA (3)	Elevated DL	a, d, e
	m-Xylene & p-Xylene	µg/kg	150	64066	NA (3)	27	2	0.348	2.93	0	0	NA (3)	25	1.83	1720	1	0	NA (3)	Elevated DL	e
	Naphthalene	µg/kg	1146591	210000	NA (3)	18	2	4330	92500	0	0	NA (3)	16	0.914	1.29	0	0	NA (3)	--	--
	n-Butylbenzene	µg/kg	NA (4)	NA (4)	NA (3)	25	2	36.2	7810	NA (4)	NA (4)	NA (3)	23	0.914	1.6	NA (4)	NA (4)	NA (3)	--	--
	n-Propylbenzene	µg/kg	203	210000	NA (3)	25	2	17.8	1950	1	0	NA (3)	23	0.914	1.6	0	0	NA (3)	--	--
	o-Chlorotoluene	µg/kg	NA (4)	NA (4)	NA (3)	25	0	0	0	NA (4)	NA (4)	NA (3)	25	0.914	860	NA (4)	NA (4)	NA (3)	--	--
	o-Xylene	µg/kg	190	64066	NA (3)	27	0	0	0	0	0	NA (3)	27	0.914	860	1	0	NA (3)	Elevated DL	e
	p-Chlorotoluene	µg/kg	NA (4)	NA (4)	NA (3)	25	0	0	0	NA (4)	NA (4)	NA (3)	25	0.914	860	NA (4)	NA (4)	NA (3)	--	--
	p-Cymene	µg/kg	NA (4)	NA (4)	NA (3)	25	4	4.95	7100	NA (4)	NA (4)	NA (3)	21	0.914	1.46	NA (4)	NA (4)	NA (3)	--	--
	sec-Butylbenzene	µg/kg	29755	210000	NA (3)	25	2	16.8	3180	0	0	NA (3)	23	0.914	1.6	0	0	NA (3)	--	--
	sec-Dichloropropane	µg/kg	NA (4)	NA (4)	NA (3)	25	0	0	0	NA (4)	NA (4)	NA (3)	25	0.914	860	NA (4)	NA (4)	NA (3)	--	--
	Styrene	µg/kg	7200	427106	NA (3)	25	4	0.216	0.425	0	0	NA (3)	21	0.921	860	0	0	NA (3)	--	--
	tert-Butylbenzene	µg/kg	NA (4)	NA (4)	NA (3)	25	0	0	0	NA (4)	NA (4)	NA (3)	25	0.914	860	NA (4)	NA (4)	NA (3)	--	--
	Tetrachloroethene	µg/kg	0.43	5979	NA (3)	31	0	0	0	0	0	NA (3)	31	0.914	860	31	0	NA (3)	Elevated DL	a, d, e
	Toluene	µg/kg	234	3417	NA (3)	33	1	0.606	0.606	0	0	NA (3)	32	0.914	860	1	0	NA (3)	Elevated DL	e
	trans-1,2-Dichloroethene	µg/kg	14	970000	NA (3)	31	0	0	0	0	0	NA (3)	31	0.914	860	1	0	NA (3)	Elevated DL	e
	trans-1,3-Dichloropropene	µg/kg	NA (4)	NA (4)	NA (3)	25	0	0	0	NA (4)	NA (4)	NA (3)	25	0.914	860	NA (4)	NA (4)	NA (3)	--	--
	Trichloroethene	µg/kg	2.2	2990	NA (3)	31	0	0	0	0	0	NA (3)	31	0.914	860	7	0	NA (3)	Elevated DL	d, e
	Trichlorofluoromethane	µg/kg	110	300000	NA (3)	25	0	0	0	0	0	NA (3)	25	0.914	860	1	0	NA (3)	Elevated DL	e
	Vinyl chloride	µg/kg	0.010	726	NA (3)	31	0	0	0	0	0	NA (3)	31	0.914	860	31	1	NA (3)	Elevated DL	a, d, e
	Xylenes, Total	µg/kg	150	64066	NA (3)	1	1	0.01	0.01	0	0	NA (3)	0	0	0	0	0	NA (3)	--	--

Notes:

(1) Risk-based screening levels for human health (ResRBSL) and Ecological (EcoRBSL) receptors are provided as reference points for assessing adequacy of data quality. ResRBSL is based on residential receptor for a risk level of 1 x 10⁻⁶ cancer risk or noncancer Hazard Index.

(2) Reference: Soil Background Report (MWH 2005)

(3) Not applicable - Background values only established for naturally occurring constituents.

(4) RBSL not available for this constituent.

(5) Elevated DLs are DLs that are above one or both of the RBSLs. For metals and dioxins, elevated DLs are DLs that are above background, EcoRBSL, or ResRBSL. In cases that DLs are below background but above an RBSL, the DL is not considered to be elevated.

(6) The following statements indicate standard DL issue resolutions throughout the group. Each issue resolution note listed for each analyte do not apply to all elevated DLs for that analyte. Instead, each issue resolution note may only apply to a subset of samples with elevated DLs for the analyte, but taken as a whole, the list of issue resolutions addresses all of the elevated DLs.

Data Issue Resolution Notes:

-- Indicates that the constituent does not have elevated detection limits.

(a) The MDL is less than the RBSL, so if the compound was present at concentrations greater than the MDL, but less than the RL, it would have been reported.

(b) DL are below background levels.

(c) DLs elevated due to contamination in the associated method, field, or equipment blank.

(d) DL concentrations achieved were within practicable laboratory reporting limits at the time the sample was collected. The adequacy assessment of sample results for characterization decisions was made based on surrounding sampling results, potential for laboratory interference, data trends, and reporting limits with respect to screening levels.

(e) Sample diluted due to high levels of other constituents

(f) The source of the elevated DL is unknown

Acronyms

DL - detection limit
EcoRBSL - ecological risk-based screening level
ResRBSL - residential risk-based screening level
NA - not applicable

TABLE B.3-3B
B4133 RFI SITE ANALYTICAL DATA SCREENING SUMMARY AND DATA QUALITY (SOIL VAPOR)
(Page 1 of 1)

Table B.3-3B

Analyte Group	Constituent	Units	Screening Levels (1)		Total Number Samples Analyzed	Detect Data Summary					Non-Detect Data Summary					Data Issue (3)	Issue Resolution (4)
			Residential (ResRBSL)	Ecological (EcoRBSL)		Total Samples w/ Detections	Minimum Detected Concentration	Maximum Detected Concentration	Number of Detected Concentrations > Res RBSL	Number of Detected Concentrations > Eco RBSL	Total Samples ND	Minimum Detection Limit	Maximum Detection Limit	Number DLs > ResRBSL	Number DLs > EcoRBSL		
VOCs (µg/L)																	
	1,1,1,2-Tetrachloroethane	µg/L	48	NA (2)	38	0	0	0	0	NA (2)	38	0.1	0.1	0	NA (2)	--	--
	1,1,1-Trichloroethane	µg/L	640000	38000	38	0	0	0	0	0	38	0.1	0.1	0	0	--	--
	1,1,2,2-Tetrachloroethane	µg/L	48	NA (2)	38	0	0	0	0	NA (2)	38	0.2	0.2	0	NA (2)	--	--
	1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	8800000	91000	38	0	0	0	0	0	38	0.5	0.5	0	0	--	--
	1,1,2-Trichloroethane	µg/L	170	57	38	0	0	0	0	0	38	0.1	0.1	0	0	--	--
	1,1-Dichloroethane	µg/L	1700	36000	38	0	0	0	0	0	38	0.1	0.1	0	0	--	--
	1,1-Dichloroethene	µg/L	58000	600	38	0	0	0	0	0	38	0.1	0.1	0	0	--	--
	1,2-Dichloroethane	µg/L	130	42000	38	0	0	0	0	0	38	0.1	0.1	0	0	--	--
	Benzene	µg/L	95	570	38	12	0.036	0.11	0	0	26	0.05	0.1	0	0	--	--
	Carbon Tetrachloride	µg/L	63	630	38	0	0	0	0	0	38	0.05	0.1	0	0	--	--
	Chloroethane	µg/L	NA (2)	992000	38	0	0	0	NA (2)	0	38	0.1	0.1	NA (2)	0	--	--
	Chloroform	µg/L	500	240	38	0	0	0	0	0	38	0.1	0.1	0	0	--	--
	cis-1,2-Dichloroethene	µg/L	10000	1900	38	0	0	0	0	0	38	0.1	0.1	0	0	--	--
	Dichlorodifluoromethane	µg/L	58000	91000	38	0	0	0	0	0	38	0.1	0.1	0	0	--	--
	Ethylbenzene	µg/L	290000	23000	38	3	0.18	0.37	0	0	35	0.1	0.1	0	0	--	--
	Isopropanol	µg/L	NA (2)	NA (2)	14	0	0	0	NA (2)	NA (2)	14	1	1	NA (2)	NA (2)	--	--
	Methylene chloride	µg/L	2700	870	38	0	0	0	0	0	38	2	5	0	0	--	--
	m-Xylene & p-Xylene	µg/L	29000	16000	38	3	0.18	0.49	0	0	35	0.2	0.2	0	0	--	--
	o-Xylene	µg/L	29000	16000	38	2	0.05	0.1	0	0	36	0.1	0.1	0	0	--	--
	Tetrachloroethene	µg/L	452	24000	38	0	0	0	0	0	38	0.1	0.1	0	0	--	--
	Toluene	µg/L	110000	84	38	5	0.05	0.27	0	0	33	0.1	0.1	0	0	--	--
	trans-1,2-Dichloroethene	µg/L	20000	1900	38	0	0	0	0	0	38	0.1	0.1	0	0	--	--
	Trichloroethene	µg/L	1400	6400	38	0	0	0	0	0	38	0.1	0.1	0	0	--	--
	Trichlorofluoromethane	µg/L	200000	91000	38	0	0	0	0	0	38	0.1	0.1	0	0	--	--
	Vinyl chloride	µg/L	35	560	38	0	0	0	0	0	38	0.05	0.1	0	0	--	--

Notes:

(1) Risk-based screening levels for human health (ResRBSL) and Ecological (EcoRBSL) receptors are provided as reference points for assessing adequacy of data quality. ResRBSL is based on residential receptor for a risk level of 1 x 10-6 cancer risk or noncancer Hazard Index.

(2) RBSL not available for this constituent.

(3) Elevated DLs are DLs that are above one or both of the RBSLs. For metals and dioxins, elevated DLs are DLs that are above background, EcoRBSL, or ResRBSL. In cases that DLs are below background but above an RBSL, the DL is not considered to be elevated.

(4) The following statements indicate standard DL issue resolutions throughout the group. Each issue resolution note listed for each analyte do not apply to all elevated DLs for that analyte. Instead, each issue resolution note may only apply to a subset of samples with elevated DLs for the analyte, but taken as a whole, the list of issue resolutions addresses all of the elevated DLs.

Data Issue Resolution Notes:

-- Indicates that the constituent does not have elevated detection limits.

Acronyms

DL - detection limit
EcoRBSL - ecological risk-based screening level
ResRBSL - residential risk-based screening level
NA - not applicable

TABLE B.3-3C
B4133 RFI SITE ANALYTICAL DATA SCREENING SUMMARY AND DATA QUALITY (SURFACE WATER)
(Page 1 of 1)

Table B.3-3C

Analyte Group	Constituent	Units	Screening Levels		Total Number Samples Analyzed	Detect Data Summary					Non-Detect Data Summary					Data Issue	Issue Resolution
			Residential (ResRBSL)	Ecological (EcoRBSL)		Total Samples w/ Detections	Minimum Detected Concentration	Maximum Detected Concentration	Number of Detected Concentrations > Res RBSL	Number of Detected Concentrations > Eco RBSL	Total Samples ND	Minimum Detection Limit	Maximum Detection Limit	Number DLs > ResRBSL	Number DLs > EcoRBSL		
No RFI surface water samples collected for this site.																	

Table B.4-1

**Chemicals of Potential Concern for Human Health
B4133 RFI Site**

Chemical	Soil (0 to 2 feet bgs)	Soil (0 to 10 feet bgs)	Building 4133 Area RFI Site Groundwater (Indirect Pathway)	Group 7 Groundwater (Direct Pathway)	Soil Vapor
Inorganic Compounds					
Beryllium				X	
Cadmium	X	X			
Hexavalent chromium	X	X			
Lithium	X				
Mercury	X	X			
VOCs					
1,1,2-Trichloro-1,2,2-trifluoroethane				X	
1,1-Dichloroethane				X	
1,1-Dichloroethene				X	
1,2,4-Trimethylbenzene	X	X			X
1,3,5-Trimethylbenzene	X	X			X
Acetone	X		X		
Benzene	X	X			X
Chloroform				X	
cis-1,2-Dichloroethene				X	
Ethylbenzene	X	X			X
Isopropylbenzene	X				
m,p-Xylene	X	X			X
Methylene chloride	X	X			X
n-Butylbenzene	X	X			X
n-Propylbenzene	X	X			X
o-Xylene	X	X			X
p-Isopropyltoluene	X	X			X
sec-Butylbenzene	X	X			X
Styrene	X	X			X
Tetrachloroethene				X	
Toluene	X	X			X
Trichloroethene			X	X	
SVOCs					
1-Methylnaphthalene	X	X			
2-Methylnaphthalene	X	X			
Acenaphthene	X	X			
Acenaphthylene	X	X			
Anthracene	X	X			
Benzo(a)anthracene	X	X			
Benzo(a)pyrene	X	X			
Benzo(b)fluoranthene	X	X			
Benzo(e)pyrene	X	X			
Benzo(g,h,i)perylene	X	X			
Benzo(k)fluoranthene	X	X			
bis(2-Ethylhexyl)phthalate	X	X			
Butyl benzyl phthalate	X	X			
Chrysene	X	X			
Dibenz(a,h)anthracene	X	X			
Di-n-butylphthalate	X	X			
Fluoranthene	X	X			
Fluorene	X	X			
Indeno(1,2,3-cd)pyrene	X	X			
Naphthalene	X	X			
Perylene	X	X			
Phenanthrene	X	X			
Pyrene	X	X			

Table B.4-1

**Chemicals of Potential Concern for Human Health
B4133 RFI Site**

Chemical	Soil (0 to 2 feet bgs)	Soil (0 to 10 feet bgs)	Building 4133 Area RFI Site Groundwater (Indirect Pathway)	Group 7 Groundwater (Direct Pathway)	Soil Vapor
Total Petroleum Hydrocarbons					
C08-C11(Gasoline Range)	X	X			
C11-C14(Kerosene Range)	X	X			
C14-C20(Diesel Range)	X	X			
C20-C30(Lubricant Oil Range)	X	X			
PCBs					
Aroclor 1242	X	X			
Aroclor 1248	X	X			
Aroclor 1254	X	X			
Aroclor 1260	X	X			
PCB-105	X	X			
PCB-114	X	X			
PCB-118	X	X			
PCB-123	X	X			
PCB-126	X	X			
PCB-156	X	X			
PCB-157	X	X			
PCB-167	X	X			
PCB-169	X	X			
PCB-189	X	X			
PCB-77	X	X			
PCB-81	X	X			

Notes:

bgs - below ground surface

PCBs - polychlorinated biphenyls

SVOC - semi-volatile organic compound

VOC - volatile organic compound

X - selected as a chemical of potential concern

Table B.4-2

**Human Health Risk Estimate Summary¹
B4133 RFI Site**

Receptor	Soil Media ²				Groundwater ³				Total for Site Media			
	HI Range	CD ⁴	Risk Range	CD	HI Range	CD	Risk Range	CD	HI Range	CD	Risk Range	CD
Future Adult Recreator	<0.001 - 0.009	-	2E-09 - 2E-07	-	<0.001 - <0.001	-	2E-13 - 3E-12	-	<0.001 - 0.009	-	2E-09 - 2E-07	-
Future Child Recreator	0.01 - 0.07	-	2E-08 - 2E-07	-	<0.001 - <0.001	-	1E-12 - 5E-12	-	0.01 - 0.07	-	2E-08 - 2E-07	-
Future Adult Resident	0.02 - 0.09	-	3E-08 - 4E-07	-	<0.001 - <0.001	-	7E-10 - 5E-09	-	0.02 - 0.09	-	3E-08 - 4E-07	-
Future Child Resident	0.1 - 0.4	-	2E-07 - 7E-07	-	<0.001 - <0.001	-	3E-09 - 4E-09	-	0.1 - 0.4	-	2E-07 - 7E-07	-

Notes:

1. Risk estimates shown are a sum of all exposure pathways per media; the range reported is for the central tendency and reasonable maximum exposures, respectively.
2. Soil media risk estimates are a sum of all direct and indirect exposure, so site soil and soil vapor.
3. Groundwater media risk estimates are for indirect exposure only and assume no domestic use of groundwater.
4. Chemical risk drivers are those COPCs detected onsite with an HI > 1, risk > 1x10⁻⁶, or blood lead concentration > 10 µg/dl. Only major risk contributors listed if cumulative HI >> 1 or cancer risk >> 1x10⁻⁶.

CD = Chemical risk driver

COPC = Chemical of potential concern

HI = Hazard index

NA = Not Applicable

µg/dl - micrograms per deciliter

Table B.4-3

**Human Health Risk Assessment Uncertainty Analysis
B4133 RFI Site**

Uncertainty	Magnitude of Impact	Direction of Impact
COPC Selection		
Mercury was demonstrated to be consistent with background concentrations by the Wilcoxon Rank Sum test but was included as a COPC because the maximum detected concentrations were substantially above the maximum detected background concentration.	Low	Conservative
Cadmium concentrations were shown to be above background concentrations based on the Wilcoxon Rank Sum test. However, the maximum detected concentration at the B4133 RFI Site was only slightly higher than the maximum background concentration and the mean, median and standard deviation of the background data were higher than that of the B4133 RFI Site data. Cadmium was conservatively retained as a COPC.	Low	Conservative
Hexavalent chromium concentrations are considered to be above background concentrations because soil background data are not available. However, at the location of the maximum hexavalent chromium concentration, the total chromium concentration is below background concentrations of total chromium; and chromium concentrations are shown to be below background based on the results of the Wilcoxon Rank Sum test. Thus, hexavalent chromium was conservatively retained as a COPC.	Low	Conservative
Potential impacts of the Topanga fire on the selection of COPCs and risks have been evaluated. The evaluation concluded that the presence of boron, mercury, and zinc outside of CMS areas may be indicative of impacts of fire ash on soil metal concentrations at the B4133 RFI Site.	Low	Uncertain
EPC Calculations		
Where available, site-specific (actual) chemical data were used in the risk assessment. Where data were not available, risks associated with benzene, toluene, ethylbenzene, xylenes (BTEX) and polynuclear aromatic hydrocarbons (PAHs) are estimated based, in part, on extrapolation factors using site TPH data as described in the SRAM (MWH, 2005). The estimation of BTEX and PAH concentrations from TPH concentrations is considered conservative since the extrapolation factors used to estimate BTEX and PAH concentrations are based on the maximum ratio of the TPH concentration to the individual petroleum constituent concentration in the dataset.	Low	Conservative
Where VOCs are detected in one medium, and analyzed for in another medium to which the VOC could migrate but were not detected, media-to-media extrapolations were conducted (e.g., soil-to-soil vapor). This procedure is expected to overestimate potential exposures.	Low	Conservative
When VOC soil vapor samples were available, soil matrix-to-soil vapor extrapolations were only conducted for non-colocated soil matrix samples with detects.	Low	Conservative
The maximum detected concentration of each COPC detected in groundwater was used as the EPC. This is likely to result in an overestimation of potential exposures.	High	Conservative

Table B.4-3

**Human Health Risk Assessment Uncertainty Analysis
B4133 RFI Site**

Uncertainty	Magnitude of Impact	Direction of Impact
The mean concentration for some chemicals exceeded the selected RME concentration; therefore, the RME concentration was also used as the CTE concentration under some circumstances.	Low	Conservative
Indoor and ambient air m,p-xylene concentrations were determined to be the higher of the estimated m-xylene or p-xylene concentrations.	Low	Conservative
Vapor migration into indoor air has been estimated using a model which is being validated for the site. Preliminary findings show that the model conservatively over-predicts air concentrations when compared to flux chamber measurements.	Low	Conservative
Exposure Pathways		
Risks associated with drinking of groundwater are not realistic because the groundwater beneath the SSFL is not currently used as a drinking water source and the presence of the contamination will likely require a restriction on its future use as well.	High	Conservative
Future land use of the site is currently undecided but may be recreational, which has lower risks than residential.	Medium	Uncertain
Cancer Slope Factor		
To develop cancer slope factors and reference doses, dose-response data are extrapolated from laboratory animals to humans.	High	Conservative
Assumes that all carcinogens do not have a threshold below which a carcinogenic response does not occur, and therefore, any dose, no matter how small, results in some potential risk.	Medium	Conservative
Cancer slope factors derived from animal studies are the upper-bound maximum likelihood estimates based on a linear dose-response curve, and therefore, overstate carcinogenic potency.	Medium	Conservative
Risk Calculations		
Although benzo(g,h,i)perylene was selected as COPCs for soil from 0 to 10 feet bgs and from 0 to 2 feet bgs, risks could not be evaluated since toxicity values are not available. This is not expected to affect the overall results of the risk assessment since other PAHs are evaluated in the risk assessment for soil.	Low	Not Conservative

Notes:

Low - This uncertainty is considered to have minimal impact on the total risk estimate.

Medium - This uncertainty is considered to have moderate impact on the total risk estimate.

High - This uncertainty is considered to have significant impact on the total risk estimate.

bgs - below ground surface

BTEX - benzene, toluene, ethylbenzene, and xylenes

COPC - chemical of potential concern

EPC - exposure point concentration

Table B.4-3

**Human Health Risk Assessment Uncertainty Analysis
B4133 RFI Site**

Uncertainty	Magnitude of Impact	Direction of Impact
--------------------	--------------------------------	--------------------------------

HRA - human health risk assessment

PAH - polycyclic aromatic hydrocarbons

TPH - total petroleum hydrocarbons

Table B.4-4

**Chemicals of Potential Ecological Concern
B4133 RFI Site**

Chemical	Soil (0 to 2 feet bgs)	Soil (0 to 4 feet bgs)	Soil (0 to 6 feet bgs)	Soil Vapor ^a (0 to 6 feet bgs)
Inorganic Compounds				
Cadmium	X	X		
Hexavalent chromium	X	X	X	
Lithium	X	X		
Mercury	X	X	X	
Selenium			X	
VOCs				
1,2,4-Trimethylbenzene	X	X	X	X
1,3,5-Trimethylbenzene	X	X	X	X
Acetone	X	X	X	X
Benzene	X	X	X	X
Ethylbenzene	X	X	X	X
Isopropylbenzene	X	X	X	X
m,p-Xylene	X	X	X	X
Methylene chloride	X	X	X	X
n-Butylbenzene	X	X	X	X
n-Propylbenzene	X	X	X	X
o-Xylene	X	X	X	X
p-Isopropyltoluene	X	X	X	X
sec-Butylbenzene	X	X	X	X
Styrene	X	X	X	X
Toluene	X	X	X	X
Trichloroethene				X
SVOCs				
1-Methylnaphthalene	X	X	X	
2-Methylnaphthalene	X	X	X	
Acenaphthene	X	X	X	
Acenaphthylene	X	X	X	
Anthracene	X	X	X	
Benzo(a)anthracene	X	X	X	
Benzo(a)pyrene	X	X	X	
Benzo(b)fluoranthene	X	X	X	
Benzo(e)pyrene	X	X	X	
Benzo(g,h,i)perylene	X	X	X	
Benzo(k)fluoranthene	X	X	X	
bis(2-Ethylhexyl)phthalate	X	X	X	
Butyl benzyl phthalate	X	X	X	
Chrysene	X	X	X	
Dibenz(a,h)anthracene	X	X	X	
Di-n-butylphthalate	X	X	X	
Fluoranthene	X	X	X	
Fluorene	X	X	X	
Indeno(1,2,3-cd)pyrene	X	X	X	
Naphthalene	X	X	X	
Perylene	X	X	X	
Phenanthrene	X	X	X	
Pyrene	X	X	X	
Total Petroleum Hydrocarbons				
C08-C11(Gasoline Range)	X	X	X	
C11-C14(Kerosene Range)	X	X	X	
C14-C20(Diesel Range)	X	X	X	
C20-C30(Lubricant Oil Range)	X	X	X	

Table B.4-4

**Chemicals of Potential Ecological Concern
B4133 RFI Site**

Chemical	Soil (0 to 2 feet bgs)	Soil (0 to 4 feet bgs)	Soil (0 to 6 feet bgs)	Soil Vapor ^a (0 to 6 feet bgs)
PCBs				
Aroclor 1242	X	X	X	
Aroclor 1248	X	X	X	
Aroclor 1254	X	X	X	
Aroclor 1260	X	X	X	
PCB-105	X	X	X	
PCB-114	X	X	X	
PCB-118	X	X	X	
PCB-123	X	X	X	
PCB-126	X	X	X	
PCB-156	X	X	X	
PCB-157	X	X	X	
PCB-167	X	X	X	
PCB-169	X	X	X	
PCB-189	X	X	X	
PCB-77	X	X	X	
PCB-81	X	X	X	

Notes:

a. Chemical selected as a CPEC since it was selected as a COPC in groundwater

bgs - below ground surface

COPC - chemical of potential concern

CPEC - chemical of potential ecological concern

PCB - polychlorinated biphenyl

PCDD/PCDF - polychlorinated dibenzo-p-dioxin and dibenzofurans

SVOC - semi-volatile organic compound

VOC - volatile organic compound

X - selected as a chemical of potential ecological concern

Table B.4-5
Ecological Hazard Estimate Summary
B4133 RFI Site

Receptor	Chemical Risk Driver¹
Deer Mouse	Cadium (10), Total Aroclors (2)
without inhalation pathway	Cadium (10), Total Aroclors (2)
Hermit Thrush	Cadium (10)
Red-Tailed Hawk	None
Using Large Home Range Factor ²	None
Bobcat	None
Using Large Home Range Factor ²	None
Mule Deer	Cadium (2)
Using Large Home Range Factor ²	None

Notes:

1. Chemical risk drivers are those CPECs detected onsite with an HQ > 1, the RME HQ is provided after the chemical name. "None" indicates that no chemical's HQs > 1.
2. The HIs for hawk, mule deer, and bobcat assume that their home ranges are equal to the RFI site acreage. This is an extremely conservative assumption; RFI site acreage is typically only a small fraction of a large animal's home range. The estimated HIs decrease to the values indicated above if an adjustment is made to reflect a more realistic home range for these receptors.

CPEC = Chemical of potential ecological concern

HI = Hazard index

HQ = Hazard Quotient

RME - reasonable maximum exposure

Table B.4-6

**Ecological Risk Assessment Uncertainty Analysis
B4133 RFI Site**

Uncertainty	Magnitude of Impact	Direction of Impact
CPEC Selection		
Mercury was demonstrated to be consistent with background concentrations by the Wilcoxon Rank Sum test but was included as a CPEC because the maximum detected concentrations were substantially above the maximum detected background concentration.	Low	Conservative
Cadmium concentrations were shown to be above background concentrations based on the Wilcoxon Rank Sum test. However, the maximum detected concentration at the B4133 RFI site was only slightly higher than the maximum background concentration and the mean, median and standard deviation of the background data were higher than that of the B4133 RFI Site data. Cadmium was conservatively retained as a CPEC.	High	Conservative
Hexavalent chromium concentrations are considered to be above background concentrations because soil background data are not available. However, at the location of the maximum hexavalent chromium concentration, the total chromium concentration is below background concentrations of total chromium; and chromium concentrations are shown to be below background based on the results of the Wilcoxon Rank Sum test. Thus, hexavalent chromium was conservatively retained as a CPEC.	Low	Conservative
Potential impacts of the Topanga fire on the selection of CPECs and risks have been evaluated. The evaluation concluded that the presence of boron, mercury, and zinc outside of CMS areas may be indicative of impacts of fire ash on soil metal concentrations at the B4133 RFI Site .	Low	Uncertain
EPC Calculations		
Where available, site-specific data were used in the risk assessment. When data were not available, risks associated with BTEX and PAHs are estimated based, in part, on extrapolation factors using site TPH data as described in the SRAM (MWH, 2005). The estimation of BTEX and PAH concentrations from TPH concentrations is considered conservative since the extrapolation factors used to estimate BTEX and PAH concentrations are based on the maximum ratio of TPH concentration to petroleum constituent concentration in the dataset.	Medium	Conservative
Where VOCs are detected in one medium, and analyzed for in another medium to which the VOC could migrate but were not detected, media-to-media extrapolations were conducted (e.g., soil-to-soil vapor). This procedure is expected to overestimate potential exposures.	Medium	Conservative
When VOC soil vapor samples were available, soil matrix to soil vapor extrapolations were only conducted for non-collocated soil matrix samples with detects.	Medium	Conservative
Soil and soil vapor CTE EPCs were calculated using 1/2 the SQL for CPECs in soil and soil vapor samples when there were too few samples to calculate a mean in ProUCL.	Medium	Uncertain

Table B.4-6

**Ecological Risk Assessment Uncertainty Analysis
B4133 RFI Site**

Uncertainty	Magnitude of Impact	Direction of Impact
The 95% UCL concentration of some chemicals is greater than the maximum concentration, therefore the maximum was used as the RME EPC. This is considered to be a likely overestimation of the representative exposure point concentration because samples were collected in areas with the highest likelihood to detect the highest concentrations at the site, and a receptor using the site is not always exposed to the location of highest concentration.	Low	Conservative
The mean concentration for some chemicals exceeded the selected RME concentration; therefore, the RME concentration was also used as the CTE concentration under some circumstances.	Low	Conservative
For Perched Groundwater matrix CPEC Trichloroethene, burrow-air inhalation risks are estimated using groundwater to soil vapor partitioning, though the chemicals were not detected in soil or soil vapor.	Low	Conservative
Estimation of soil vapor concentrations overstates actual burrow concentrations due to the following: 1. Model is conservative 2. Model does not account for attenuation between 73 feet bgs depth to groundwater and 0 to 6 feet bgs interval for burrows 3. Air flow in burrows is not accounted for	Low	Conservative
Wildlife Exposure Factors		
Some wildlife exposure factors were based on taxonomically similar species	Low	Uncertain
Hazard estimates for the hawk, bobcat and mule deer assume that these species spend all of their time at the B4133 RFI Site. This assumption is unlikely to be true and it results in an overestimation of potential risks to these species due to chemicals present in soils at the site. The minimum reported foraging ranges for the red-tailed hawk, bobcat and mule deer are 195, 1,152 and 192 acres, respectively, as compared to 1.5 acres for the B4133 RFI Site. When the foraging ranges of these species are accounted for in the ERA, the RME HQs are all less than one. Hazard estimates for large-home-range receptors (hawk, bobcat and mule deer) will be addressed for the entire SSFL facility after all RFI site assessments have been completed and potential site-specific risks are evaluated.	Medium	Conservative
Exposure Pathways		
Dermal and inhalation (for surface-dwelling animals) exposure pathways were not quantified.	Low	Not Conservative
Toxicity Reference Value		
High degree of uncertainty in extrapolation of dose-response data from laboratory animals to representative receptors.	High	Uncertain
Use of acute/subchronic-to-chronic and endpoint-to-NOAEL uncertainty factors to estimate chronic NOAEL-equivalent TRVs.	Medium	Conservative
Lack of TRVs for amphibians and reptiles -- note that no threatened or endangered amphibians or reptiles are known to reside at SSFL	Medium	Not Conservative

Table B.4-6

**Ecological Risk Assessment Uncertainty Analysis
B4133 RFI Site**

Uncertainty	Magnitude of Impact	Direction of Impact
Use of chronic NOAEL-equivalent TRVs	High	Conservative

Notes:

Low - This uncertainty is considered to have minimal impact on the total risk estimate.

Medium - This uncertainty is considered to have moderate impact on the total risk estimate.

High - This uncertainty is considered to have significant impact on the total risk estimate.

bgs - below ground surface

BTEX - benzene, toluene, ethylbenzene, and xylenes

CPEC - chemical of potential ecological concern

CTE - central tendency exposure

EPC - exposure point concentration

ERA - ecological risk assessment

ESL - ecological screening level

HI - hazard index

NOAEL - no observable adverse effects level

PAH - polycyclic aromatic hydrocarbon

RFI - Resource Conservation and Recovery Act Facility Investigation

RME - reasonable maximum exposure

SSFL - Santa Susana Field Laboratory

SQL - sample quantitation limit

SVOC - semivolatile organic chemicals

TPH - total petroleum hydrocarbons

TRV - toxicity reference value

UCL - upper confidence limit

Table B.5-1
B4133 RFI Site Surficial Media Site Action Recommendations
(Page 1 of 1)

Area	Chemical Use Area Number	CMS Areas ⁽¹⁾	Recommended for Further Consideration in CMS Based On:		
			Residential Receptor ⁽²⁾⁽⁴⁾	Recreational Receptor ⁽²⁾	Ecological Receptor ⁽²⁾⁽⁵⁾
Building 4133 Treatment Building, Southern Concrete Pad, and Size Reduction Area	1	--	--	--	--
Caustic Solution Tank T-1	2a	--	--	--	--
Sodium-Potassium Alloy Tank T-2	2b	--	--	--	--
Caustic Solution Tank T-3 and unpaved area northeast of Building 4133	2c, 3 ⁽³⁾	B4133 - 2	Benzene; gasoline range organics; 1,2,4-trimethylbenzene	--	--
Rinse Tanks T-4A and T-4B	2d	--	--	--	--
Temporary Holding Tank	2e	--	--	--	--
Unpaved area north of Building 4133	3 ⁽³⁾	B4133 – 1	Aroclor 1254	--	--
Building 4133 Storage and Staging Area, and Debris Areas	3, 4c, 4d	--	--	--	--
Western Debris Areas	4a, 4b	--	--	--	--
Northwest Excavation Area	5	--	--	--	--
Former Building 4654 Interim Storage Facility	6	--	--	--	--

General Notes:

'--' Indicates area is recommended for No Further Action (NFA) for respective receptor, or parameter not applicable; not recommended for CMS evaluation.

Notes:

- (1) Extent of CMS Areas shown on Figure B.5-1 and are approximate and reflect site action recommendations based on characterization and risk assessment results inclusive for all receptors (See Section B.5).
- (2) CMS recommendations are based on compounds considered risk drivers (excess cancer risk > 1 x 10⁻⁶ or hazard index > 1) and/or significant risk contributors.
- (3) The CMS area only covers a portion of this chemical use area.
- (4) Although lithium was identified as a human health risk contributor, the maximum detected soil concentration is less than background (33.9 mg/kg vs 37 mg/kg); thus, areas not recommended for further evaluation in the CMS.
- (5) Although cadmium was identified as a risk driver for the thrush and deer mouse, the maximum detected soil concentration is approximately equal to background (1.1 mg/kg vs 1 mg/kg); thus, areas not recommended for further evaluation in the CMS.

Acronyms:

CMS - Corrective Measures Study
mg/kg - milligrams per kilogram
NFA - no further action
RFI - Resource Conservation and Recovery Act Facility Investigation

TABLE B.5-2
SUMMARY OF B4133 RFI SITE SURFICIAL MEDIA CMS RECOMMENDATIONS
(Page 1 of 1)

CMS Area	Description	Chemical Risk Drivers and Contributors	Rationale
B4133 – 1	Area north of Building 4133	Aroclor 1254	Elevated Aroclor 1254 detected in the unpaved area north of site, collocated with elevated sodium results. Extent delineated by sampling results, topography, bedrock outcrops, and drainage pathways.
B4133 – 2	Area northeast of Building 4133	Benzene, gasoline range organics, 1,2,4-trimethylbenzene	Elevated benzene, gasoline range organics, and 1,2,4-trimethylbenzene detected in northeast portion of site adjacent to tank T-3. Extent delineated by sampling results.

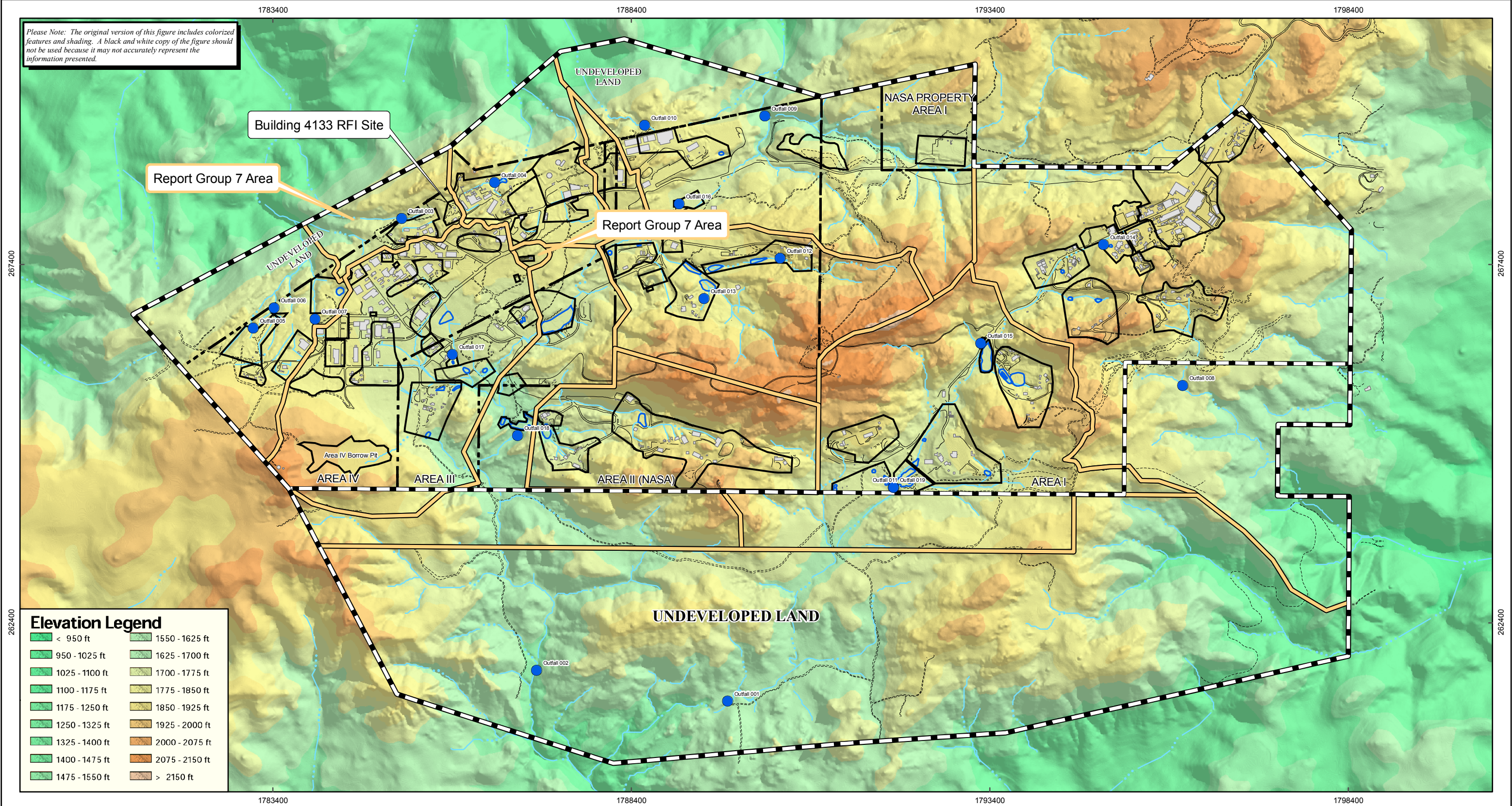
Acronyms:

CMS – Corrective Measures Study

RFI – Resource Conservation and Recovery Act Facility Investigation

FIGURES

Please Note: The original version of this figure includes colored features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.



0 1,300
FEET

MAP COORDINATES IN
STATEPLANE, NAD 27, ZONE V

AREA I

SWMU 4.1 - B1 Area
SWMU 4.2 - Area I Landfill
SWMUs 4.3, 4.4 and AOC - Instrument and Equipment Laboratories (IEL)
SWMU 4.5, 4.6 - LOX Plant Former Sump/Clarifier and Drum Disposal Area
SWMU 4.7 - Component Test Laboratory III (CTL-III) Area
SWMU 4.8 - Area I Burn Pit
SWMU 4.9, 4.10, 4.11, AOC - Advanced Propulsion Test Facility (APTF) Area
SWMU 4.12 - Laser Engineering Test Facility (LETf) Component Test Lab (CTL-1) Area
SWMU 4.14 Canyon Area
SWMU 4.15 and AOC - Bowl Area and Building 901 Leachfield
SWMU 4.16 - Area I Reservoir (R-1 Pond)
SWMU 4.17 - Perimeter Pond
AOC - Building 1359 Sump
AOC - Happy Valley Area
AOC - CTL-V

AREA II

SWMU 5.1 - Area II Landfill
SWMU 5.2 - ELV Final Assembly Building 2206
SWMU 5.5 and AOC - Building 2204 Area
SWMU 5.6 - Former Incinerator Ash Pile
SWMU 5.7 - Hazardous Waste Storage Area Waste Coolant Tank (WCT)
SWMU 5.9, 5.10, 5.11 - Alfa Area
SWMU 5.12, 5.13, 5.14, 5.15 - Alfa/Bravo Skim Pond and Bravo Area
SWMU 5.18, 5.19 - Coca Area
SWMU 5.20, 5.21, 5.22 - Propellant Load Facility (PLF)
SWMU 5.23, 5.24 - Delta Area
SWMU 5.26 - R-2A and R2B Ponds
AOC - Building 2515 Sewage Treatment Plant
AOC - Storable Propellant Area (SPA)
AOC - Alfa/Bravo Fuel Farm
AOC - Coca/Delta Fuel Farm

AREA II (cont)

AOC - Building 2224 Leach Field
AREA III
SWMUs 6.1, 6.3, AOC - Engineering Chemistry Laboratory (ECL) Area
SWMU 6.4 - Compound A Facility
SWMU 6.5 - Systems Test Laboratory IV (STL-IV) Area
SWMU 6.8 - Silvernale Reservoir
SWMU 6.9 - Environmental Effects Laboratory (EEL)
AOC - Sewage Treatment Plant (STL) Pond Area
AREA IV
SWMU 7.1 - Building 4056 Landfill
SWMU 7.2 - Building 4133, Sodium Burn Facility
SWMU 7.3 - Former Sodium Disposal Facility (FSDF)
SWMU 7.4 - Old Conservation Yard (OCY)
SWMU 7.5 - Building 4100 Trench
SWMU 7.6 - Radioactive Materials Handling Facility (RMHF)

AREA IV (cont)

SWMU 7.7 - Rockwell International Hot Laboratory (RIHL)
SWMU 7.8 - New Conservation Yard (NCY)
SWMU 7.9 - ESADA Chemical Storage Area
SWMU 7.10 - Former Coal Gasification PDU
SWMU 7.11 - Building 4029, Reactive Metal Storage Yard
AOC - Former Hazardous Materials Storage Area (HMSA)
AOC - Chemistry Laboratory Metals Clarifier
AOC - Pond Dredge Area
AOC - Sodium Reactor Experiment (SRE) Area
AOC - SE Drum Storage Yard
AOC - SNAP Facility
AOC - Boeing Area IV Leach Fields
AOC - DOE Area IV Leach Fields
AOC - Building 4008 Warehouse

Legend

- | | |
|-------------------------|---------------|
| SSFL Property Boundary | Pond |
| Administrative Boundary | Drainage |
| Report Group Boundary | Dirt Road |
| RFI Site Boundary | Road |
| Building | NPDES Outfall |

B4133
RFI Site Location Map
SANTA SUSANA FIELD LABORATORY

Document: RFI-Report-Group7-Appendix-B4133-RFI_Site_Location.mxd



Date: Jun 11, 2009

FIGURE
B.1-1

Chemical Use Areas
B4133 RFI Site

- Base Map Legend**
- Administrative Area Boundary
 - RFI Site Boundary
 - Report Group Boundary
 - Existing Building or Structure
 - Removed Building or Structure
 - Other Tanks
 - Solvent Tank
 - Petroleum Fuel/Oil Tank
 - Hydrazine Tank
 - Awning
 - Sump
 - Vaults and Pits
 - Ponds
 - Dirt Road
 - A/C Paving
 - Fence
 - Pipe
 - Leach Field
 - Sewer Line
 - Manhole
 - NPDES Outfall
 - Well
 - Drainage
 - Lined Drainage
 - Surface Water Divide
 - Rock Outcrop
 - Excavation
 - Elevation Contour

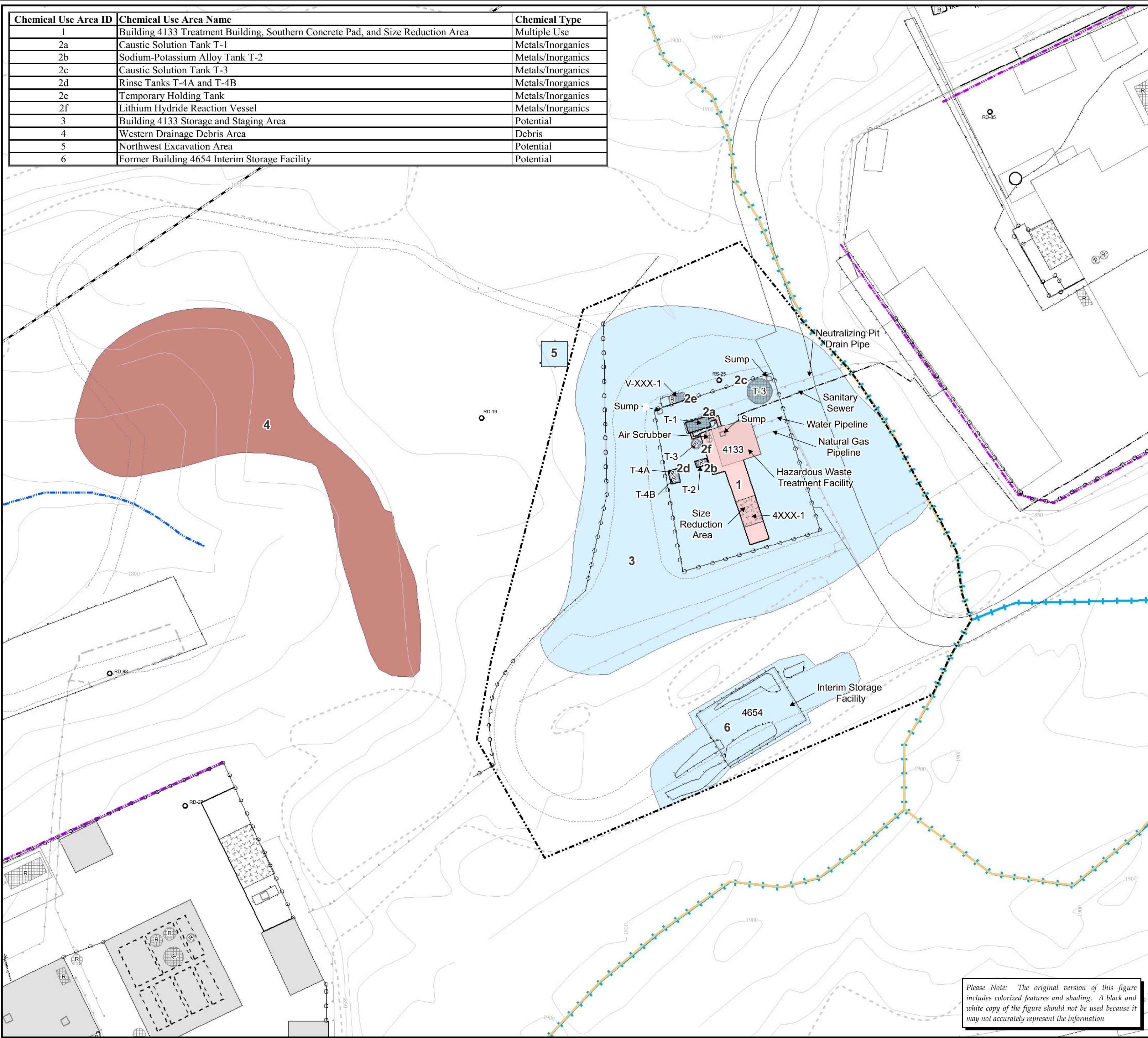
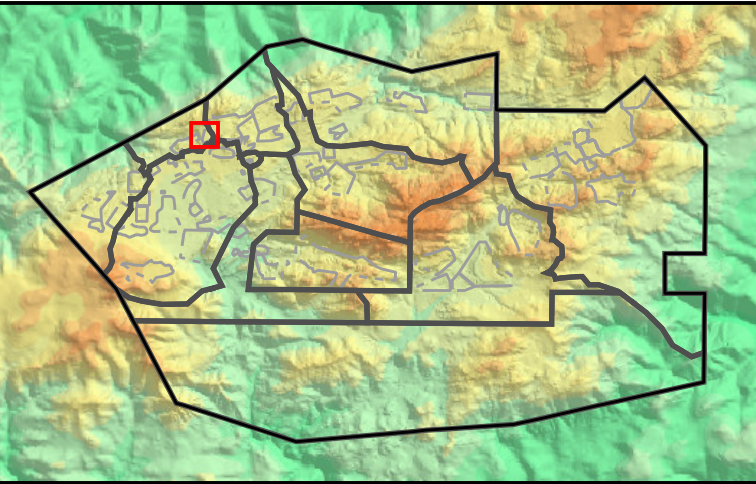
(R) = Removed Tank

Chemical Use Area ID	Chemical Use Area Name	Chemical Type
1	Building 4133 Treatment Building, Southern Concrete Pad, and Size Reduction Area	Multiple Use
2a	Caustic Solution Tank T-1	Metals/Inorganics
2b	Sodium-Potassium Alloy Tank T-2	Metals/Inorganics
2c	Caustic Solution Tank T-3	Metals/Inorganics
2d	Rinse Tanks T-4A and T-4B	Metals/Inorganics
2e	Temporary Holding Tank	Metals/Inorganics
2f	Lithium Hydride Reaction Vessel	Metals/Inorganics
3	Building 4133 Storage and Staging Area	Potential
4	Western Drainage Debris Area	Debris
5	Northwest Excavation Area	Potential
6	Former Building 4654 Interim Storage Facility	Potential

- Chemical Use Area**
- Multiple Use
 - Metals / Inorganics
 - Leach Field
 - Solvents
 - Perchlorate / Energetics
 - Potential
 - Petroleum
 - Hydrazine
 - Oils / PCBs
 - Debris

Document: RFI-Report-Group7-Appendix-B4133-CUA_C.mxd Date: Jun 07, 2009

1 inch = 40 feet
0 40 80 Feet

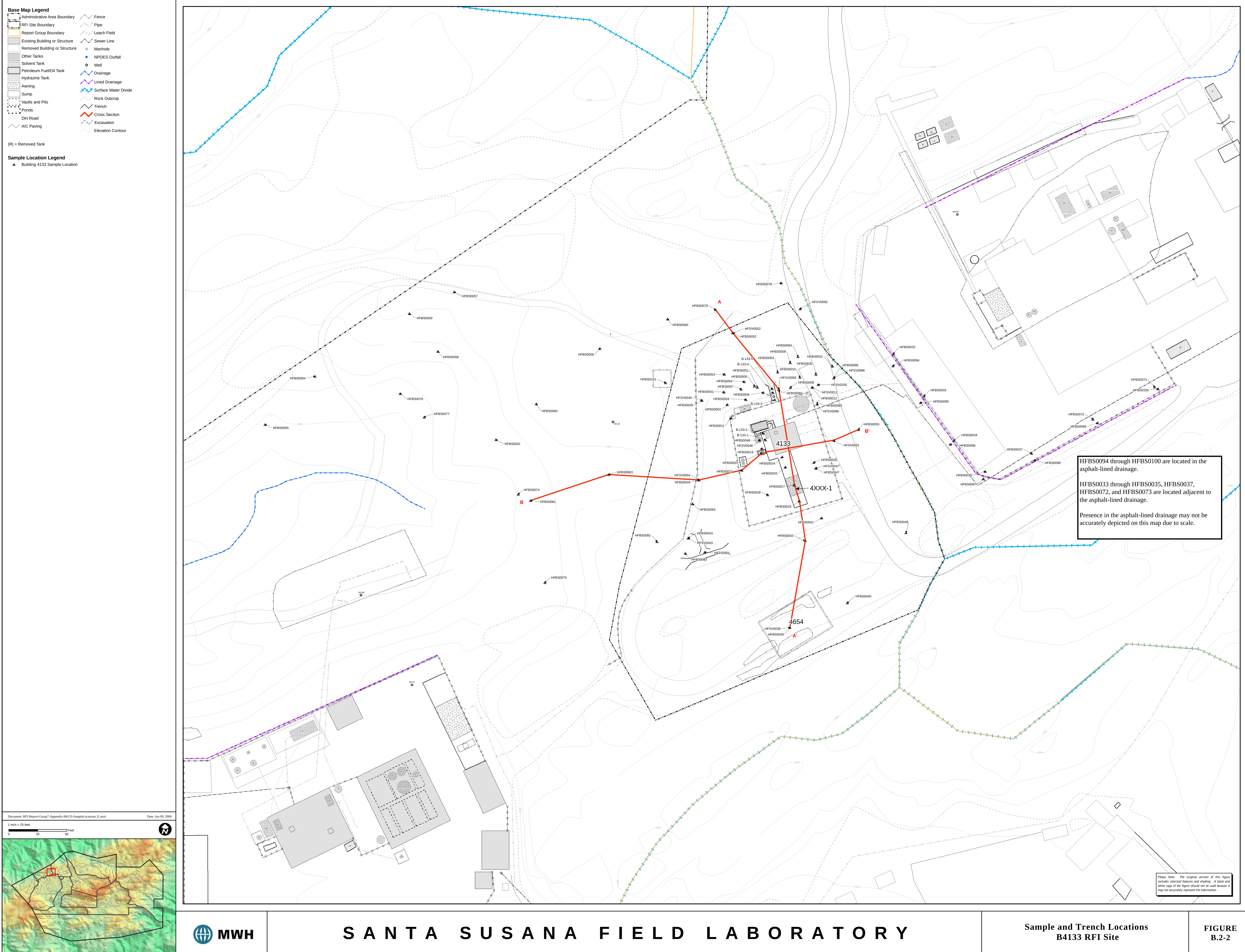


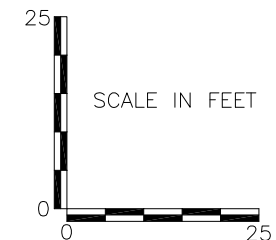
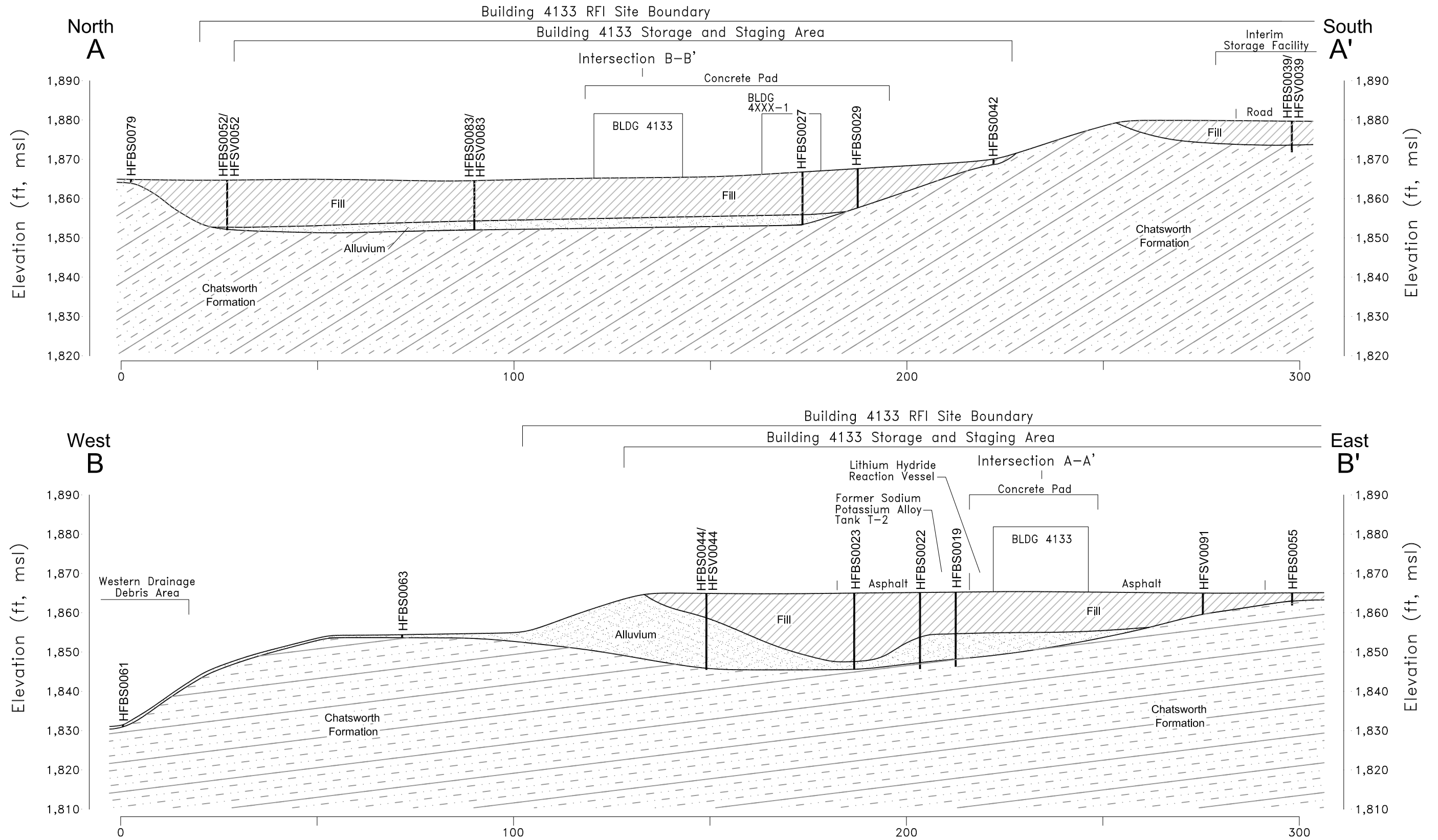
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SANTA SUSANA FIELD LABORATORY

FIGURE B.2-1





MWH

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
MAY 2009
SURFICIAL CROSS SECTIONS
A-A' & B-B'
BLDG 4133 RFI SITE
FIGURE B.2-3

Soil Disturbance Areas
B4133 RFI Site

- Base Map Legend**
- | | |
|------------------------------|----------------------|
| Administrative Area Boundary | Dirt Road |
| RFI Site Boundary | A/C Paving |
| Report Group Boundary | Fence |
| Existing Building | Pipe |
| Removed Building | Leach Field |
| Other Tanks | NPDES Outfall |
| Solvent Tank | Well |
| Petroleum Fuel/Oil Tank | Drainage |
| Hydrazine Tank | Lined Drainage |
| Awning | Surface Water Divide |
| Sump | Rock Outcrop |
| Vaults and Pits | Excavation |
| Ponds | Elevation Contour |

Note: This figure is created to depict current conditions.

Soil Disturbance Areas

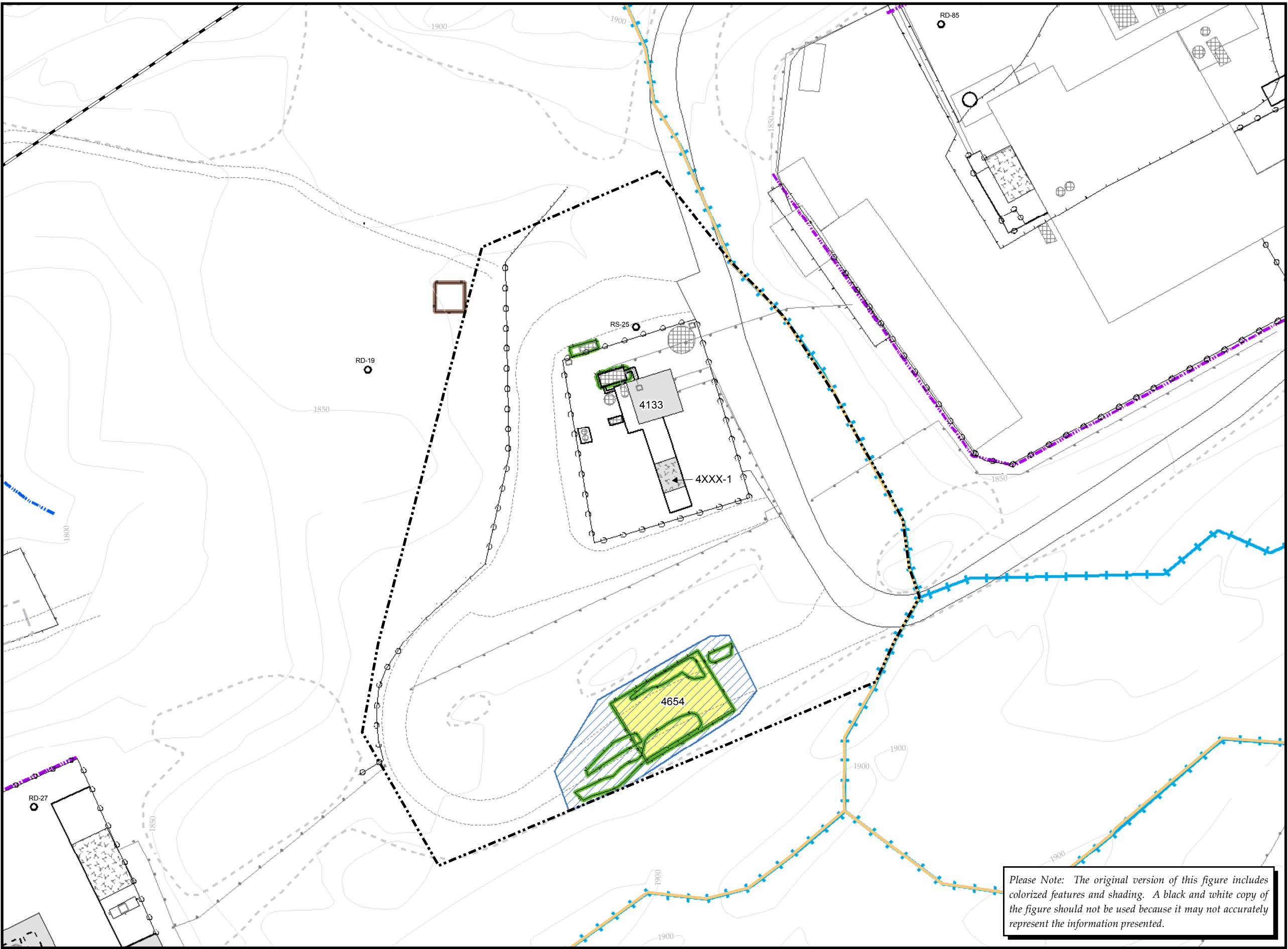
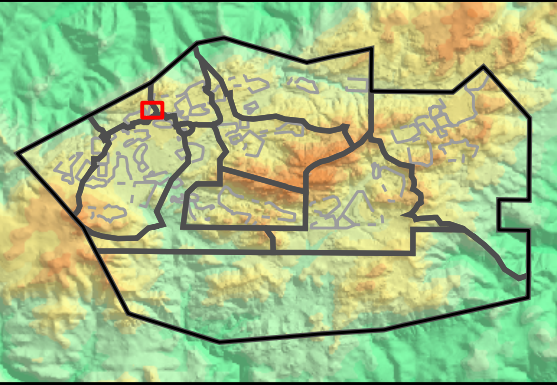
- | | |
|--|---|
| | Excavation |
| | Excavation-Backfill |
| | Grading |
| | Building Foundation & Asphalt / Concrete Demolition (minimal grading) |

Note: The soil disturbances shown include only those areas or features found within the RFI Site.

Document: RFI-Report-Group7-Appendix-B4133-SoilDisturbance_11x17.mxd Date: Jun 07, 2009

1 inch = 50 feet

0 50 100 Feet



Soil Sample Location Symbol Legend

- ▲ Soil sample location with detected VOCs Chemical Data
- ▲ Soil sample location with no detected VOCs Chemical Data
- ▲ Contained unit soil sample
- ▲ Refused sample (refusal depth < 1' below ground surface)
- ▲ Soil sample location not analyzed for VOCs Chemical Data
- ▲ Soil sample not analyzed by any sample method

Data Box Information

Sample Location ID: **1.00** **Primary** **RMDFSS01** **7/10/2005**

Depth in Feet: **12.05**

Sample Type: **J**

Unique Sample Identifier: **12.05**

Date: **7/10/2005**

Historical Sample: **NA**

QC: **NA**

Notes:

- 12.05 Detect with sample concentration shown
- <0.06 Non-Detect with lab detection limit shown
- J Analyte positively identified. Associated numerical value is considered estimated
- E Data validation not performed
- Data not validated, laboratory qualifier for estimated value
- QC Data not validated, laboratory qualifier for internal lab QC issue
- NA Analysis not conducted
- If more than one result per column, the maximum is presented, with number of results in brackets.

Note: *12.05" and *0.06" are for reference only and may not represent actual sample results.

Detect: **12.05**

Non-Detect: **<0.06**

Exceeds Res RBSL: **<0.06**

Exceeds Eco RBSL: **<0.06**

Exceeds Res RBSL + Eco RBSL: **<0.06**

Comparison Levels

Soil Matrix VOCs	Res RBSL (mg/kg)	Eco RBSL (mg/kg)
Acetone	482,143.9253	42,710.5703
Methyl ethyl ketone	62,000.0000	2,540.0000
m-Xylene & p-Xylene	0.1900	64.065854
n-Butylbenzene	0.1900	64.065854
Styrene	0.1900	64.065854
Toluene	0.1900	64.065854
Soil Matrix VOCs (ug/kg)	40,740.0000	64,065.8554
1,2,4-Trimethylbenzene	38.0000	64,065.8554
1,3,5-Trimethylbenzene	482,143.9253	42,710.5703
Acetone	4,645.0000	210,000.0000
Cumene	62,000.0000	2,540.0000
Methyl ethyl ketone	4,000.0000	24,985.6836
Methylene chloride	114,699.7159	210,000.0000
n-Butylbenzene	0.0000	210,000.0000
n-Propylbenzene	203.2675	210,000.0000
p-Cymene	190.0000	64,065.8554
sec-Butylbenzene	297,54.6624	210,000.0000
Styrene	720.0000	427,105.7027
Tetrahydrofuran	0.4300	5,979.4788
Toluene	233.5017	3,416.8456
Xylenes, Total	150.0000	64,065.8554
Soil Vapor VOCs (ug/L)	0.0950	0.5700
1,1,2-Trichloro-1,2,2-trifluoroethane	290.0000	23.0000
Benzene	29.0000	16.0000
Ethylbenzene	0.4523	24.0000
m-Xylene & p-Xylene	110.0000	0.0840
n-Butylbenzene	110.0000	0.0840
Styrene	110.0000	0.0840
Toluene	110.0000	0.0840

Note: (ug/kg) = micrograms per kilogram

Note: (ug/L) = micrograms per liter

Note: (ug) = micrograms

Note: For the chemical result boxes, if results are not listed for a VOCs analyte, this indicates the analyte was not analyzed.

Res RBSL Residential Risk-Based Screening Level

Eco RBSL Ecological Risk-Based Screening Level

Base Map Legend

- Administrative Area Boundary
- RFI Site Boundary
- Report Group Boundary
- Existing Building or Structure
- Removed Building or Structure
- Other Tanks
- Solvent Tank
- Petroleum Fuel/Oil Tank
- Hydrazine Tank
- Awning
- Sump
- Vaults and Pits
- Fonds
- Dirt Road
- A/C Paving
- Fence
- Pipe
- Leach Field
- NPDES Outfall
- Well
- Drainage
- Lined Drainage
- Surface Water Divide
- Rock Outcrop
- Trench
- Excavation
- Elevation Contour

Chemical Use Area

- Multiple Use
- Solvents
- Petroleum
- Oils / PCBs
- Metals / Inorganics
- Perchlorate / Energetics
- Hydrazine
- Leach Field
- Potential

Document: RFI Report Group 7-Drinking B4133-VOC.mxd

Date: Jun 10, 2009

1 inch = 25 feet

ANSI E 34 x 44

1 inch = 25 feet

ANSI E 34 x 44

1 inch = 25 feet

ANSI E 34 x 44

1 inch = 25 feet

ANSI E 34 x 44

1 inch = 25 feet

ANSI E 34 x 44

1 inch = 25 feet

ANSI E 34 x 44

1 inch = 25 feet

ANSI E 34 x 44

1 inch = 25 feet

ANSI E 34 x 44

1 inch = 25 feet

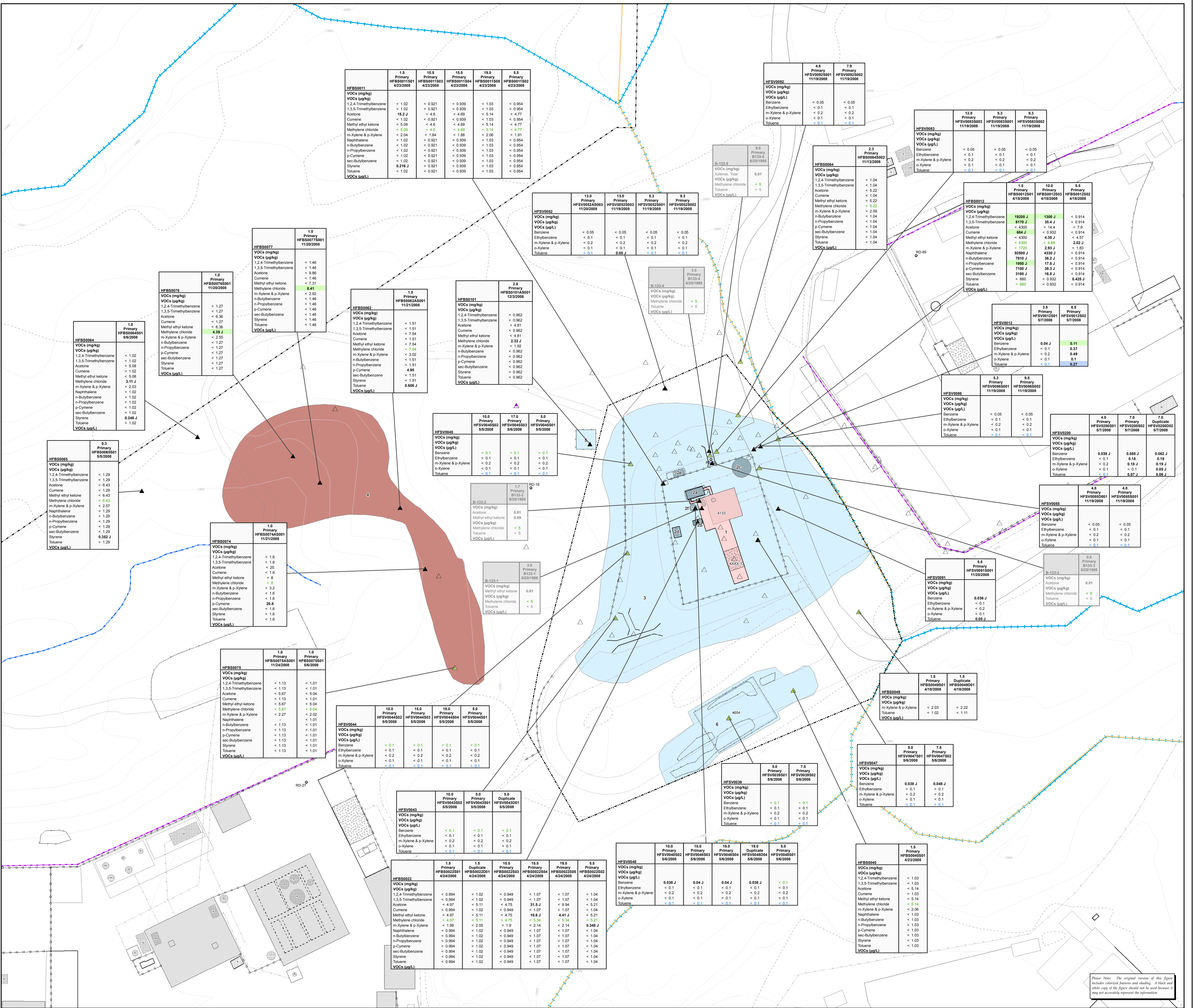
ANSI E 34 x 44

1 inch = 25 feet

ANSI E 34 x 44

1 inch = 25 feet

ANSI E 34 x 44



Soil Sample Location Symbol Legend

- ▲ Soil sample location with detected SVOCs Chemical Data
- ▲ Soil sample location with no detected SVOCs Chemical Data
- ▲ Contained unit soil sample
- ▲ Refused sample (refusal depth < 1' below ground surface)
- ▲ Soil sample location not analyzed for SVOCs Chemical Data
- ▲ Soil sample not analyzed by any sample method

Data Box Information

Sample Location ID: **1.00** Primary **RMDF5591** 7/19/2005

Depth in Feet: **12.05**

Sample Type: **RMDF5591**

Unique Sample Identifier: **7/19/2005**

Historical Sample: **12.05**

Non-Detect with sample concentration shown

Non-Detect with lab detection limit shown

Analyte positively identified; Associated numerical value is considered estimated

Data validation not performed

Data not validated, laboratory qualifier for estimated value

Data not validated, laboratory qualifier for internal lab QC issue

Analysis not conducted

If more than one result per column, the maximum is presented, with number of results in brackets

Detect **Non-Detect**

12.05 **<0.06** Exceeds Res RBSL

12.05 **<0.06** Exceeds Eco RBSL

12.05 **<0.06** Exceeds Res RBSL + Eco RBSL

Comparison Levels

SVOCs	Res RBSL (µg/kg)	Eco RBSL (µg/kg)
1-Methyl naphthalene	24716.0871	210000.0000
2-Methylnaphthalene	230000.0000	210000.0000
Acenaphthylene	3400000.0000	2455.5351
Acenaphthylene	3400000.0000	270383.6107
Anthracene	17000000.0000	2384.0085
Benzo(a)anthracene	600.0000	1418.4033
Benzo(a)pyrene	60.0000	5595.0847
Benzo(b)fluoranthene	600.0000	4359.7436
Benzo(ghi)perylene	0.0000	6411.1389
Benzo(k)fluoranthene	600.0000	5762.7470
Butyl benzyl phthalate	377249.0243	339549.0336
Chrysene	6000.0000	2358.9445
Di-n-butyl phthalate	5700000.0000	488.2013
Di-n-octyl phthalate	2300000.0000	13000.0000
Dibenz(a,h)anthracene	170.0000	5595.0847
Diethyl phthalate	46000000.0000	6940467.6688
Dimethyl phthalate	570000000.0000	4438.1939
Fluoranthene	2300000.0000	38000.0000
Fluorene	23000000.0000	1645.5450
Indeno(1,2,3-cd)pyrene	600.0000	5820.8899
Naphthalene	1146590.7159	210000.0000
Phenanthrene	17000000.0000	1313.8397
Pyrene	17000000.0000	18000.0000
bis(2-Ethylhexyl) phthalate	2500000.0000	4926.3953
n-Nitrosodimethylamine	45.0000	20000.0000

Note: (µg/kg) = micrograms per kilogram

Note: For the chemical result boxes, if results are not listed for a SVOCs analyte, this indicates the analyte was not analyzed.

Res RBSL Residential Risk-Based Screening Level

Eco RBSL Ecological Risk-Based Screening Level

Base Map Legend

- Administrative Area Boundary
- RFI Site Boundary
- Report Group Boundary
- Existing Building or Structure
- Removed Building or Structure
- Other Tanks
- Solvent Tank
- Petroleum Fuel/Oil Tank
- Hydrazine Tank
- Awning
- Sump
- Vaults and Pits
- Ponds
- Dirt Road
- A/C Paving
- Fence
- Pipe
- Leach Field
- NPDES Outfall
- Well
- Drainage
- Lined Drainage
- Surface Water Divide
- Rock Outcrop
- Trench
- Excavation
- Elevation Contour

Chemical Use Area

- Multiple Use
- Metals / Inorganics
- Leach Field
- Solvents
- Perchlorate / Energetics
- Potential
- Petroleum
- Hydrazine
- Oils / PCBs
- Debris

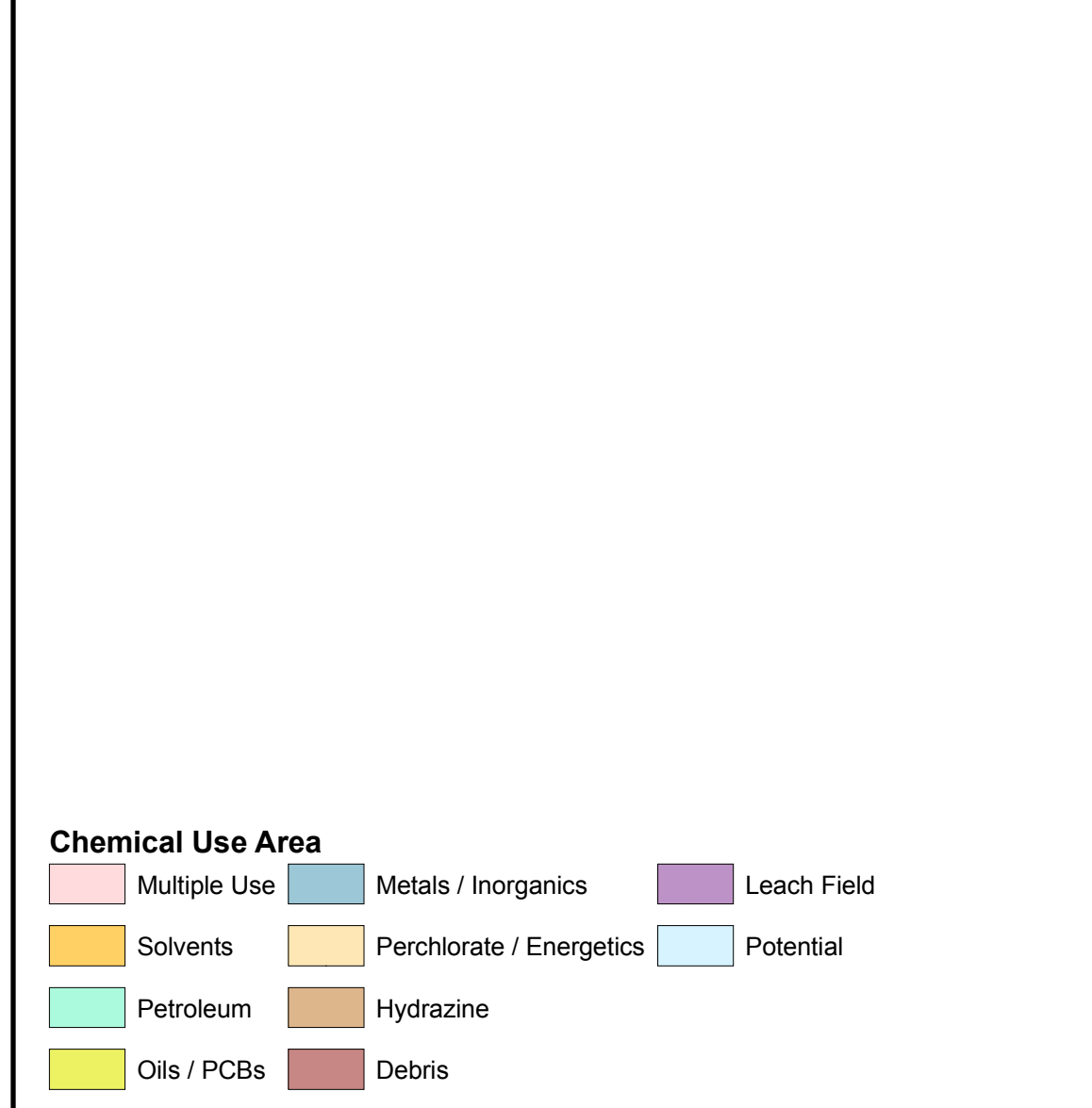
Document: RFI-Report-Group7-Dough-B4133-SVOC_East.mxd

Date: Jun 10, 2009

1 inch = 25 feet

0 25 50 Feet

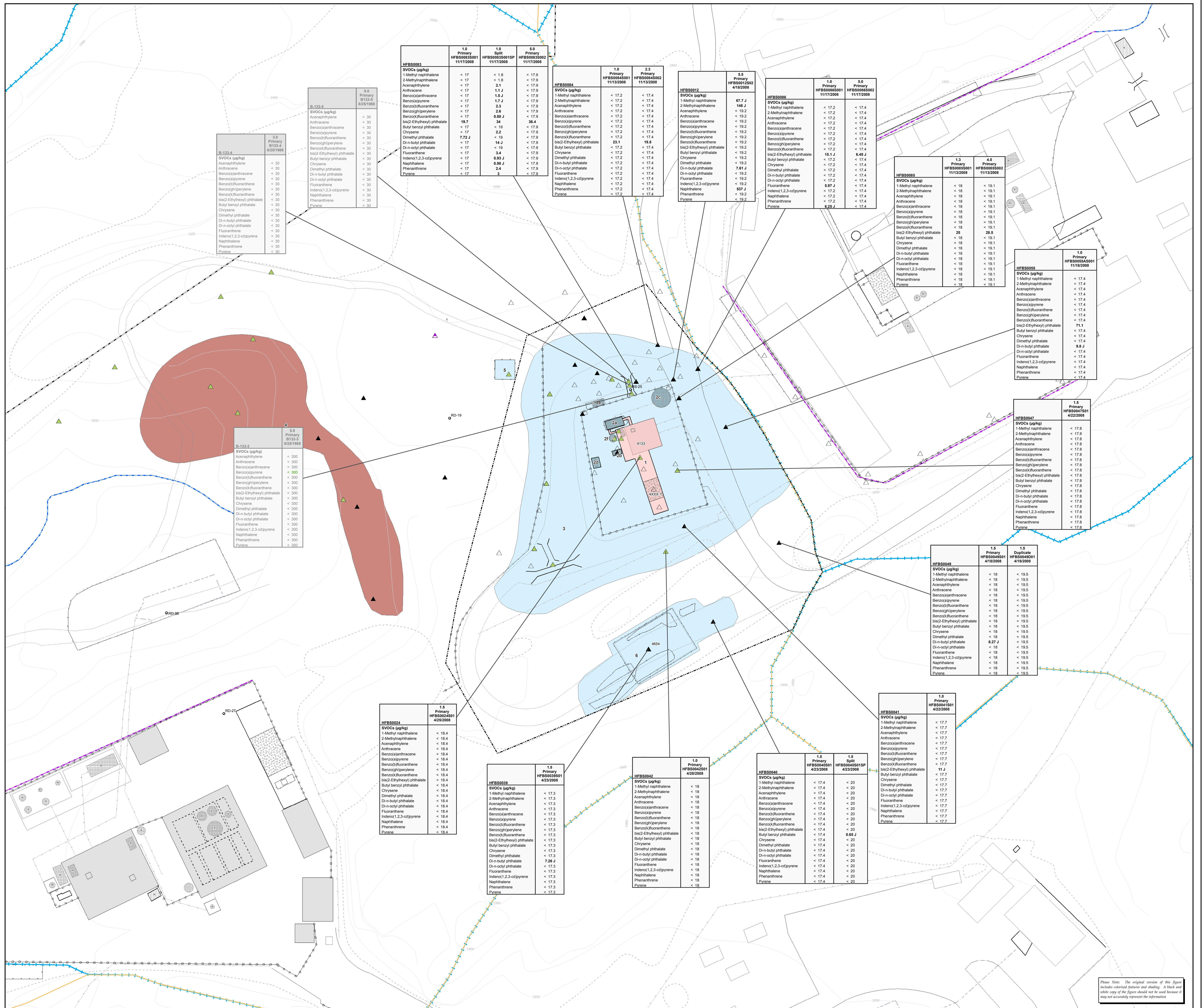
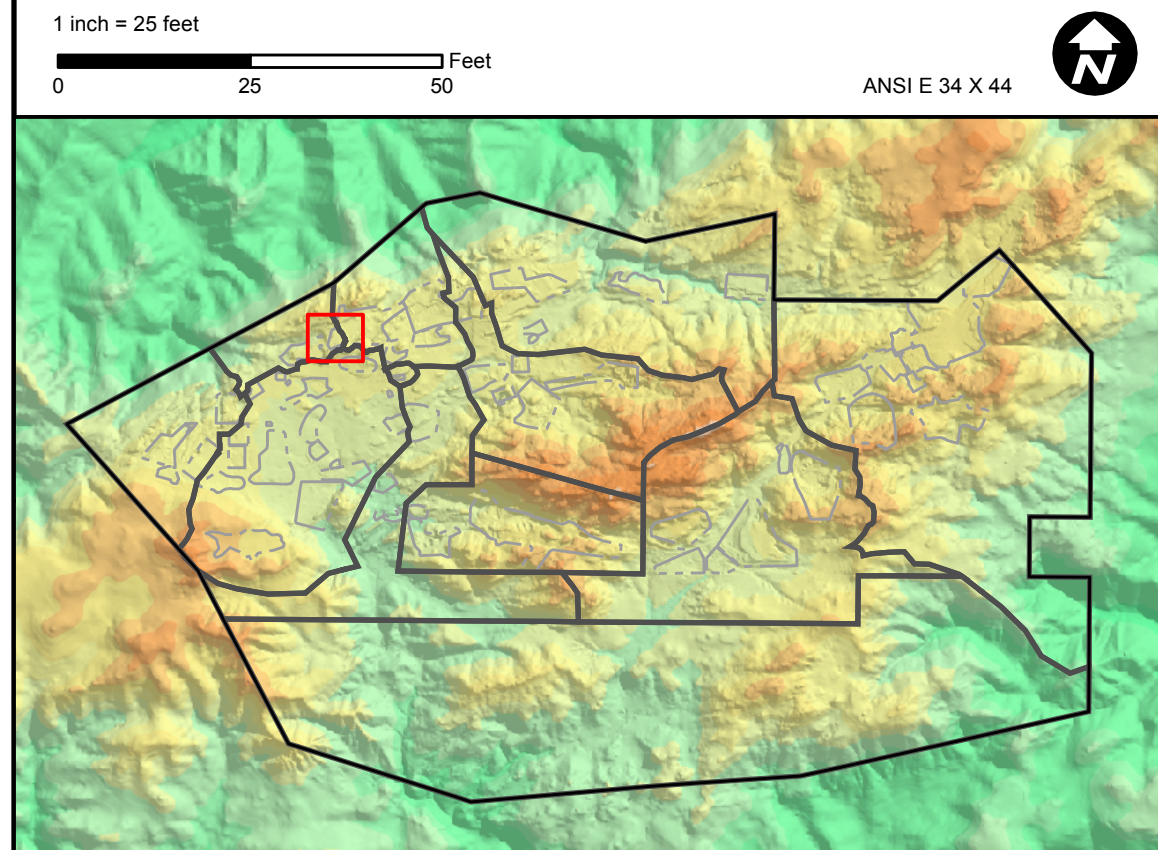
ANSI E 34 X 44



1 inch = 25 feet

0 25 50 Feet

ANSI E 34 X 44



Soil Sample Location Symbol Legend

- ▲ Soil sample location with detected SVOCs Chemical Data
- △ Soil sample location with no detected SVOCs Chemical Data
- △ Contained unit soil sample
- △ Refused sample (refusal depth < 1' below ground surface)
- △ Soil sample location not analyzed for SVOCs Chemical Data
- △ Soil sample not analyzed by any sample method

Data Box Information

Sample Location ID: **1.00** Primary **RMDF5901** 7/19/2005

Depth in Feet: **12.05**

Sample Type: **RMDF5901**

Unique Sample Identifier: **7/19/2005**

Historical Sample

12.05 Detect with sample concentration shown

<0.06 Non-Detect with lab detection limit shown

J Analyte positively identified; Associated numerical value is considered identified

E Data validation not performed

***** Data not validated, laboratory qualifier for estimated value

QC Data not validated, laboratory qualifier for internal lab QC issue

NA Analysis not conducted

[#] If more than one result per column, the maximum is presented, with number of results in brackets

Detect **Non-Detect**

12.05 **<0.06** Exceeds Res RBSL

12.05 **<0.06** Exceeds Eco RBSL

12.05 **<0.06** Exceeds Res RBSL + Eco RBSL

Comparison Levels

SVOCs	Res RBSL (µg/kg)	Eco RBSL (µg/kg)
1-Methyl naphthalene	24716.0871	210000.0000
2-Methylnaphthalene	230000.0000	210000.0000
Acenaphthene	3400000.0000	2455.5351
Acenaphthylene	3400000.0000	270383.6107
Anthracene	17000000.0000	2384.0085
Benzo(a)anthracene	600.0000	1418.4033
Benzo(a)pyrene	60.0000	5595.0847
Benzo(b)fluoranthene	600.0000	4359.7436
Benzo(g,h,i)perylene	0.0000	6411.1389
Benzo(k)fluoranthene	600.0000	5762.7470
Butyl benzyl phthalate	377249.0243	339549.0336
Chrysene	6000.0000	2358.5445
Di-n-butyl phthalate	5700000.0000	488.2013
Di-n-octyl phthalate	2300000.0000	13000.0000
Dibenz(a,h)anthracene	170.0000	5595.0847
Diethyl phthalate	57000000.0000	4438.1939
Fluoranthene	230000.0000	38000.0000
Fluorene	2300000.0000	1645.5450
Indeno(1,2,3-cd)pyrene	600.0000	5820.8899
Naphthalene	1146590.7159	210000.0000
Phenanthrene	17000000.0000	1313.8397
Phenanthrene	17000000.0000	18000.0000
Phenanthrene	250000.0000	4926.3953
Phenanthrene	45.0000	20000.0000

Note: (µg/kg) = micrograms per kilogram

Note: For the chemical result boxes, if results are not listed for a SVOCs analyte, this indicates the analyte was not analyzed.

Res RBSL Residential Risk-Based Screening Level

Eco RBSL Ecological Risk-Based Screening Level

Base Map Legend

- Administrative Area Boundary
- RFI Site Boundary
- Report Group Boundary
- Existing Building or Structure
- Removed Building or Structure
- Other Tanks
- Solvent Tank
- Petroleum Fuel/Oil Tank
- Hydrazine Tank
- Awning
- Sump
- Vaults and Pits
- Ponds
- Dirt Road
- A/C Paving
- Fence
- Pipe
- Leach Field
- NPDES Outfall
- Drainage
- Lined Drainage
- Surface Water Divide
- Rock Outcrop
- Trench
- Excavation
- Elevation Contour

Chemical Use Area

- Multiple Use
- Metals / Inorganics
- Leach Field
- Solvents
- Perchlorate / Energetics
- Potential
- Petroleum
- Hydrazine
- Oils / PCBs
- Debris

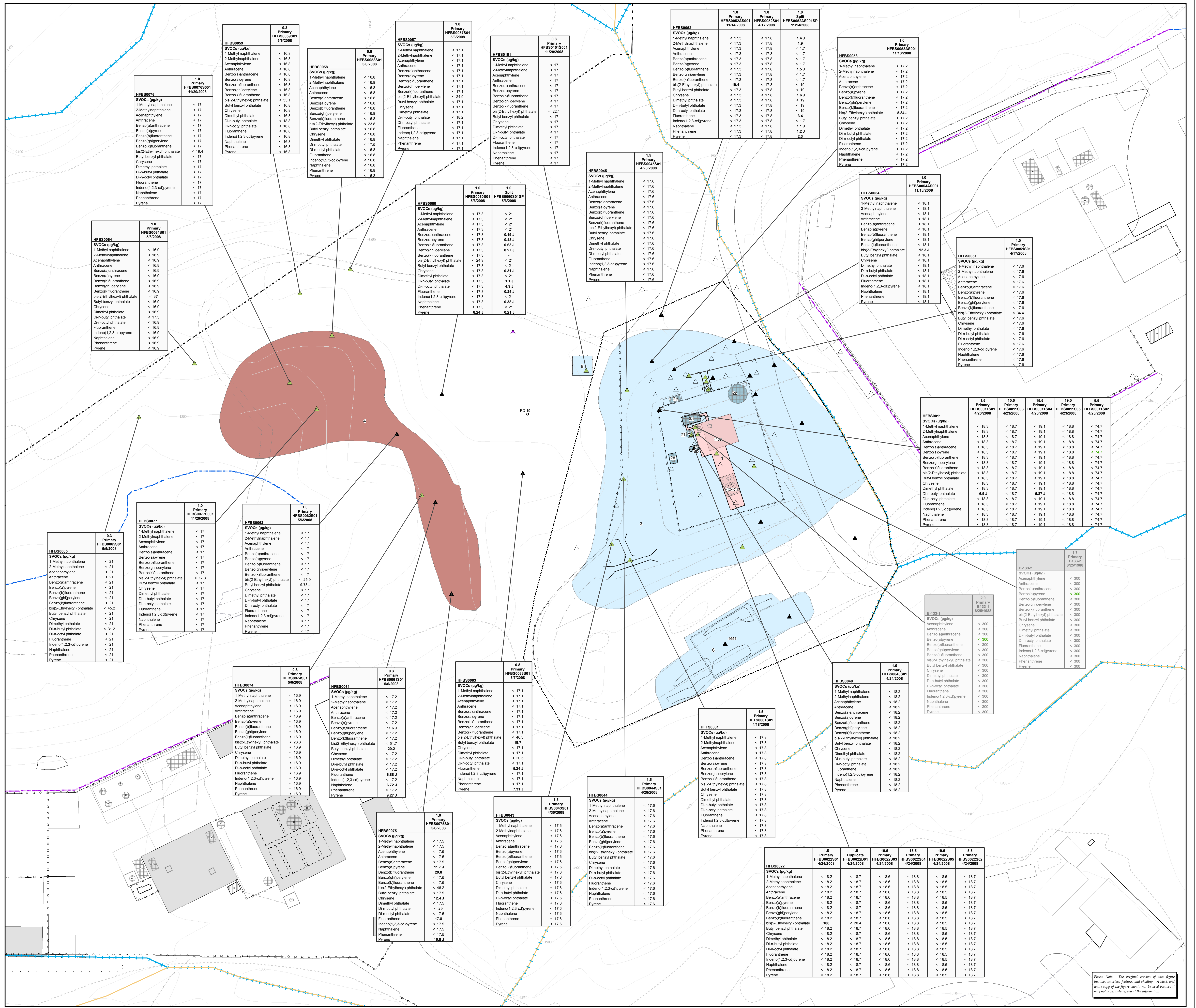
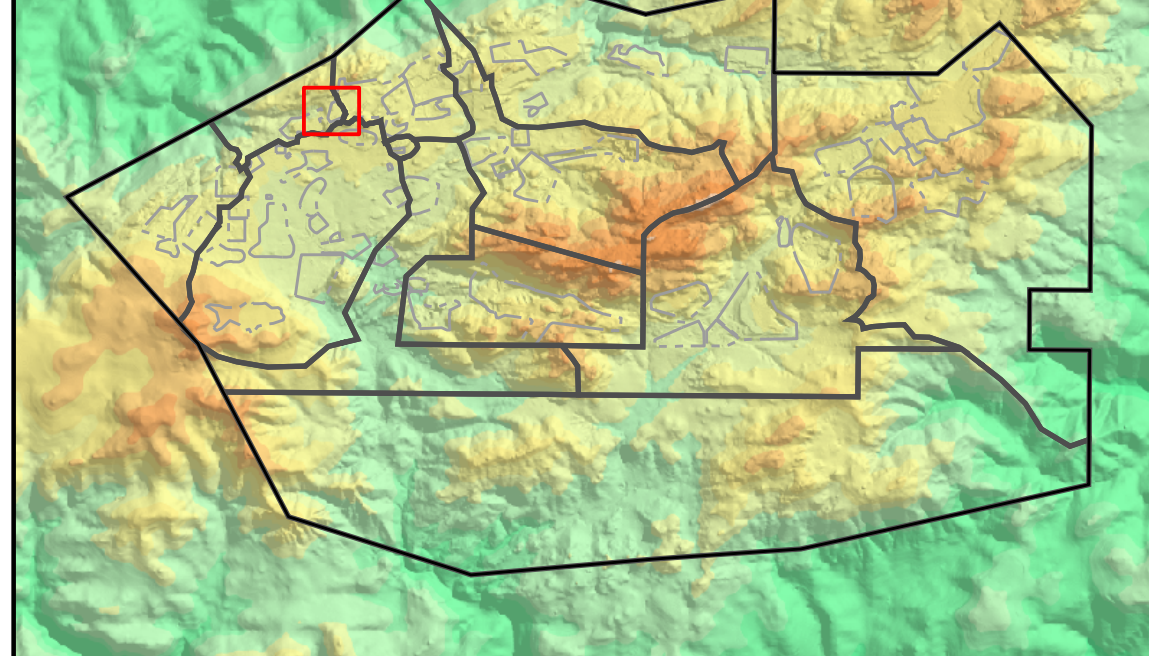
Document: B3-Report-Group7-Dougherty-B4133-SVOC_West.mxd

Date: Jun 10, 2009

1 inch = 25 feet

0 25 50 Feet

ANSI E 34.4 X 4



Soil Sample Location Symbol Legend

- ▲ Soil sample location with detected TPH Chemical Data
- △ Soil sample location with no detected TPH Chemical Data
- ◀ Contained unit soil sample
- △ Refused sample (refusal depth < 1' below ground surface)
- △ Soil sample location not analyzed for TPH Chemical Data
- △ Soil sample not analyzed by any sample method

Data Box Information

Sample Location ID	1.00 Primary RMDFS001 7/10/2005	Depth in Feet Sample Type Unique Sample Identifier Date	(Historical Sample)
12.05	< 0.06	Detect with sample concentration shown	
J		Non-Detect with lab detection limit shown	
+		Analyte positively identified. Associated numerical value is considered estimated	
*		Data validation not performed	
E		Data not validated, laboratory qualifier for estimated value	
QC		Data not validated, laboratory qualifier for internal lab QC issue	
NA		Analysis not conducted	
[W]		If more than one result per column, the maximum is presented, with number of results in brackets.	
Detect	Non-Detect	Exceeds Res RBSL	
12.05	< 0.06		

Comparison Levels

TPHs	Res RBSL (mg/kg)
Gasoline Range Organics (C08-C11)	1.1
Gasoline Range Organics (C9-C22)	1.1
Kerosene Range Organics (C12-C14)	1,400.0
Diesel Range Organics (C15 - C22)	1,400.0
Lubricant Oil Range Organics (C21-C30)	1,400.0

Note: (mg/kg) = milligrams per kilogram

Note: For the chemical result boxes, if results are not listed for a TPH analyte this indicates the analyte was not analyzed.

Note: Kerosene, diesel and lubricant oil range organics have a combined ResRBSL of 1400 mg/kg for all three hydrocarbon ranges (C12-C30).

Res RBSL Residential Risk-Based Screening Level

Base Map Legend	Legend
Administrative Area Boundary	AC Paving
RFI Site Boundary	Fence
Report Group Boundary	Pipe
Existing Building or Structure	Leach Field
Removed Building or Structure	NPDES Outfall
Other Tanks	Well
Solvent Tank	Drainage
Petroleum Fuel/Oil Tank	Lined Drainage
Hydrazine Tank	Surface Water Divide
Awning	Rock Outcrop
Sump	Trench
Vaults and Pits	Excavation
Ponds	Elevation Contour
Dirt Road	

Chemical Use Area	Legend
Multiple Use	Metals / Inorganics
Solvents	Perchlorate / Energetics
Petroleum	Hydrazine
Oils / PCBs	Debris
	Leach Field
	Potential

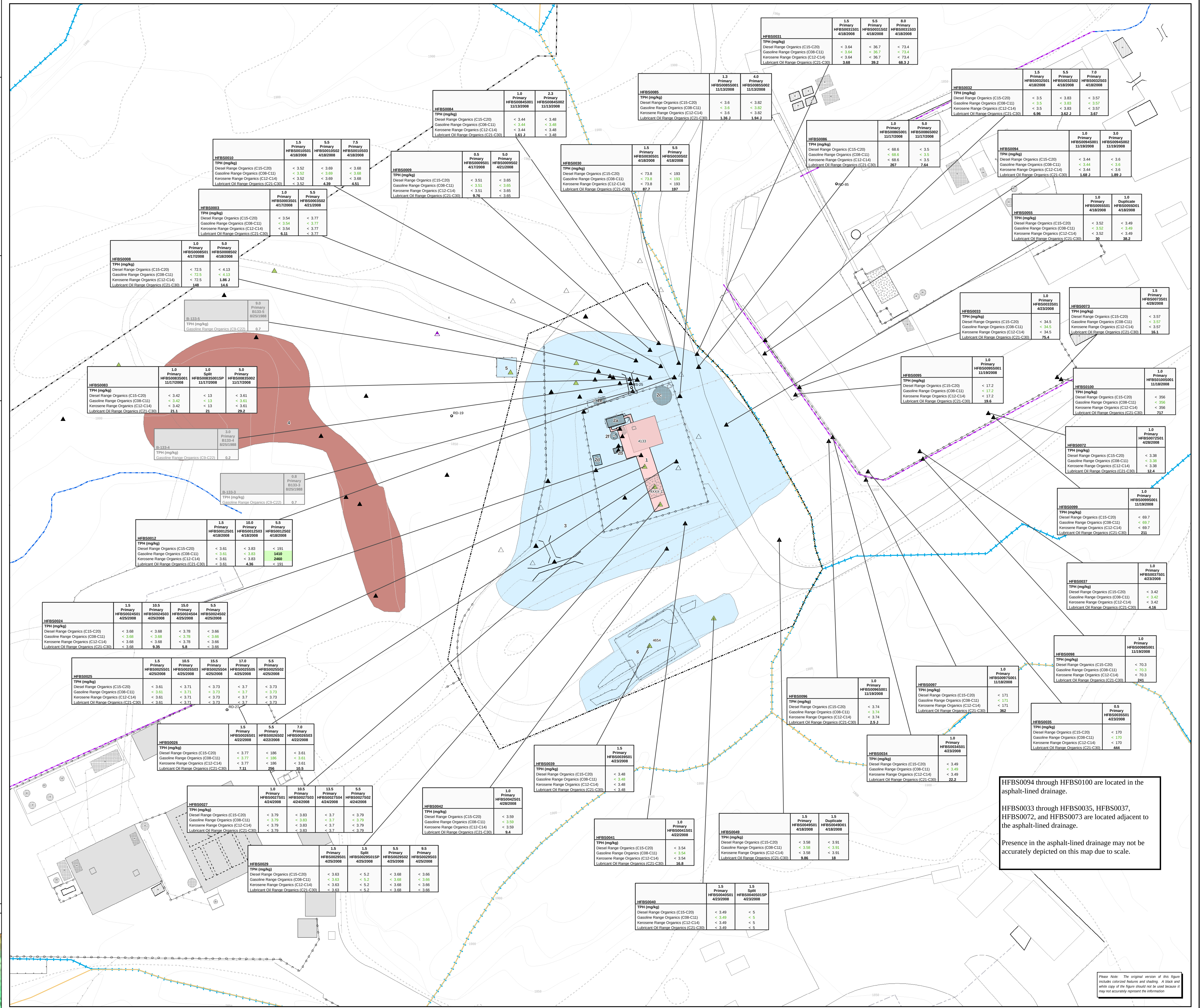
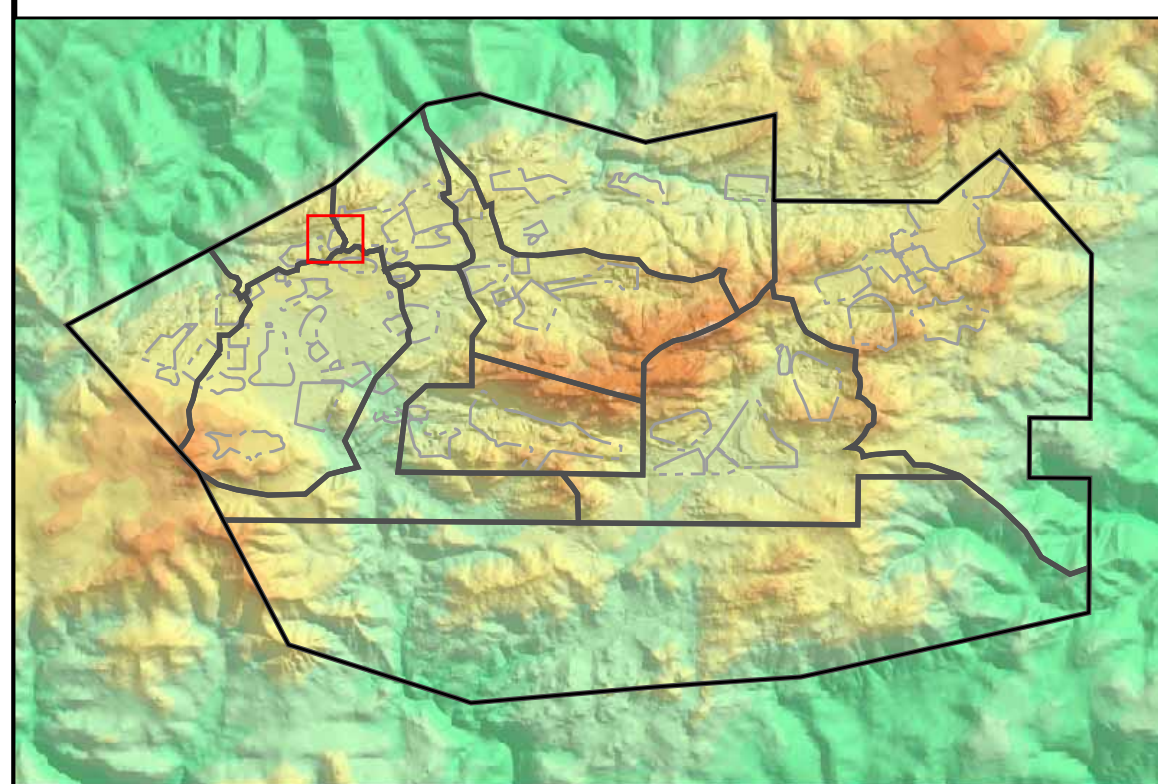
Document: RFI-Report-Group7-BayArea-B4133-TPH_East.mxd

Date: Jun 10, 2009

1 inch = 25 feet

0 25 50 Feet

ANSI E 34 x 44



HFBS0094 through HFBS0100 are located in the asphalt-lined drainage.

HFBS0033 through HFBS0035, HFBS0037, HFBS0072, and HFBS0073 are located adjacent to the asphalt-lined drainage.

Presence in the asphalt-lined drainage may not be accurately depicted on this map due to scale.

Please Note: The original version of this figure includes colored features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information.

Soil Sample Location Symbol Legend

- ▲ Soil sample location with detected TPH Chemical Data
- △ Soil sample location with no detected TPH Chemical Data
- ▲ Contained unit soil sample
- ▲ Refused sample (refusal depth < 1' below ground surface)
- ▲ Soil sample location not analyzed for TPH Chemical Data
- ▲ Soil sample not analyzed by any sample method

Data Box Information

Sample Location ID: **RMDF5** **1.00 Primary** **RMDF5S01** **7/10/2005**

Depth in Feet: **<0.06**

Sample Type: **J**

Unique Sample Identifier: **RMDF5S01**

Date: **7/10/2005**

Note: "12.05" and "<0.06" are for reference only and may not represent actual sample results.

Detect: **12.05** Non-Detect: **<0.06**

Exceeds Res RBSL

Comparison Levels

TPHs	Res RBSL (mg/kg)
Gasoline Range Organics (C08-C11)	1.1
Gasoline Range Organics (C9-C22)	1.1
Kerosene Range Organics (C12-C14)	1,400.0
Diesel Range Organics (C15 - C22)	1,400.0
Lubricant Oil Range Organics (C21-C30)	1,400.0

Note: (mg/kg) = milligrams per kilogram

Note: For the chemical result boxes, if results are not listed for a TPH analyze this indicates the analyze was not analyzed.

Note: Kerosene, diesel and lubricant oil range organics have a combined ResRBSL of 1400 mg/kg for all three hydrocarbon ranges (C12-C30).

Res RBSL Residential Risk-Based Screening Level

Base Map Legend

- Administrative Area Boundary
- RFI Site Boundary
- Report Group Boundary
- Existing Building or Structure
- Removed Building or Structure
- Other Tanks
- Solvent Tank
- Petroleum Fuel/Oil Tank
- Hydrazine Tank
- Awning
- Sump
- Vaults and Pits
- Ponds
- Dirt Road
- A/C Paving
- Fence
- Pipe
- Leach Field
- NPDES Outfall
- Well
- Drainage
- Lined Drainage
- Surface Water Divide
- Rock Outcrop
- Trench
- Excavation
- Elevation Contour

Chemical Use Area

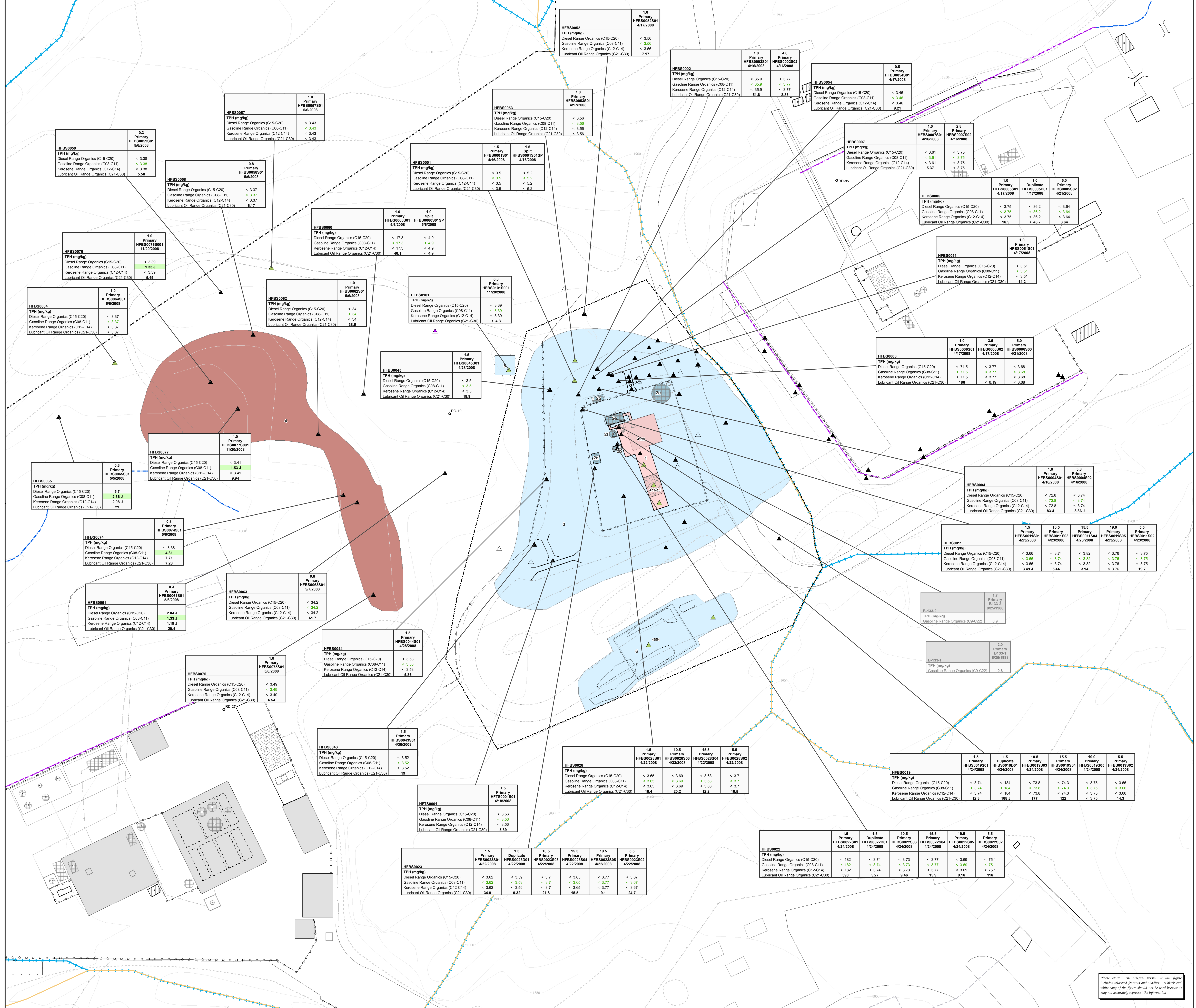
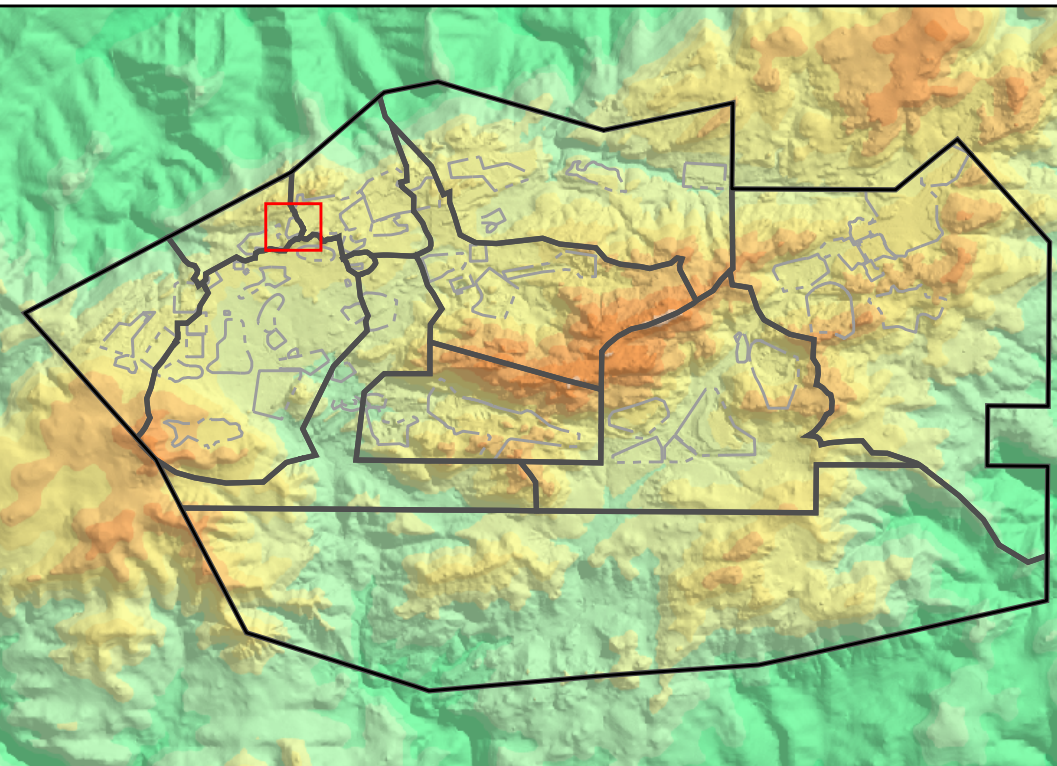
- Multiple Use
- Solvents
- Petroleum
- Oils / PCBs
- Metals / Inorganics
- Perchlorate / Energetics
- Hydrazine
- Leach Field
- Potential
- Debris

Document: RFI-Report-Group7-040404-B4133-TPH_West.mxd

Date: Jun 10, 2009

1 inch = 25 feet

ANSI E 34 X 44



- ▲ Soil sample location with detected Metals/pH/Inorganics
Chemical Data
- ▲ Soil sample location with no detected Metals/pH/Inorganics
Chemical Data
- △ Contained unit soil sample
- △ Refused sample (refusal depth < 1' below ground surface)
- △ Soil sample location not analyzed for Metals/pH/Inorganics
Chemical Data
- ▲ Soil sample not analyzed by any sample method

Sample Location ID	RMDF5	1.00	Depth in Feet	(Historical Sample)
		Primary	Sample Type	
		RMDF5S01	Unique Sample Identifier	
		7/10/2005	Date	

E	Data not validated, laboratory qualifier for estimated value
QC	Data not validated, laboratory qualifier for internal lab QC issue
NA	

Detect	Non-Detect	
12.05	<0.06	Exceeds Background
12.05	<0.06	Exceeds Background + Res RBSL
12.05	<0.06	Exceeds Background + Eco RBSL
12.05	<0.06	Exceeds Background + Res RBSL + Eco RBSL

Metals	Background	Res RBSL	Eco RBSL
	(mg/kg)	(mg/kg)	
Aluminum	20,000	75,000	12,0000
Antimony	8,7000	30,0000	0.0949
Asenic	15,0000	0.00	1.9190
Barium	140,000	1500,000	14,6000
Beryllium	1,1000	150,3254	5.0873
Boron	9,7000	15000,000	6.7600
Cadmium	1,0000	77,8248	0.0208
Chromium	36,8600	114,0000,0000	930,0000
Cobalt	21,0000	22,7763	8.9469
Copper	29,0000	3000,0000	1.0886
Hexavalent Chromium	0.0000	110,0000	0.2000
Iron	-	-	-
Lead	34,0000	150,000	0.0632
Lithium	37,0000	152,2000	10.0000
Mercury	0.0900	23,0000	0.1000
Molybdenum	5,3000	380,0000	0.1073
Nickel	29,0000	1500,0000	0.1020
Phosphate	-	-	-
	6,400,0000	-	-
Selenium	0.6550	380,4156	0.1738
Silver	0.7900	380,4197	0.5397
Sodium	110,0000	-	-
Thallium	0.4600	4,9455	2.8798
Vanadium	62,0000	369,1094	1.5000
Zinc	8,0000	23000,0000	20.7550
Zirconium	110,000	0.0000	7.4316
Inorganics			
Chloride	-	-	-
Cyanide	-	1,500,0000	290,0000
Fluoride	6,7000	4600,0000	0.0000
Nitrate-N	-	-	-
Sulfate	-	-	-
pH			
pH	-	-	-

Background	Background Level
Res RBSL	Residential Risk-Based Screening Level
Eco RBSL	Ecological Risk-Based Screening Level

	Administrative Area boundary		RFI Site Boundary
	Report Group Boundary		Pipe
	Existing Building or Structure		Leach Field
	Removed Building or Structure		NPDES Outfall
	Other Tanks		Well
	Solvent Tank		Drainage
	Petroleum Fuel/Oil Tank		Lined Drainage
	Hydrazine Tank		Surface Water Divide
	Awning		Rock Outcrop
	Sump		Trench
	Vaults and Pits		Excavation
	Ponds		Elevation Contour
	Dirt Road		

Multiple Use	Metals / Inorganics	Leach Field
Solvents	Perchlorate / Energetics	Potential
Petroleum	Hydrazine	
Oils / PCBs	Debris	

A topographic map of the study area, showing elevation contours and a black polygon indicating the study area. The map is oriented with North at the top. The study area is located in the central part of the map, bounded by a black line. The map shows a mix of green and brown colors, representing different elevations and vegetation. The black polygon is irregular, following the contours of the terrain. The map is labeled with 'Elevation' and 'Study Area'.



Soil Sample Location Symbol Legend

- ▲ Soil sample location with detected Metals/pH/Inorganics Chemical Data
- ▲ Soil sample location with no detected Metals/pH/Inorganics Chemical Data
- △ Contained unit soil sample
- △ Refused sample (refusal depth < 1' below ground surface)
- △ Soil sample location not analyzed for Metals/pH/Inorganics Chemical Data
- ▲ Soil sample not analyzed by any sample method

Data Box Information

Sample Location ID: **RMDF5**

1.00 Primary RMDF5501 7/10/2005

Depth in Feet: 12.05

Sample Type: J

Unique Sample Identifier: 12.05

Date: 12.05

Detected with sample concentration shown. Non-Detect with lab detection limit shown. Analyte positively identified. Associated numerical value is considered estimated. Data validation not performed. Data not validated, laboratory qualifier for estimated value. Data not validated, laboratory qualifier for internal lab QC issue. Analysis not conducted. If more than one result per column, the maximum is presented, with number of results in brackets.

Detect 12.05 Exceeds Background 12.05 Exceeds Background + Res RBSL 12.05 Exceeds Background + Eco RBSL 12.05 Exceeds Background + Res RBSL + Eco RBSL

Non-Detect <0.06 Exceeds Background <0.06 Exceeds Background + Res RBSL <0.06 Exceeds Background + Eco RBSL <0.06 Exceeds Background + Res RBSL + Eco RBSL

Comparison Levels

Metals	Background (mg/kg)	Res RBSL (mg/kg)	Eco RBSL (mg/kg)
Aluminum	20,000	75,000	12,000
Antimony	8,700	30,000	0.0949
Arsenic	15,000	0.0950	1,910
Barium	140,000	150,000	14,602
Beryllium	1,000	150,325	5,087
Boron	9,700	150,000	6,760
Cadmium	1,000	77,824	0.0208
Chromium	36,800	114,000	930,000
Cobalt	21,000	22,776	8,948
Copper	29,000	300,000	1,086
Hexavalent Chromium	0.000	110,000	0.200
Iron	-	-	-
Lead	34,000	150,000	0.0632
Lithium	37,000	152,200	10,000
Mercury	0.000	23,000	0.100
Molybdenum	5,300	380,000	0.107
Nickel	29,000	150,000	0.102
Phosphate	-	-	-
Potassium	6,400,000	-	-
Selenium	0.650	380,415	0.173
Silver	0.790	380,417	0.537
Sodium	110,000	-	-
Thallium	0.460	4,945	2,878
Vanadium	62,000	369,104	1,500
Zinc	110,000	230,000	20,755
Zirconium	8,600	0.000	7,431
Inorganics	-	-	-
Chloride	-	-	-
Cyanide	-	1,500,000	290,000
Fluoride	6,700	460,000	0.000
Nitrate-N	-	-	-
Sulfate	-	-	-
pH	-	-	-

Note: (mg/kg) = milligrams per kilogram. Data Date: April 2009. Note: For the chemical result boxes, if results are not listed for a Metal/pH/inorganic analyte, this indicates the analyte was not analyzed.

Base Map Legend

- Administrative Area Boundary
- RFI Site Boundary
- Report Group Boundary
- Existing Building or Structure
- Removed Building or Structure
- Other Tanks
- Solvent Tank
- Petroleum Fuel/Oil Tank
- Hydrazine Tank
- Awning
- Sump
- Vaults and Pits
- Ponds
- Dirt Road
- A/C Paving
- Fence
- Pipe
- Leach Field
- NPDES Outfall
- Well
- Drainage
- Lined Drainage
- Surface Water Divide
- Rock Outcrop
- Trench
- Excavation
- Elevation Contour

Chemical Use Area

- Multiple Use
- Solvents
- Petroleum
- Oils / PCBs
- Metals / Inorganics
- Perchlorate / Energetics
- Hydrazine
- Leach Field
- Potential
- Debris

Document: RFI-Report-Group7-Diagram-B4133-Metals-West.mxd Date: Jun 10, 2009

1 inch = 25 feet

0 25 50 Feet

ANSI E 34 x 44

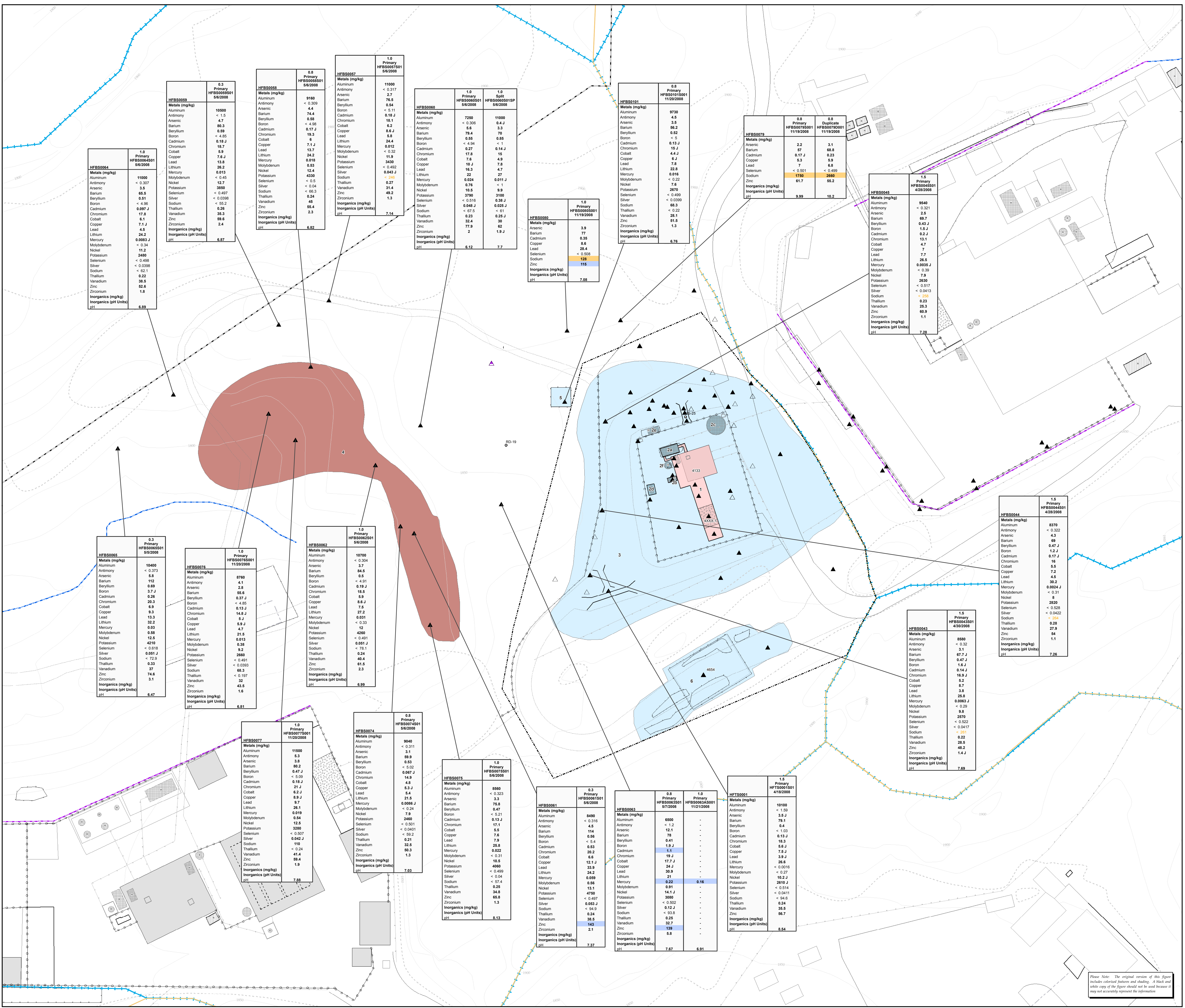
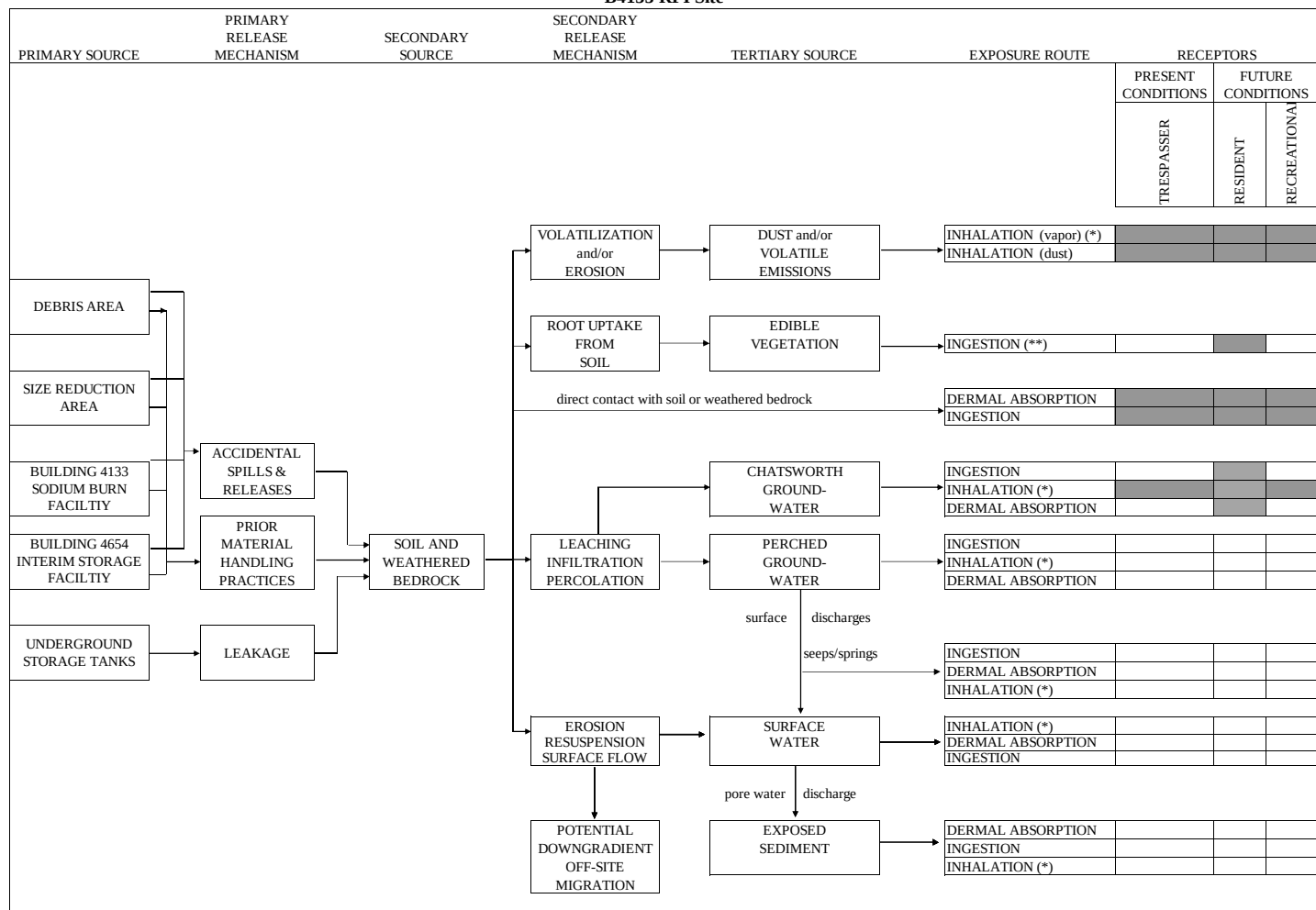


Figure B.4-1

Human Health Risk Assessment Conceptual Site Model
B4133 RFI Site



NOTES:

As described in the SRAM (MWH 2005), note that risk estimates for the potential future recreational user (recreator) are used as surrogate risk estimates for the trespasser.

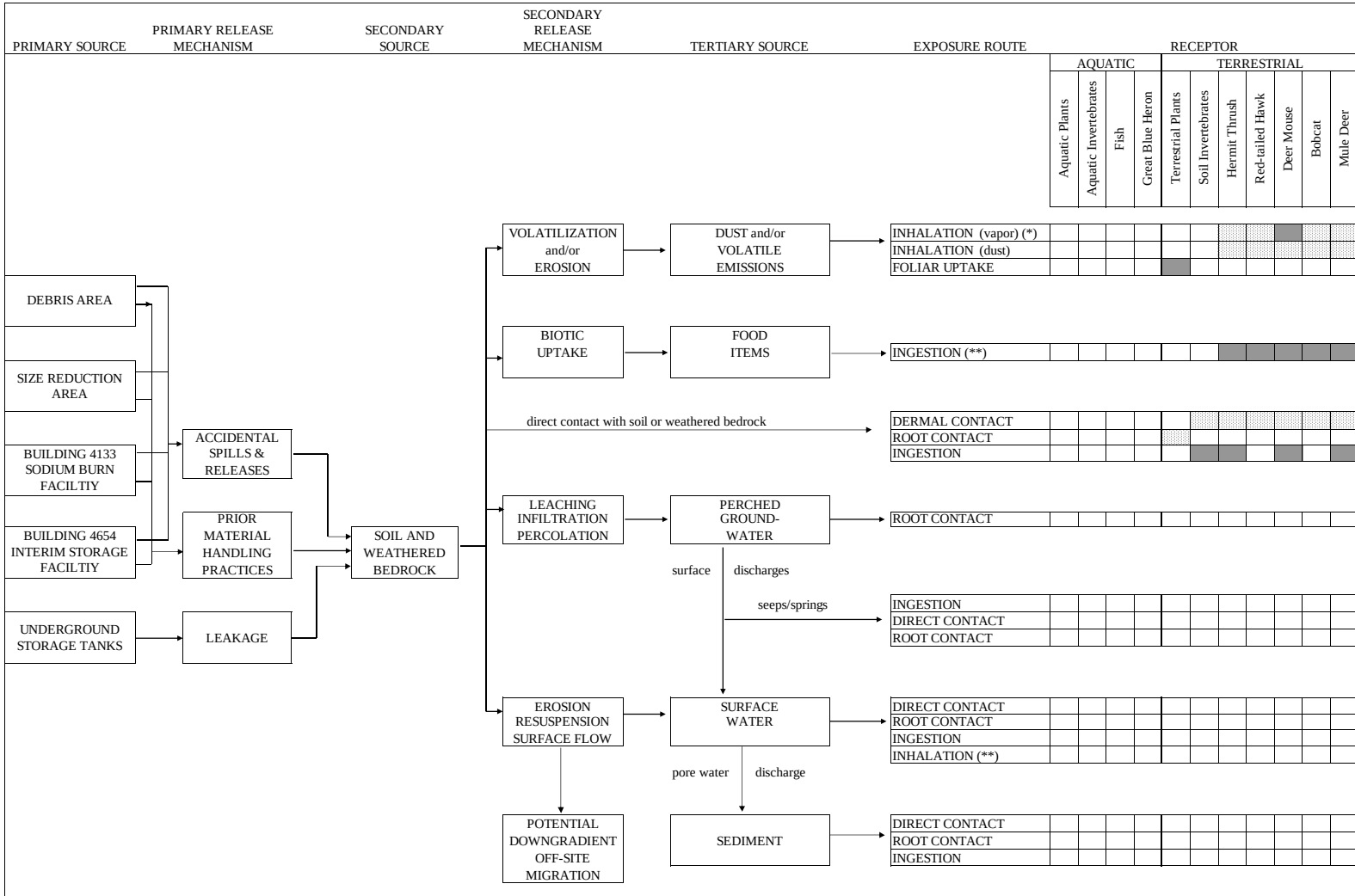
(*) Exposure limited to volatile compounds as defined in the text; residential receptors include both indoor and outdoor air exposure to volatiles; non-residential receptors include only outdoor air exposure. Exposure to fugitive dust is limited to non-VOC compounds. For residents, exposures to reporting area Chatsworth formation groundwater includes pathways associated with domestic use. For residents, exposures to Chatsworth formation groundwater includes pathways associated with migration to indoor and outdoor air.

(**) Exposure limited to bioaccumulatable compounds as described in the text.

 - complete and potentially complete exposure pathways evaluated in this risk assessment

 - incomplete exposure pathways not evaluated in this risk assessment

Figure B.4-2
Ecological Risk Assessment Conceptual Site Model
B4133 RFI Site



NOTES:

(*) Exposure limited to volatile compounds as defined in the text.

(**) Exposures limited to bioaccumulative compounds as defined in the text.

 - complete and potentially complete exposure pathways evaluated in this risk assessment

 - incomplete exposure pathways not evaluated in this risk assessment

 - minor exposure pathway not evaluated in this risk assessment

Surficial Media Site Action Recommendations B4133 RFI Site

Base Map Legend

 Administrative Area Boundary	 Dirt Road
 RFI Site Boundary	 A/C Paving
 Report Group Boundary	 Fence
 Existing Building	 Pipe
 Removed Building	 Leach Field
 Other Tanks	 NPDES Outfall
 Solvent Tank	 Well
 Petroleum Fuel/Oil Tank	 Drainage
 Hydrazine Tank	 Lined Drainage
 Awning	 Surface Water Divide
 Sump	 Rock Outcrop
 Vaults and Pits	 Excavation
 Ponds	 Elevation Contour

Note: This figure is created to depict current conditions.

CMS Areas

 Building 4133 CMS Area

CMS Areas recommended for further evaluation in Corrective Measures Study (CMS)

CMS Area Designations described in Table B.5-2

Document: RFI-Report-Group7-Appendix-B4133-CMS_11x17.mxd

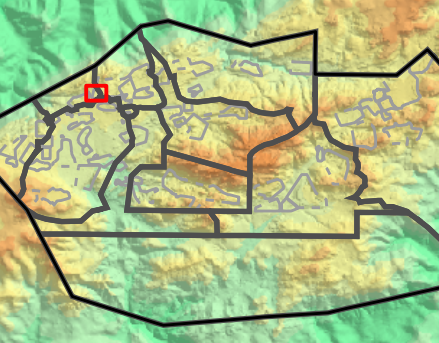
Date: Jun 09, 2009

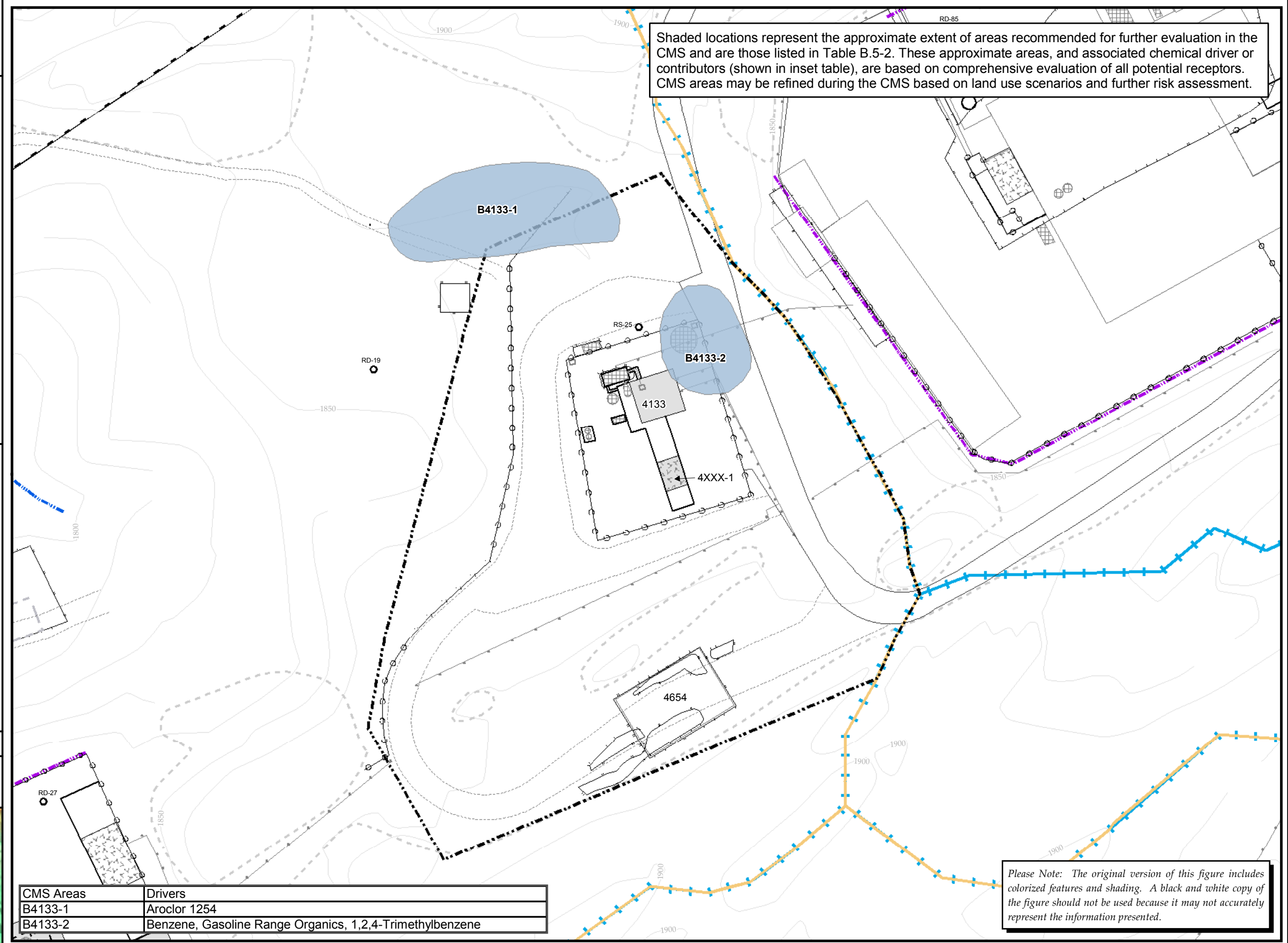
1 inch = 50 feet



0 50 100 Feet







APPENDIX B

ATTACHMENT B-1

**REGULATORY AGENCY CORRESPONDENCE
(Electronic Copy)**

Rocketdyne Division
Rockwell International Corporation
6633 Canoga Avenue
Canoga Park, California 91303

Telex: 698478
ROCKETDYN CNPK



Rockwell
International

RECEIVED

OCT 03 1990

DRF 2188

CERTIFIED - RETURN RECEIPT REQUESTED

24 September 1990

In reply refer to 90RC12167

State of California
Department of Health Services
Toxic Substances Control Division
Region 3
1405 N. San Fernando Road, Suite 300
Burbank, CA 91504

Attention: Ms. Florence Pearson

Subject: EPA ID No. CAD000629972 T/133 Hazardous Waste
Treatment Facility

Dear Ms. Pearson:

Rockwell International Corporation, Rocketdyne Division notified the California Department of Health Services, Toxic Substances Control Program (DHS) by telephone on 20 September 1990 that a portable, temporary 6600 gallon polyethylene Baker Tank that was placed inside the T/133 Hazardous Waste Treatment Facility. The current conditions of the RCRA Part B permit do not mention the use or existence of the tank. Due to the increased activity of the facility, i.e., treating the abandoned sodium and the backlogged sodium cold traps, the tank was brought in to increase storage capacity which in turn would reduce the frequency of transporting waste off-site. The tank is also equipped with a liner to provide secondary containment. Rocketdyne is diligent in working with your office on this matter and is making progress toward treating the sodium wastes. This written transmittal is to confirm the verbal "okay" for the use and placement of the tank at T/133.



BNA03068603

HDMS00379395

90RC12167
24 September 1990
Page 2

Should any questions arise, please contact Mr. Randy Ueshiro, of my staff, at 818/773-5315.

Very truly yours,

ROCKWELL INTERNATIONAL CORPORATION
Rocketdyne Division



S. R. Lafflam
Director
Environmental Control
and Energy Conservation

cc: EPA/Karen Schwinn
DHS/Dennis Dickerson
RWQCB/James Ross
VCEHD/Terrence Gilday
DOE/G. Lavagnino, R. Liddle, A. Adduci



BNA03068604

HDMS00379396

Rocketdyne Division
Rockwell International Corporation
6633 Canoga Avenue
Canoga Park, California 91303

Telex: 698478
ROCKETDYN CNPK



Rockwell
International

CERTIFIED-RETURN RECEIPT REQUESTED

In reply refer to 90RC13495

15 October 1990

State of California
Department of Health Services
Toxic Substances Control Program
1405 N. San Fernando Blvd., Suite 300
Burbank, CA 91504

RECEIVED

OCT 26 1990

DRF 2456

Attention: Dennis Dickerson

Subject: Spill Notification Report

On 10 October 1990, at approximately 15:30, a release of hazardous waste was discovered at the Sodium Burn Facility (EPA I.D. No CAD000629972) located at the Rockwell International Corporation, Rocketdyne Division Santa Susana Field Laboratory in Simi Hills, California. The spill was reported by telephone as follows:

Material Involved: 2-5% aqueous sodium hydroxide solution (pH=13-14)
Quantity Released: 74 gallons
Cause: storage tank flange/valve failure
Remedial Action: not an emergency condition, soil will be removed
Injuries: none

The report was telephoned to the following agencies:

<u>Agency</u>	<u>Date/Time</u>	<u>Contact</u>	<u>Report</u>
Cal. Office of Emergency Services	09:15 10/11/90	Loyd Darrigton	13426
U.S. Coast Guard National Response Center	09:27 10/11/90	Kyle Wallace	43148
Cal. Regional Water Quality Control Board	09:45 10/11/90	King Yu	--
Cal. Department of Health Services	10:07 10/11/90	Florence Pearson--	--
Ventura County Bureau of Fire Protection	08:00 10/12/90	Lisa Hines	--

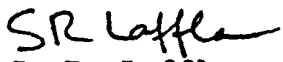
90RC13495
15 September 1990
Page 2 of 2

Remedial activities involved the removal of approximately one-half cubic yard of contaminated soil from the facility. The quantity of sodium hydroxide released was re-determined to be a maximum of five to ten gallons based on soil content. The removal will reduce the potential hazards to human health or the environment. The soil has been placed into containers and will be managed as hazardous waste and treated and disposed of at U.S. Pollution Control, Inc. in Clive, Utah.

Should you have any comments regarding this matter, please contact Glenn Taylor, of my staff, at (818) 773-5321.

Very truly yours,

ROCKWELL INTERNATIONAL CORPORATION
Rocketdyne Division


S. R. Lafflam, Director
Environmental Control & Energy Conservation

cc: U.S. Department of Energy
San Francisco Operations
1333 Broadway, Oakland, CA 94612
Attn: Gary Lavagnino

California Office of Emergency Services
2800 Meadowview Rd., Sacramento, CA 95832

California Regional Water Quality Control Board
101 Centre Plaza Drive, Monterey Park, CA 91754-2156

Ventura County Office of Emergency Services
800 S. Victoria Ave., M.S. 3450, Ventura, CA 93009

Rocketdyne Division
Rockwell International Corporation
6633 Canoga Avenue
Canoga Park, California 91303

Telex: 698478
ROCKETDYN CNPK



Rockwell
International

CERTIFIED-RETURN RECEIPT REQUESTED

April 19, 1991

In reply refer to 9IRC05118

Ventura County
Air Pollution Control District
800 South Victoria Avenue
Ventura, CA 93009

Attention: Gigi Raote

Subject: B/133 Breakdown Condition Notification Report

Reference: Telecon between Ms. Gigi Raote and Mr. Robert Melvold on April 12, 1991

Dear Ms. Raote:

Please find enclosed the Rockwell International Corporation, Rocketdyne Division (Rocketdyne) Equipment Breakdown Report for the Sodium Treatment Facility (Building 133) at ETEC, Area IV, Santa Susana Field Laboratory.

If you have any questions concerning this submittal please contact Mr. Richard Kistner at (818) 773-5317.

Very truly yours,

ROCKWELL INTERNATIONAL CORPORATION
Rocketdyne Division

R. W. Melvold, Manager
Air Quality Programs

RWM/sj

Enclosures as noted



BNA00278835

HDMS00377591

SODIUM TREATMENT FACILITY (B/133)
BLOWER FAILURE EVENT

On April 12, 1991 at 10:00 a.m. a report was received that an equipment failure had occurred at the SSFL Sodium Treatment Facility (B/133). The report indicated that an exhaust blower for the Sodium Treatment Facility had failed and sodium oxide smoke was being emitted from the treatment room. Upon closer inspection it was discovered that water used in filling the scrubber had blocked the gas exhaust line (from an apparent overflow) such that the venturi gauge indicated a blower failure. Once the excess water was drained from the exhaust scrubber, normal operation of the blower was restored (10.20 a.m.).

The District was notified at 10:30 a.m. on April 12, 1991 (via a telecon between Ms. Gigi Raote and Mr. Robert Melvold) pursuant to Rule 32, that a brief equipment breakdown condition had existed at B/133 and that corrective measures had been taken and normal operations restored.

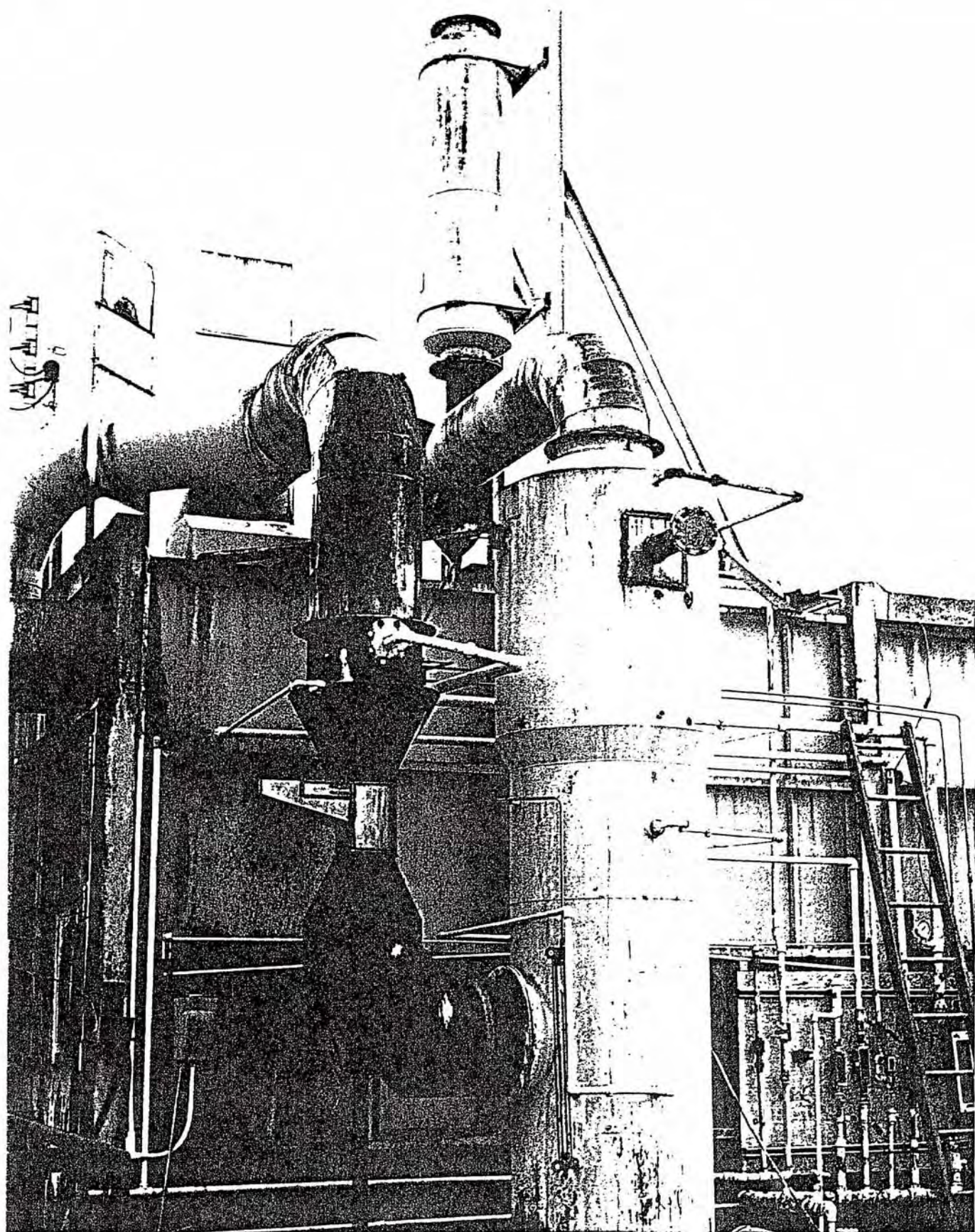
An estimated 53 lbs. of sodium oxide may have been emitted during this time. This figure is based on a maximum burn of 78 lbs. of sodium which was converted to 105 lbs. of sodium oxide of which 50 percent or 53 lbs. would be aerosol. Although the emissions during this hour exceeded the 1.0 lb. per hour permit limit it will not affect the annual permit limit.

Investigation by ETEC staff of the incident ascertained that the design/construction of the scrubber sight glass (used to determine the water level in the scrubber) was flawed. Unless the operator observed the approximate moment that the rising water level (upon filling) reached the desired level, the original design was very unforgiving in that an air pocket would then be isolated in the top portion of the sight glass by the rising water level in the scrubber. Once this occurred, the sight glass was rendered useless for indicating the actual water level in the scrubber. This flaw was corrected by replumbing the exit line from the top of the sight glass to a much higher level on the scrubber (see attached long-range and close-up photos of new sight glass arrangement and scrubber).



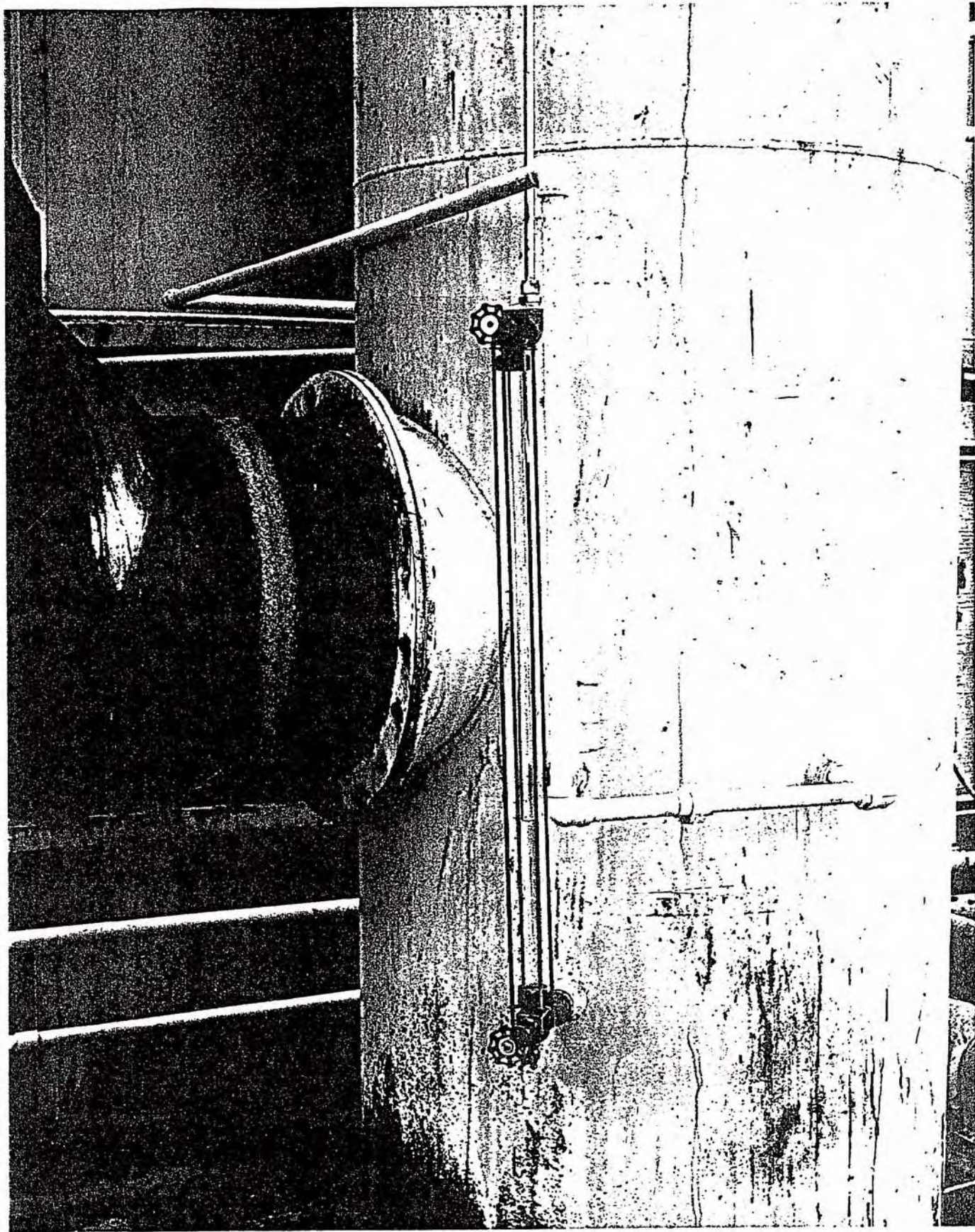
BNA00278836

HDMS00377592



BNA00278837

HDMS00377593



BNA00278838

HDMS00377594

29841
 43518
 26445



JUN 27 1991

Mr. Steve R. Lafflam, Director,
 Environmental & Energy Conservation
 Rockwell International Corporation
 6633 Canoga Avenue
 Canoga Park, CA 91303

Dear Mr. Lafflam:

ENERGY TECHNOLOGY ENGINEERING CENTER (ETEC) HAZARDOUS WASTE MANAGEMENT
 FACILITY OPERATION PLAN REVIEW, NOTICE OF DEFICIENCY (NOD), EPA ID NUMBER
 CAD000629972

The United States Environmental Protection Agency (EPA) and the Department of Health Services (DHS) have evaluated Operation Plan (OP), dated March 5, 1991, for Rockwell ETEC Hazardous Waste Management Facility (alkali metals burn facility), Area IV. The facility is located in Santa Susana Field Laboratory, top of Woosley Canyon Road in Simi Hills, Ventura county. We have evaluated this document according to guidelines set forth in "Instructions for Preparing an Operation Plan for a Hazardous Waste Storage and/or Treatment Facility Which Involves Containers and/or Tanks Only", dated October 1985 and "RCRA Part B Permit Application Checklist".

As a result of this evaluation, several sections of the OP were found to be incomplete. The enclosed NOD identifies the information necessary to bring your OP into full compliance with State and Federal requirements. Each comment is preceded by the applicable OP guidelines section number for reference and the appropriate sections of Title 40 of the Code of Federal Regulations (CFR) and Title 22 California Code of Regulations (CCR). Your response should be incorporated into the OP and resubmitted.

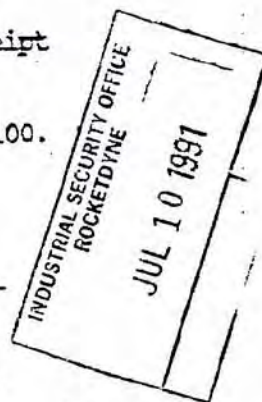
Be advised that the enclosed NOD does not address the proposed work plan for "Assessment of Potential Soil Contamination in the Vicinity of Building T-133 Hazardous Waste Treatment Facility". DHS is currently reviewing your proposed plan and will inform you of any discrepancies in the near future.

Please submit your revised application within thirty (30) days from receipt of this letter.

If you have any questions, please contact Florence Pearson at (818) 567-3100.

Scott Simpson
 Scott Simpson, Chief
 Facility Management Branch
 Toxic Control Substances Program
 Department of Health Services

David P. Feeley
 Michael Feeley, Chief
 Permits and Solid Waste Branch
 Hazardous Waste Management Division
 Environmental Protection Agency



Enclosure

006719RC

Post-It brand fax transmittal memo 7571		# of pages	6
To	Gaylord	From	Lafflam
Co.		Co.	
Dept.		Phone #	
Fax #	180-5118	Fax #	



BNA03068582

NOTICE OF DEFICIENCY

Rockwell ETEC Hazardous Waste Management Facility Operation
Plan Review Area IV, EPA ID Number CAD000629972

The following comments identify important areas that need revision, correction and/or addition in the Part B Application for Rockwell ETEC hazardous waste management facility located in Area IV, Santa Susana Field Laboratory.

The items identified below refer to relevant sections in "Instructions for Preparing an Operation Plan for a Hazardous Waste Storage and/or Treatment Facility Which Involves Containers and/or Tanks Only" dated October 1985. Applicable sections of Title 40 CFR and Title 22 OCR have been also included.

~~Be advised that storing alkali metals under conditions described in the Part B Application does not meet the fire hazard prevention requirements and should be revised according to the recommended procedures below.~~ In addition, based on our knowledge of the operation of this unit, the quantity of waste that you are proposing to treat (60,000 lbs per year) is much higher than what the facility is capable of handling with the existing burn pan. Although the design criteria for the burn pan is 62.5 lbs/hr, a much smaller quantity of solid alkali metal can be burned in a batch treatment which takes approximately one hour. Please re-evaluate the treatment capacity of the burn pan based on its actual burn capacity.

Ref.?

Section II.B.3.g.5
22 OCR 66391 (a)
(18) (L)

Equipment and Container Cleaning area

pg. 25

Identify the equipment and container cleaning area.

Section V.A.5

Processes that Produced the Waste

Be more specific. Explain the experimental tests that produce these wastes (except NaX). Is ETEC conducting research or experiments for other organizations or agencies? Specify any other contamination that might exist in these wastes.

Section V.A.6

Process(es) Used for Handling the Waste

This section should read "all alkali metals are transported and stored under kerosene in DOT approved drums for handling alkali metals". Sodium potassium alloy should be stored and transported under nitrogen, argon or helium. *Fire Protection Code 49-155*

No! See Sodium: Its Manufacture, Properties and Uses. Pg. 144

Section V.A.7

Process Design Capacity and Units of Measure for Process(es) Used for Handling waste.

Specify the capacity of drums or any other containers used for storage.



Section V.C.1.d
CCR 67102 (b) (3)

The Sampling Method to be Used for Obtaining a Representative Sample of the Waste.

Indicate the statistically representative sampling techniques (i.e. random, grab or composite) used for waste analysis.

Section V.C.1.e

The Frequency With Which the Waste Analysis Will Be Repeated or Reviewed for Accuracy and Timeliness.

Please specify that only waste from ETEC Area IV facility will be handled at this storage treatment facility. Clarify the "generating organization" in the following phrase: "Every container for which waste constituents are unknown or were poorly described by the generating organization is sampled and analyzed". Does it mean that you are accepting waste from other areas in Santa Susana Field Laboratory?

Section V.D

Treatment

On page 79 of your application, you have indicated that "In the washdown process the oxides are converted to a solution of NaOH which is captured in the liquid waste Tank, T-1. Please explain this process further and specify how the solution of NaOH in the burn pan is "captured" in the waste tank T-1.

we are removing NaOH. Mesh has already been water rinsed. No metallic sodium remains.

The proposed method to rinse-off the remaining alkali metals from contaminated components (i.e. mesh in cold traps) in tanks with water and acid may expose the workers to unsafe conditions. Rinse tanks T-4A and T-4B should be removed. You may either send the contaminated components to an off-site facility or propose an alternate safe method.

Section VI.A.1.e

Data Which Demonstrate that the Wastes are Compatible with materials of Construction of the Containers and their Linings of Coating and with Overpacking Materials Used.

This information has not been provided.

*metals Handbook
pg. 1174-1175*

*Liquid-Metals
Handbook: Sodium-
NaK Supplement
pg. 178*



Section VI.B.
40 CFR 264.191,
192 and 194
22 OCR 66391(b) (2) (B)

Tanks used for Storage or Treatment

Why is it not safe?

T-1 tank which is an open top tank is not safe and should be covered. The lifetime of this tank is approximately 6 years, as indicated. Be advised that if the facility is permitted, any changes to the design and operating conditions of the tank in the future will require a major modification to the permit.

The storage tanks must have corrosion protection as follows:

- o Coated and cathodically protected steel
- o Fiberglass
- o Steel tank clad with fiberglass

The same requirements apply to piping of tanks.

Section VII.C.2.e

First aid kits must be available at both buildings.

Section VII.E.

Lighting

The same light system that is used for security at the treatment building should be used at the storage building.

Section VIII.

Operational Procedures

Provide detailed information regarding maintenance of alkali metal treatment unit and inspection schedule. Explain if any parts need to be replaced regularly and if so, specify the time intervals.

Provide detailed information regarding monitoring of treatment units. How do you ensure that the air emission control unit is working properly?

VIII.B.1.b.

All Persons are Properly Protected from Exposure to Contamination with Hazardous Waste

Persons who handle alkali metal containers at the storage area should wear NIOSH approved protective gloves and clothing.



Section VIII.B.1.f

Aisle Space is Sufficient to Allow Unobstructed Movement of Emergency Equipment and Personnel Provided.

Explain how way containers are being stored and the space between them (are they stacked vertically?). Is the provided space enough for forklift to get to the containers easily? *Yes* *No*

Section VIII.B.3

Describe Operational Procedures to Ensure that Chance of Fire or Explosion is Minimized.

*NaK is in either
An inverted tank
or within welded
components such as
NaK bubblers and pressure X-ders.*

Storing sodium potassium alloy (NaK), which ignites spontaneously in air, under the proposed conditions is a fire hazard. NaK must be stored under argon, nitrogen or helium. Solid alkali metals should be stored under kerosene.

Emergency Procedures

Specify the location of emergency communication equipment at each building.

Section XIII.

22 CFR 66391(a)(13),
67211, 67212,
40 CFR 270.14(b)(13)
and 264.112

Closure Plan

This document should be complete and stand by itself. Provide a detailed description of the storage and treatment activities. Describe activities during the closure period to ensure that all partial or final closure satisfy the closure performance standard. These activities include groundwater monitoring and soil sampling.

*This is a Wlastic
not metal, outer
tank liner. It is
not in use and
is not contaminated.
It does not store
NaOH or KOH.*

Explain what you are planning to do with the metal baker tank that was located outside the fenced area for storing sodium and potassium hydroxide. Is this tank closed? What was the decontamination method used for this tank?

Explain the postclosure activities since groundwater contamination might exist and groundwater monitoring may continue beyond closure.



Section XV.
40 CFR 264.101

Corrective Action

A. Identification of the unit

Building T-029 is part of the Part B Application and should be included in the Corrective Action Plan. Please explain if there has been any soil sampling and analysis at this building.

Does any radioactive contamination exist in the storage and treatment area?

B. Provide information regarding spills that caused soil and groundwater contamination at T-133 building.

Include measurement of sodium and potassium in your sample analysis.

This NOD does not include evaluation of the Rockwell "Assessment of the Potential Soil Contamination in the Vicinity of Building T-133 Hazardous Waste Treatment facility" submitted in March 1991. We are currently reviewing this plan and will inform you of our evaluation in the near future.



BNA03068587

HDMS00375303

Rocketdyne Division
Rockwell International Corporation
6633 Canoga Avenue
Canoga Park, California 91303

Telex: 698478
ROCKETDYN CNPK



Rockwell
International

20 March 1992

In reply refer to 92RC02636

California EPA
Department of Toxic Substances Control
1405 N. San Fernando Rd., Suite 300
Burbank, CA 91504

Attention: Mr. Scott Simpson, Chief Facilities & Permitting Unit

Subject: Santa Susana Field Laboratory Environmental Monitoring Quarterly
Report

Gentlemen:

Rockwell International Corporation, Rocketdyne Division (Rocketdyne) is pleased to submit the March 1992 quarterly report describing the Santa Susana Field Laboratory Environmental Monitoring program.

Rocketdyne welcomes comments on this document. If you have any further questions, comments or suggestions, please contact Ms. Wilma Seltzer at (818) 773-5330.

Very truly yours,

ROCKWELL INTERNATIONAL CORPORATION
Rocketdyne Division

S. R. Lafflam, Director
Environmental Protection

SRL/ws

- Enclosures: 1. Distribution List
2. Environmental Monitoring Quarterly Report



BNA04938844

HDMSE00669401

DISTRIBUTION LIST

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California Assembly

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The Honorable Patrick Nolan
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The Honorable Ed Davis
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City Officials

Ms. Cherie Paglia, City Clerk	City of Hidden Hills
Mr. Steve Kueny, City Manager	City of Moorpark
Mr. Lin Koester, City Manager	City of Simi Valley
Mr. Grant Brimhall, City Manager	City of Thousand Oaks
The Honorable Tom Bradley, Mayor	City of Los Angeles
Mr. Richard Alarcon	City of Los Angeles
The Honorable Joy Picus	L.A. City Council
The Honorable Hal Bernson	L.A. City Council
The Honorable Zav Yaroslavsky	L.A. City Council
Mr. William Luddy	L.A. Dist. Planning Commission



BNA04938845

HDMSE00669402

City Officials (Con't.)

Mr. Mel Blevins, Watermaster

Upper L.A. River Authority

Community/Business Groups

Ms. Carol Henderson, Office Mgr.
Ms. Barbara Johnson
Ms. Evia Phillips, Exec. Director
Ms. Dinah Jasensky
Mr. Myron Levin
Ms. Susan Chasen
Mr. Robert Marshall

Ms. Gayle Demirtas
Mr. Howard Kaplan
Ms. Helen Eisenstein
Mr. Wayne Lee
Mr. Dan Hirsch
Mr. Jerome Raskin
Mr. Sheldon Plotkin

Bell Canyon Association
Susana Knolls Homeowners, Inc.
Woodland Hills Chamber of Commerce
Groundwater Resources Consultants, Inc.
Los Angeles Times
Simi Enterprise
California State University, Northridge Library
(Urban Archives Center)
Simi Valley Library
Brandeis-Bardin Institute
Brandeis-Bardin Institute
SSFL Work Group
SSFL Work Group
SSFL Work Group
SSFL Work Group

County Officials

Mr. Frank Meneses
Mr. Norm Groome
The Honorable Melanie Fallon
The Honorable Michael D. Antonovich
The Honorable Edmund D. Edelman
The Honorable Vicky Howard
The Honorable Maria VanderKolk
Mr. Craig Morgan
Mr. Terrence Gilday
Mr. Reddy Pakala
Mr. Richard Baldwin

L.A. County Region. Planning Comm.
L.A. County Dept. of Health Services
L.A. City Planning Department
L.A. County Board of Supervisors, 5th Dist.
L.A. County Board of Supervisors, 3rd Dist.
Ventura County Board of Supervisors, 4th Dist.
Ventura County Board of Supervisors, 2nd Dist.
Ventura County Fire Dept.
Ventura County Environmental Health
Ventura County Water Works Dist. 17
Ventura County Air Pollution Control Dist.

State Officials

Ms. Maxine Richey
Mr. Dennis Dickerson, Director
Mr. E. D. Bailey, Chief Radio. Health
Mr. Scott Simpson, Chief Facil./Permit
Mr. Jack McGurk, Chief Env. Health
Mr. Kim S. Wong
Mr. Robert Holtzer

Dept. of Health Services
Dept. of Health Services
Dept. of Health Services
Dept. of Health Services
Dept. of Health Services
Dept. of Health Services
Dept. of Health Services



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HDMSE00669403

State Officials (Con't.)

Mr. Dean Kunihiro
Mrs. Karen Bessette
Mr. Jim Ross, Resource Control Eng.
Mr. King Yu

U.S. Nuclear Regulatory Commission
CA State Water Resources Control Board
CA Regional Water Quality Control Board
CA Regional Water Quality Control Board

U.S. Officials

Mr. Jerry Clifford
Ms. Karen Schwinn, Chief
Mr. Michael Bandrowski
Mr. Gregg Dempsey
Mr. Jim Hartman, Director
Mr. Robert Le Chevalier, ETEC Proj.
Mr. Roger Liddle
Mr. James T. Davis, Environ. Safe.
Mr. Gary Lavagnino, EOS Division
Anthony Kluk, Ph.D., Branch Chief
Mr. John Semko
J. Deb Kobler, CEMRO-ED-EC
Mike Green
Rebecca McCaleb (AB10)
Mr. R. J. Summers

U.S. EPA, Region IX
U.S. EPA, Toxics & Waste Mgmt. Division
U.S. EPA, Air Toxics & Radiation Division
U.S. EPA, Office of Radiation Programs
U.S. Dept. of Energy, San Francisco Oper.
U.S. Dept. of Energy, San Francisco Oper.
U.S. Dept. of Energy, San Francisco Oper.
U.S. Dept. of Energy, San Francisco Oper.
U.S. Dept. of Energy, San Francisco Oper.
U.S. Dept. of Energy, NW Area Programs
U.S. Dept. of Energy, Las Vegas Facility
U.S. Army Corps of Engineers
NASA/HQ/NXG
NASA/MSFC
DPRO, Rocketdyne On-site Office



BNA04938847

HDMSE00669404

OUTGOING LETTER NUMBER

92RC02636

SIGNATURE APPROVAL

AE0 CORR. DIV. 001 E45
 AFPRO (SUMMERS R.) PA14
 AGULIA R.S. GB08
 ALDRED P.A. HA08
 ASP W.A. FB63

BATES J.O. IB45
 BELL J.A. NB21
 BLEWETT L.E. PA01
 BRADLEY J.W. AA52
 BUCKELS W.T. GB10
 BURDS A.J. FB63

CADWELL T.D. AB53
 CLANCY S.M. BA77
 CLARK T.D. GB10
 CLARKE D.E. SS03
 COLBO H.I. AA19
 COLE R.E. BA76
 COOK J. CA08
 CORTS D.C. BA65
 CHARNY, J. AB57
 DARBY A.K. IB23
 DATA MGMT. AB16
 DATA MGMT. (PK) EB38
 DAVIS M.R. AA47
 DIXON M.T. CB04
 DODSON H.C. IB07
 DUTTON P.L. FB63
 DINIUS L. JA16
 DENNY. A. JA16
 EDWARDS F.D. GB12
 ERBS J.E. BA22
 EZELL W.F. AC04

FODOR, N. JA16
 FARGO R.C. GD24
 FISCHLER S. SS11
 FLANAGAN J.E. BA05
 FLIGIEL R.T. BA35
 FONTANELLA C.N. CB16
 FULLER P.N. EB03
 FULTON D.L. IB07
 FUJIKAWA N.S. JA16
 GABLER M.J. HA02
 GAONA R.J. BA90
 GARCIA F.S. (HUNTS) RA02
 GEIGER D.A. AA23
 GENSTIL S.M. LB05

GIBBS D.C. T038
 GAYLORD E. T038
 GORMAN J.J. AB70
 GRAF D.A. AA22
 GRANARA J.A. PA31
 GRAY J.C. SS05
 GRIFFITHS A.L. HB35
 GILIBERTO, A. A. JA16
 HARD P. Q/567, AB12
 HALLDEN A.L. AC11
 HARRIS D.C. EB98
 HAUENSTEIN C.A. EB34
 HAWORTH J.M. JB11
 HINDY R.N. FA60
 HOLLAND J.A. BA15
 HURDLE P.M. WC70
 HOLWEGER D. (NASA) AA18
 HOKWATT, J. 874,001. B03
 JENSEN M. JA16
 JACKSON E.D. IA32
 JOHNSON J.R. WB03
 JOHNSON, J.R. (D/543) JA16
 KELLER J.H. JA10
 KLEIN J.A. HA08
 JURKOWSKY, S. JA16
 LEVESQUE M. JA16
 LAFFLAM S.R. JA16
 LAI R.R. GB10
 LANCASTER J.L. EB05
 LEM M.D. NB18
 LINCOLN J.A. AB57
 LINDSAY N.J. EB98
 LYLE O.W. SANB
 MANCUSO, A. JA16
 MARTIN JR., I. AA62
 MASTER FILE CORR. AA01
 MATHEWS J.C. BA52
 MCALISTER D.S. GB02
 MCCOURT P.C. AA21
 MCHALE R.M. FA06
 MELVOLD R.W. JA16
 MICKELSON P.R. BA60
 MINAMI H.M. BA14
 MIRLISS G. EB21
 MISNER R.C. GB04
 MIYATA S. BA14
 MOONEY J.R. BA15
 MURPHY T.H. AA16
 MUSILEK J.E. BA60
 MYERS D.M. EB34
 NELSON A.D. JA16
 NAGAMATSU J.T. AA24
 NECHAK M. AA16
 NEW BUSINESS OFF. FA22
 NITZ F.P. AC17

STONE, L. T038
 OSTROWIECKI J. EB98

PAPPAN R.L. JA18
 PASTER R.D. AA49
 PATENT OFFICE FB18
 PAUCKERT R.P. IB43
 PETERSON D.L. GC01
 PIETROWSKI A.F. AA46
 PLOWDEN J.B. RF01
 PUGH L.A. BA26
 RUTHERFORD, P. T100
 RAMOS R.A. GB06
 RICHTENBURG W.J. BA14
 ROSS P.A. AB61
 ROWLES J.A. T100
 ROZAS C.J. CB01
 RUPERT J.H. BA15
 REISENWEBER R. 001,110, SG05
 ROBERTSON M.D. SS12
 SCALVINI C.J. EB21
 SECURITY AA89
 SHAUGHNESSY T.R. EB08
 SHOJI C.H. CA08
 SICKLES C.B. CA08
 SITLINGTON S.C. NB22
 SIMPSON G.R. EB10
 SLATER D.C. FA07
 SMITH R.A. BA22
 SUNDBERG R.A. GB02
 SWANSON P.L. AA98
 SELTZER W.W. JA16
 SUMMERS, R. PA14
 TAFOYA A.J. AA16
 THATCH J.M. BA52
 THOMPSON J.C. EB09
 TJULANDER R. (NASA) AA18
 TURNQUIST L.R. BA52
 TUTTLE R.J. T100
 TWICHELL P.W. FA50
 VETTER W. 842, 001- B28
 VIETINGHOFF W.F. EB15
 VENABLE, T. JAH6
 WAGNER K.C. EB34
 WALKER L.D. FB62
 WANG V. FA15
 WHELOCK V.J. AA55
 WHITE JR., T.A. WC70
 WILLIAMS J.A. BA15
 WINTON B.A. CA08
 WOOD B.K. AA50
 WOOSTER, E.J. AB34
 WRIGHT D.E. IB01

TAGGART, J. (D/543) JA16
 SEE ENVIRONMENTAL



BNA04938848

Rocketdyne Division
Rockwell International Corporation
6633 Canoga Avenue
Canoga Park, California 91303

Telex: 698478
ROCKETDYN CNPK



Rockwell
International

19 March 1993

CERTIFIED-RETURN RECEIPT REQUESTED
In reply refer to 93RC03139

Ms. Florence Pearson
California Environmental Protection Agency
Department of Toxic Substances Control
Region 3
1011 N. Grandview Avenue
Glendale, CA 91201

Subject: CEQA Compliance For Energy Technology Engineering Center,
EPA ID# CAD000629972

Dear Ms Pearson:

Enclosed is the additional information, requested by your department, from Rockwell International Corporation, Energy Technology Engineering Center (ETEC) regarding compliance with the California Environmental Quality Control Act (CEQA). This information includes the project description and the environmental setting for the Hazardous Waste Management Facility (alkali metal) storage and treatment facility. The project description includes facility operation and history, size, capacity and proposed activities to be permitted. The environmental setting describes the location of the site, topography, meteorology, surface water hydrology and geologic and groundwater conditions.

If you have any questions or need additional information, please call the undersigned at (818)586-5771 or Ms. Carole Missirlian at (818)586-6040.

Sincerely,

ROCKWELL INTERNATIONAL CORPORATION
Rocketdyne Division

M. C. Shoemaker
M.C. Shoemaker, Director
Environmental Protection

MCS/cm
Enclosure

cc DTSC/S. Haddad



BNA01182678

HDMS00378113

Hazardous Waste Management Facility

Project Description and Environmental Setting

1.0 PROJECT DESCRIPTION

1.1 Site History

The Energy Technology Engineering Center (ETEC) is a U.S. Department of Energy Installation located at the Rockwell International Corporation, Santa Susana Field Laboratory. It is a complex of experimental research, development and testing facilities. Included are facilities that have used, or are presently utilizing alkali metals such as sodium and sodium-potassium alloys (NaK).

The Hazardous Waste Management Facility, Building T029 and T133, is dedicated to the storage and treatment of sodium and NaK wastes and their reaction products, i.e. oxides, hydroxides, and carbonates generated at ETEC to render them acceptable for recycle or disposal. The treatment and storage buildings are shown in the Operation Plan Figure 1-1.

The treatment building, T133, was designed in 1977 as approved by Robert O. Broslow (California Registration C8957 and 5789). It is located approximately 900 feet to the northwest of the storage building.

The storage building, T029, was designed in 1959 as approved by Elmer H. McDonie (California Registration C9513). When the HWMF was activated in 1978, the building was designated as the storage building for waste alkali materials.

1.2 Description of Facility Operations

1.2.1 **Treatment**

Alkali metal (sodium and NaK) waste treatments are conducted at Building T133. There are basically only two types of treatment processes performed at the facility. First, the treatment of solid alkali metals (sodium) and second, the treatment of liquid alkali metals (NaK).



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For sodium, the components or drums containing the sodium metal are opened and placed on the treatment pan and heated with a natural gas burner until the sodium melts. For NaK, the liquid metal is fed to the treatment pan through a specially designed feed system. The metal in the pan (sodium or NaK) reacts with the air in the treatment chamber to form oxides which either remain in the pan or are exhausted through a wet (water) scrubber to remove the oxide aerosols prior to release to the atmosphere.

In both cases the reactive metals are converted to caustic aqueous solution, which is stored at T133 for recycle to Rocketdyne or disposal to an approved off-site facility.

In preparation for treatment, components may be cut into smaller sections to be handled in the treatment room. This operation is performed on the cement-based handling area of the treatment facility and within a carbon steel secondary containment.

1.2.2 Storage

Waste sodium, NaK and their reaction products are stored in containers in the HWMF storage building T029.

The Rocketdyne Traffic Department picks up the waste container from the generation site and delivers it to the HWMF, storage building T029. Operations personnel unlock the gate on the road providing access to Building T029 so that the container can be placed in the building. In the storage building, T029, containers are placed on pallets which in turn are stored on pallet racks. The racks are located on the building perimeter and provide unimpeded access to handling equipment as necessary for movement of stored materials.

1.3 Facility Size

1.3.1 Treatment Facility

The Treatment Facility includes B/133, the treatment building, and ancillary equipment required for the process. The overall area is approximately 6,000 sq. ft. Building 133 is a lightweight metal building with an exterior covering of sheet steel attached to framework of I-beams and channel section structural members. The building is mounted on a cast-in-place concrete slab with an area of 462 sq.ft. The treatment area includes support equipment for hoisting metal parts into and out of the treatment chamber; air handling equipment to remove the reaction products generated by treatment of alkali metals; a wet scrubber to remove metal oxides prior to discharged to the atmosphere; and three tanks to store hydroxide solution before and after treatment. The treatment building plot plan is shown on the attached Operation Plan Figure II-9.



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1.3.2 Storage Building

Building 029 is a prefabricated metal building covered with corrugated sheet steel on the exterior. It is bolted down to a cast-in-place concrete floor with an area of 800 sq. ft. that is elevated above the surrounding grade so that it is protected from flooding by storm water run-off. The storage building plot plan is shown on the attached Operation Plan Figure II-10.

1.4 Facility Capacity

1.4.1 Treatment Facility

Design of the treatment pan limits the surface area of the molten metal of 6.25 sq. ft. which will provide a maximum oxidation rate of 62.5 lb/hr based on experimental evidence of oxidation rates of 5 to 10 pounds/hour per square foot of exposed surface area. Aerosols released per 100 pounds of alkali metal are 2.0 pounds and 1.86 pounds for sodium and NaK respectively.

Sodium hydroxide tankage capacity is T-1 (Drain Tank) = 1300 gallons and T-3 (Storage Tank) = 5000 gallons and the NaK Feed Tank = 300 gallons.

1.4.2 Storage Building

Containers used for storage are enclosed drums, such as 5 to 55 gallon drums, 85 gallon overpack drums, and containers such as 44 cu. ft. component boxes. The storage building has the capacity to store a volume of 5500 gallons in drums and containers located around the perimeter of the storage area.

1.5 Proposed Activities to be Permitted

1.5.1 Treatment Facility

1. Treat an estimated maximum annual quantity of 10,000 lb of sodium and 1000 lb of NaK at a maximum reaction rate of 62.5 lb/hr.
2. Produce an estimated maximum annual quantity of 2,000,000 lb of 1% or 200,000 lb of 10% hydroxide solution resulting from the above treatment process.
3. Provide storage for a maximum of 6300 gallons of hydroxide solution generated during the treatment process.



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1.5.2 Storage Facility

1. Provide storage for a maximum of 5500 gallons of waste sodium, NaK or reaction products around the perimeter of the building T029.

2.0 ENVIRONMENTAL SETTING

2.1 Description of Site Location

The Santa Susana Field Laboratory (SSFL) is located at the top of Woolsey Canyon road, 5 miles west of the town of Chatsworth in the Simi Hills, Ventura County, California. The property boundaries of the SSFL, including the boundaries of a Government Option Area, where the Energy Technology Engineering Center (ETEC) is located, are shown in attached Figure II-1, as well as, in Figure II-2. The Hazardous Waste Management Facility (HWMF) consists of a storage building, T029, and a treatment building, T133, which are a distance of approximately 900 feet apart, and are both located within the ETEC boundaries.

1. Latitude: 34° 13' 46" N
2. Longitude: 118° 42' 30" W
3. Township: T2N
4. Range: R17W
5. Sections: 25 and 30
6. Principal meridian: San Bernardino
7. Assessors parcel numbers:

Book 685, page 5; Parcels 5 and 6 of the Ventura County Assessors Map, which includes the entire Santa Susana Field Laboratory. The HWMF is located in Area IV of the SSFL with the storage facility located in Parcel 5 and the treatment facility in Parcel 6.

8. Location:
 - a. Figure II-2 is a property layout of the SSFL Area IV showing location of treatment, T133, and storage, T029, buildings associated with the HWMF in relation to parcel boundaries.



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2.2 Topography

The detailed topographic map (Figure II-2) includes the following information.

1. Map Layout

a. Scale

- (1) One inch represents 200 feet.
- (2) The contour interval is five feet.

b. North arrow

- c. Date map completed: the base topographic map was completed in 1967; Hazardous Waste Management Facility information was added in November 1988.

2. Land Characteristics

- a. Existing contours and elevations. The 5 foot contour interval reveals the pattern of surface water flow near the facility.
- b. Proposed final contours and elevations of the completed facility (for new facilities only): not applicable since the facility is existing and the ground surface will not be altered.
- c. The Santa Susana Field Laboratory, which includes the Hazardous Waste Management Facility (HWMF) does not lie within the 100-year floodplain.

Source of data:

Federal Insurance Administration
Department of Housing and Urban Development
Flood Hazard Boundary Map
Ventura County, California
Map No. 46
Revision Date: 10/18/77



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2.3 Metrology

The amount of precipitation which enters the groundwater system depends on the volume and intensity of rainfall and antecedent moisture conditions. A precipitation station has been maintained at the SSFL since 1959. The mean annual precipitation as measured at the SSFL station has been approximately 17.6 inches with a standard deviation of about 9 inches. Because of the high variability in annual precipitation, groundwater recharge may vary significantly from year to year. Precipitation is not evenly distributed throughout the year. The dry season normally extends from May through October and the wet season commonly extends from December through March. During the dry season it is not uncommon to have several successive months with no measurable precipitation.

The mean temperature at the site ranges from 53 to 95 °F, although temperatures below freezing and in excess of 100 °F have been observed. During the spring, summer and fall five to ten knot breezes from the northwest are common. During the winter months winds tend to be less, except for days with occasional gusts as high as forty knots. A wind rose prepared from data collected at the SSFL is shown in Figure II-5

2.4 Surface Water Hydrology

There are no natural rivers or streams located at the SSFL. Seasonal flow occurs as a result of rainfall. Approximately 65% of the site's surface area contributes runoff to the south, ultimately into Bell Canyon. Approximately 18 % of the surface area of the site drains to the east ultimately into Dayton Canyon. Approximately 1% of the surface area of the site also drains to the east discharging to Woolsey Canyon. The area along the northern border drains to Meier Canyon. Approximately 16% of the site surface area drains to the north.

2.5 Geology

The SSFL is located in the Simi Hills of eastern Ventura County, California. The Simi Hills are in the northern Transverse Range geomorphic province and separate the Simi Valley from the western part of the San Fernando Valley. The Simi Valley is a broad east/west trending synclinal depression and the Simi Hills form the southern flank of the syncline. The Simi Hills are composed primarily of exposures of the Upper Cretaceous Chatsworth Formation.

The principal geologic units at the SSFL are the Chatsworth Formation and the shallow alluvium which discontinuously overlies the Chatsworth Formation. In addition, the Martinez Formation is exposed in the southwestern portion of the SSFL and the Topanga Formation is exposed in the extreme southeastern portion of the site's Buffer Zone.



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Chatsworth Formation

The Upper Cretaceous Chatsworth Formation underlies most of the SSFL. It is composed primarily of well-consolidated, massively bedded sandstone with interbeds of siltstone and claystone. At the site, the Chatsworth Formation beds dip to the northwest at approximately 20 to 30 degrees. Well developed fractures and joints are present in the Chatsworth Formation outcrops. To the northwest of the SSFL, the Chatsworth Formation is overlain by the Paleocene Martinez Formation.

Martinez Formation

The Tertiary Martinez Formation is exposed to the north and northwest of the site and in portions south of Burro Flats. The Martinez Formation is younger than the Chatsworth Formation and is composed of bedded marine sandstones and shales with a basal conglomerate. The Martinez Formation to the north of the site dips to the northwest at approximately 30 to 35 degrees.

Alluvium

The Chatsworth Formation and the Martinez Formation are overlain by a discontinuous layer of thin Quaternary alluvium, most notable in Burro Flats and along ephemeral drainages. The Quaternary alluvium consists of mixtures of unconsolidated sand, silt and clay. The thickness of the alluvium varies from a few inches to as much as 20 feet. The alluvium is underlain in some places by a zone of Chatsworth Formation which has been weathered in place.

Zones of weakness in the Chatsworth Formation are formed by fractures or faults, or by easily eroded siltstone/claystone outcrops. In some places these zone of weaknesses have been eroded to form canyons which are part of the surface drainage system. Deposit of alluvium are thickest along these drainages.

2.6 Groundwater Conditions

Groundwater conditions at the SSFL have been evaluated based on data compiled from 176 wells and other sources located at, or adjacent to the site. The first 17 wells constructed at the site in the late 1940s to mid 1950s were deep, water supply wells. From 1984 to 1991, 147 monitor wells were constructed in order to evaluate groundwater conditions at the entire SSFL site.

There are two groundwater systems at the site: 1) a shallow groundwater system (Shallow Zone) in the surficial alluvium and the underlying zones of weathered sandstone and siltstone/claystone and isolated shallow fracture systems; and 2) a deeper regional groundwater system in the fractures Chatsworth Formation. In some parts of the SSFL, the two systems appear to be hydraulically connected.



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Shallow Zone

The Shallow Zone is characterized as a thin layer of Quaternary alluvium distributed primarily in the Burro Flats area and along ephemeral drainages. The Shallow Zone is discontinuous at the site. It may be saturated along ephemeral drainages and in the southern part of the Burro Flats. Some portions of the Shallow Zone are saturated only during and immediately following the wet season.

Depth to groundwater in the Shallow Zone has generally ranged from a few feet to about 30 feet. Groundwater occurs under unconfined conditions. The saturated thickness of the Shallow Zone ranges from less than one foot to as much as 10 feet. The surface of the saturated portion of the Shallow Zone is, in general, a subdued expression of the topographic surface. Water in the Shallow Zone may move laterally to an area of discharge or downward into the underlying Chatsworth Formation.

Chatsworth Formation

The principal water bearing system at the SSFL is the Chatsworth Formation. It is predominantly composed of well-consolidated, massive, fractured sandstone with interbeds of siltstone and claystone. Fractures occurring within the Chatsworth Formation may be associated with bedding planes, jointing, and/or faulting.

The permeability of the Chatsworth Formation is very low except along open fractures. The permeability of unfractured Chatsworth Formation appears to be sufficiently low to be considered as virtually impermeable. Permeabilities determined from recently collected rock cores ranged from only 10^{-6} to 10^{-8} centimeter per second (cm/sec) for the coarsest grained sandstone cores.

Wells constructed along major fracture zones at the site produce greater volumes of groundwater relative to wells constructed in unfractured areas. Groundwater within the fractures of the Chatsworth Formation occurs under both confined and unconfined conditions. The saturated thickness of the Chatsworth Formation groundwater is not known. During 1992, the static depth to groundwater wells completed in the Chatsworth Formation groundwater system ranged from about 0 feet at well RD-30 located along the northwest border of the SSFL, to more than 370 feet at well RD-51C located along the north border of the central portion of the SSFL.



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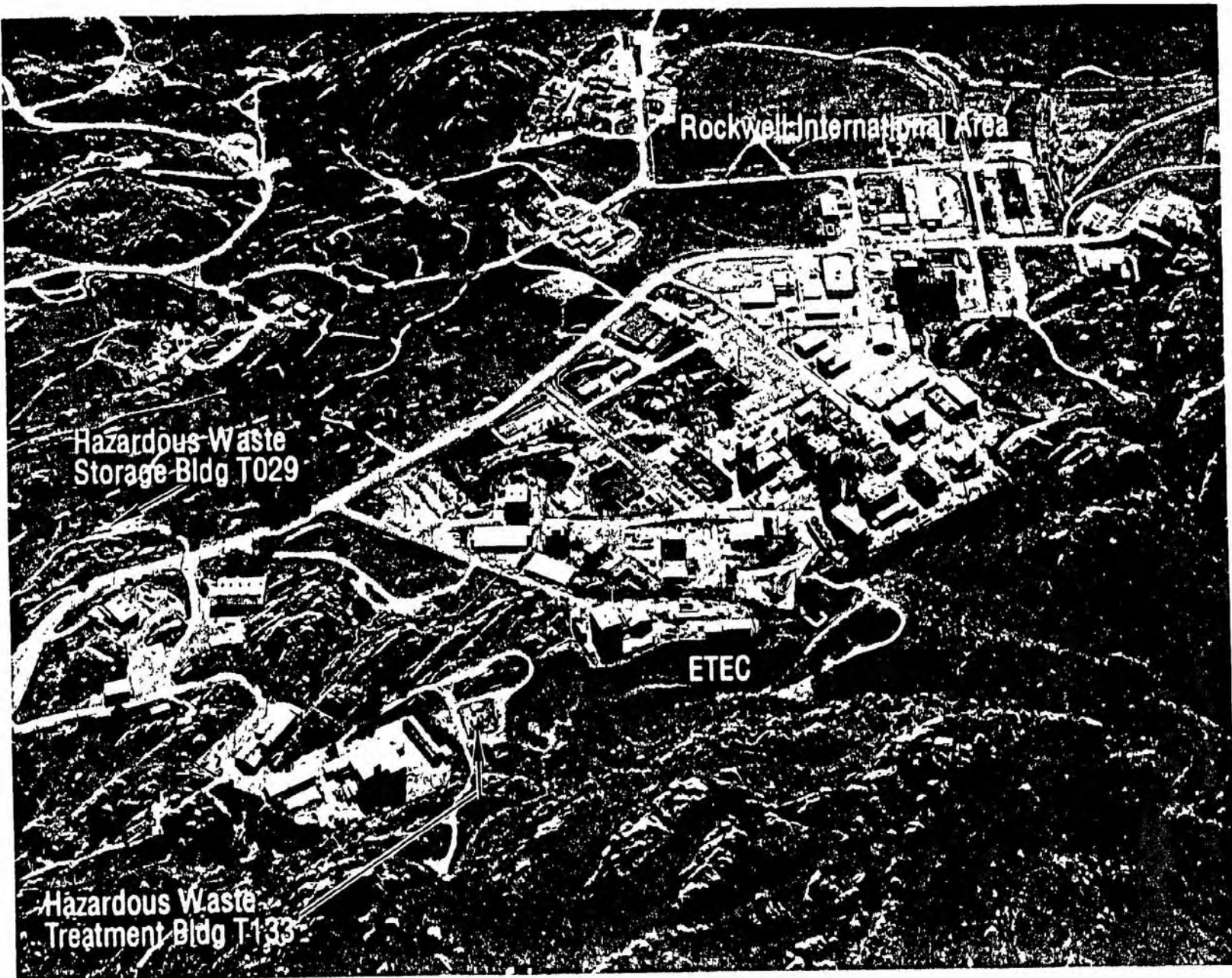


Figure I-1 ETEC and Area IV SSFL



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Hazardous Waste Treatment (Bldg. 133) Plot Plan

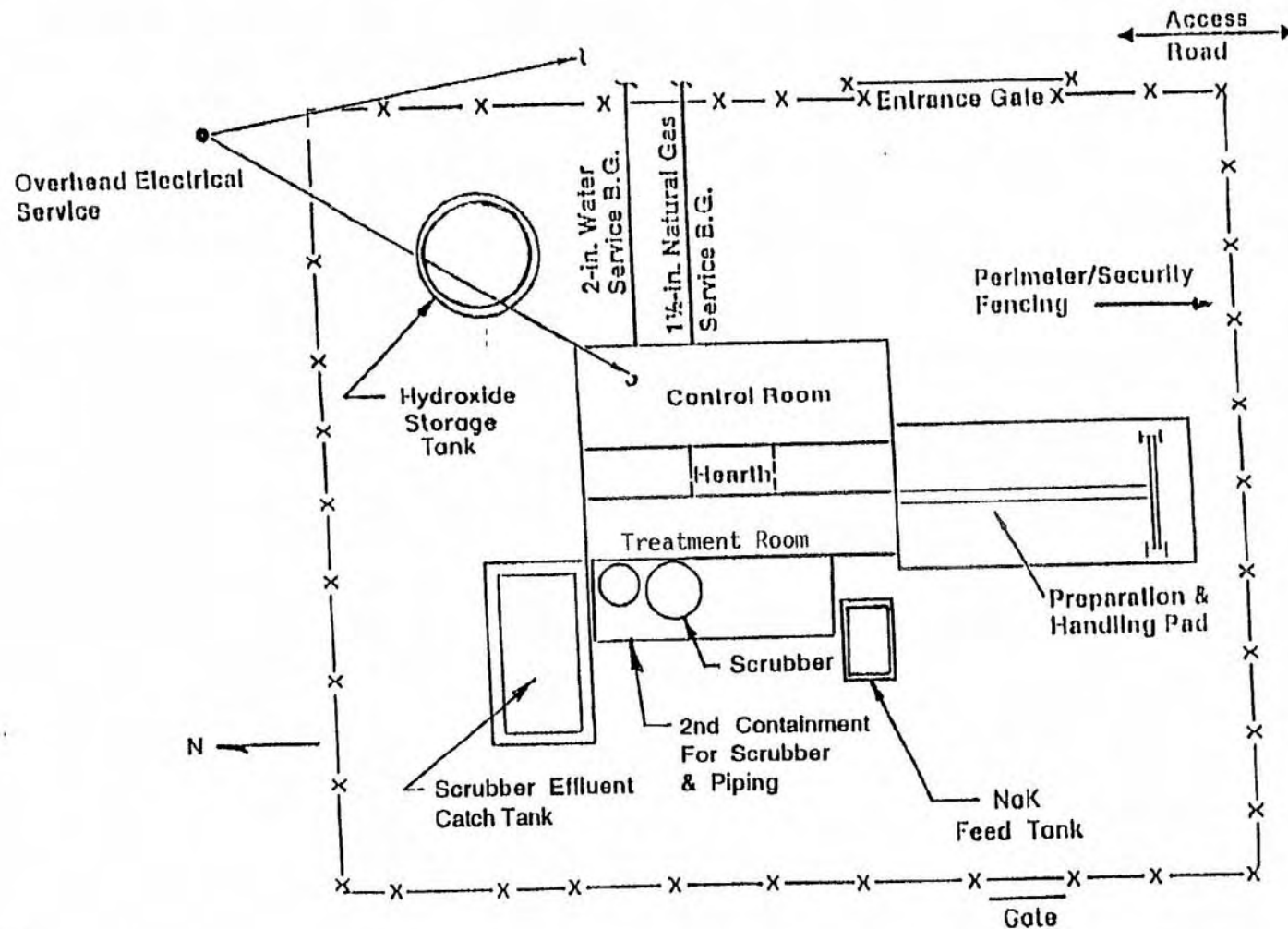


Figure II-9

Treatment Building T133 Plot Plan



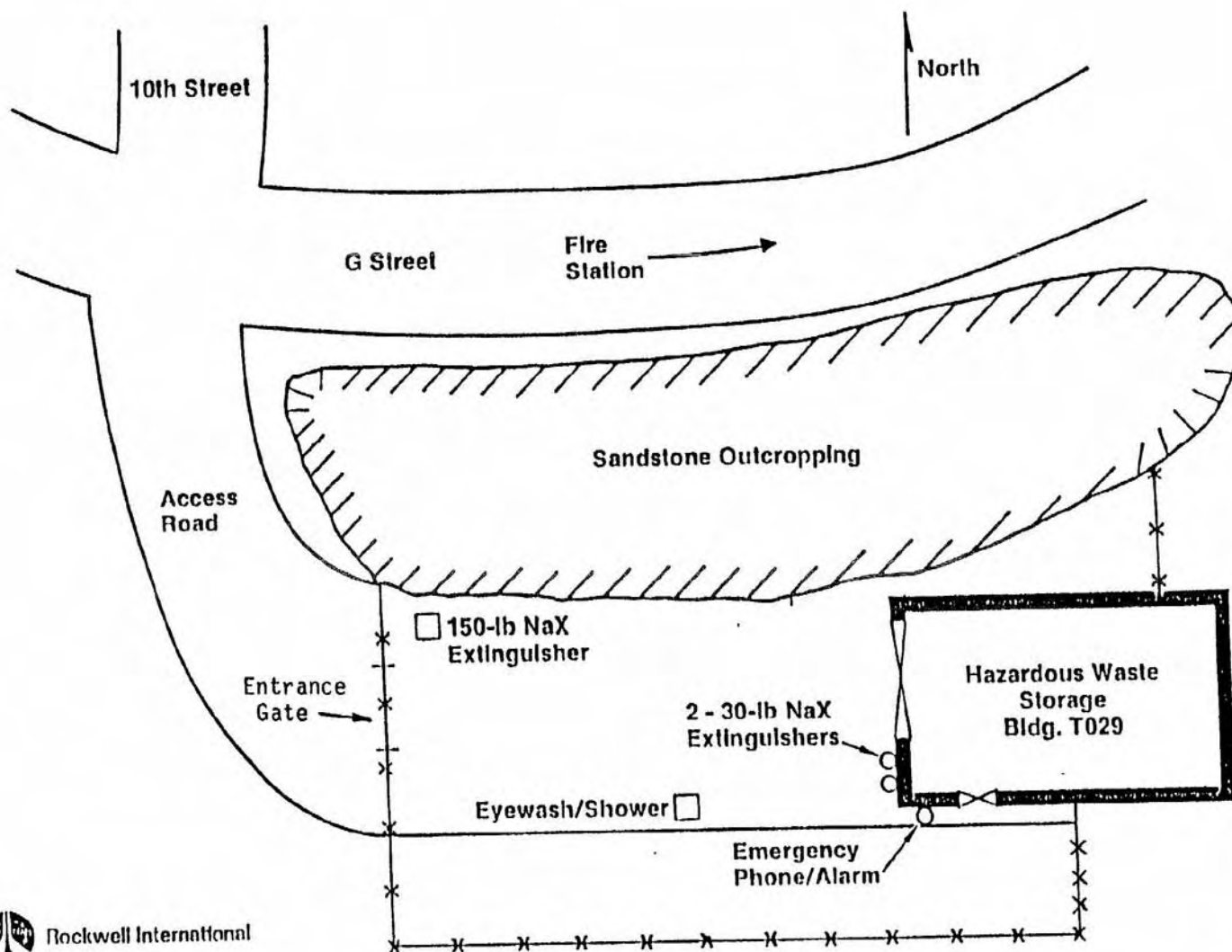


Figure II-10

Storage Building T029 Plot Plan

00D-18-124

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ANNUAL SURFACE WIND ROSE

ROCKWELL SANTA SUSANA FIELD LABORATORY

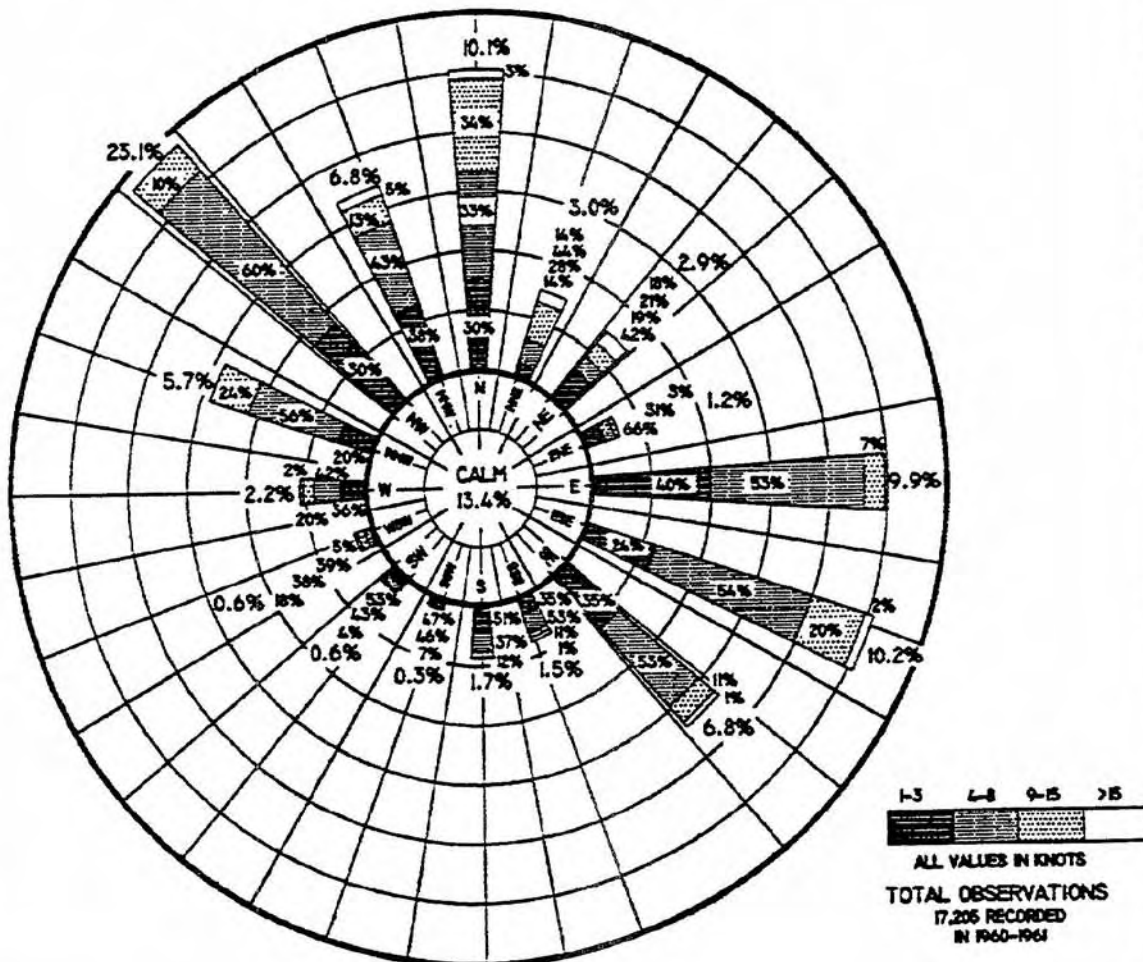


Figure II-5 Annual Surface Windrose (1960-1961), RDFTL



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Energy Technology Engineering Center
Rocketdyne Division
Rockwell International Corporation
P.O. Box 7930
Canoga Park, California 91309-7930



(818) 586-5326

Operator for
U.S. Department of Energy

July 6, 1995

In reply refer to 95ETEC DRF 0608

Mike Lopez
Department of Energy
1301 Clay St., Suite 700N
Oakland, California 94612-5208

Subject: Buildings 030, 019 and 654.

Dear Mr. Lopez:

In reviewing the status of radiological buildings at SSFL, it appears that three ex-radiological buildings have been surveyed by ETEC but not yet had independent verification surveys performed nor have they been released for unrestricted use. They are...

Building 030: This building housed a Van der Graff accelerator. This building (including the neighboring B/641 loading dock) was surveyed in 1988. The survey report is attached. The building is currently occupied.

Building 019: This building housed a SNAP 10-A Flight System critical assembly. It was surveyed in 1988. The survey report is attached. The building is currently occupied.

Building 654: This building was known as the Interim Storage Facility and was used to store SRE equipment. It was demolished and excavated in 1984 and the remaining ground surveyed. The survey report is attached.

All these buildings are DOE-owned, and it is therefore requested that DOE contract with ORISE to perform an independent verification survey on these facilities.



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As with prior ORISE surveys, ETEC intends to invite the State of California DHS/RHB to participate in these surveys and is providing the State with copies of the ETEC final surveys via this letter. Following ORISE surveys, facility release for unrestricted use will be sought from DOE/OAK with concurrence by the State DHS/RHB.

If you have any questions on the above material please contact the undersigned at (818) 586-6140 or e-mail to pdruther@rdyne.rockwell.com.

Very truly yours,



P. D. Rutherford, Manager
Radiation Protection and
Health Physics Services

Attachments:

1. GEN-ZR-0007, "Radiological Survey of Shipping/Receiving and Old Accelerator Area Buildings T641 and T030", August 19, 1988.
2. GEN-ZR-0010, "Radiological Survey of Buildings T019 and T013", August 26, 1988.
3. ESG-DOE-13507, "Interim Storage Facility Decommissioning Final Report (includes final survey data)", March 15, 1985.

cc with attachments:

E. Bailey	DHS/RHB
T. Vitkus	ORISE

cc without attachments:

K. Wong	DHS/RHB
P. Baldenweg	DHS/RHB
G. Wong	DHS/RHB
J. Cullen	DOE/OAK
R. Liddle	DOE/OAK
D. Williams	DOE/HQ
P. Newkirk	DOE/HQ



BNA03479293

HDMS00375498

ETEC LETTER REVIEW RECORD

TWX/LTR No.: ETEC-DRF- CRK8 File Name: _____ Disk No.: _____ Date: 7/6/75Subject: 2/1/75 100 019 + 654Addressee: Mike - 100 Signed by: Phil KeithfordPrepared by: Phil Keithford Typed by: _____Related G.O. No.: _____ Completes Action in: DRF- _____ Req. Action by: ETEC _____ Other _____ None _____
Remarks: _____

Approvals

General Manager: _____	Mgr., Business Mgmt: _____
<u>1</u> Mgr., Environmental Programs: <u>100</u>	Mgr., Engineering: _____
Mgr., Gen. Programs: _____	Mgr., Power Plant Test: _____
Mgr., Operations: _____	Mgr., Nuclear Ops: _____
Mgr., QA & Training: _____	<u>1</u> Mgr. RAMPs <u>100</u>

Distribution

Without Enclosure (/)		With Enclosure (X)	
Akamine, K. S. T487	Hollahan, J. E. T487	Santa Ines, R. T487	
Albert, A. T019	Holt, T. E. T487	Sheikhvand, B. H. T487	
Amar, R. T487	Homer, R. S. T487	Shinnamon, S. T019	
Atkinson, R. F. T334	Horton, P. W. T009	Shipway, W. T. T487	
Aubuchon, D. F. T355	Hunnicutt, T. D. T038	Sinclair, R. M. T355	
Benjamin, S. T038	Ingersoll, R. D. T039	Stearns, J. D. T487	
Berrett, J. M. T487	Jackson, J. M. T355	Stone, L. R. T038	
Berwager, L. E. T355	Jaquay, K. R. T487	Subbaraman, G. T038	
Boardman, T. J. T487	Jassak, R. M. T487	Tabor, W. T487	
Boggio, J. M. T039	Jetter, R. I. T487	Tapia, D. G. T355	
Brennan, J. M. T066	Klee, S. M. T065	Tessier, M. J. T038	
Carlson, Jr., M.A. T066	Klein, A. T009	Venable, T. C. T038	
Chen, W. F. T487	Knudsen, K. T. T487	Wait, D. L. T487	
Cleveland, J. R. T487	Langford, R. W. T038	Wang, A. C. T487	
Cubillos, F. T487	Langowski, T. J. T487	Weigand, M. A. T467	
Darley, D. H. T234	Lucci, J. S. T038	Wells, T. L. T013	
DeBear, W. S. T038	Makuta, R. K. T487		
DeVita, V. T487	McDowell, M. W. T487		
Doerr, S. M. T487	Moore, R. T020		
Ellis, J. G. T019	Meyer, R. D. T038		
Ervin III, G. T487	Mountford, L. T487		
Evans, R. E. T487	Newman, C. D. T038		
Finch, M. T038	Onesto, A. T. T038	A/C Coordinator T038	
Fuentes, G. L. T123	Payne, R. V. T355	<u>1</u> DRF Control T038	
Gabler, M. T038	Pascolia, A. L. T066	Library T038	
Gaylord, G. G. T038	Pascolia, J. A. T066	Safety (SS) T036	
Gerritsen, W. J. T038	Pendleberry, S. L. T487		
Gibbs, D. C. T038	Peterson, E. V. T487	<u>1</u> WINTERKORD T100	
Granger, R. A. T487	Reeder, S. E. T038	<u>1</u> LAFZAM AA 24	
Green, P. M. T487	Robinson Jr., K. S. T487	<u>1</u> GAYLORD AA 24	
Greenfield, S. L. T038	Rochelle, D. R. T038	<u>1</u> EDSTRON T100	
Henriksen, R. T355	Ruffino, K. T038	<u>1</u> JENSEN T038	
Herpich, J. F. T462	Sahagian, D. T038		
Hoffman, K. J. T038	Samuels, S. L. T038		



BNA03479294

HDMS00375499

DEPARTMENT OF HEALTH SERVICES

714/744 P STREET
P.O. BOX 942732
SACRAMENTO, CA 94234-7320
(916)323-2780



March 29, 1996

P. D. Rutherford, Manager
Radiation Protection and Health Physics Services
Rocketdyne Division
Rockwell International Corporation
P.O. Box 7922, MS-T100
Canoga Park, CA 91309-7922

RE: Buildings 030, 019, and 654

Dear Mr. Rutherford:

This letter is to confirm our telephone conversation of March 26, 1996 concerning the release of ETEC's Buildings 030, 019, and 654 on the Santa Susana Field Laboratory. The release of these buildings is now on hold because the Department of Energy's independent verification contractor (ORISE/ESSAP) recommended that Rocketdyne resurvey the buildings. The new surveys are now in the planning stages.

The Department of Health Services will not concur on the release of the subject buildings, until the results from your surveys and the final report provided by ORISE/ESSAP are submitted for review. If you have any questions, please contact me at (916) 323-2780.

Sincerely,

A handwritten signature in black ink, reading "Michael A. Montes", is positioned above the typed name.

Michael A. Montes
Health Physicist
Radiological Health Branch

cc: Steve Hsu



Department of Toxic Substances Control

Edwin F. Lowry, Director
1011 N. Grandview Avenue
Glendale, California 91201



Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Gray Davis
Governor

CERTIFIED MAIL

September 19, 2000

Mr. Roger Marshall
Site Restoration Manager
Boeing Company (BC)
6633 Canoga Avenue
P.O. Box 7922
Canoga Park, California 91309-7922

Dear Mr. Marshall:

On July 19, 2000, the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC), conducted an inspection of Boeing Company (BC) located at Top of Woolsey Canyon Road, Semi Hills, California 93063. The enclosed report describes the findings of this inspection.

There were no violations observed during the inspection. DTSC will not require you to submit a written response to this inspection report. DTSC will take no further action in regards to the findings found during this inspection.

All pertinent information derived from the inspection are included as attachments to the report. This report will become a public document; you may request that any trade secret or facility security information be withheld from public disclosure. (See Health and Safety Code Section 25173 enclosed).

If you have any questions regarding this letter, or if you wish to meet with DTSC to discuss any questions or concerns you have with the inspection or the report, please call Ahmed Hegab, Hazardous Substances Scientist at (818) 551-2902.

Sincerely,

Roberto Kou, Unit Chief
Statewide Compliance Division
Glendale Office

004265 *EC*

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HDMS00392053

**COMPLIANCE EVALUATION INSPECTION
REPORT****I. GENERAL INFORMATION:**

Company Name: Boeing Company (BC)

Facility Location: Top of Woolsey Canyon Road
Semi Hills, California 93063

Facility Mailing Address: 6633 Canoga Avenue, California
P.O. Box 7922
Canoga Park, California 91309-7922

Telephone Number: (818) 586-5329

Fax Number: (818) 586-5194

EPA ID Number: CAD 000 629 972

Facility Type: Permitted treatment and storage facility. Permit expires on 11/30/2003.

Waste Streams: Facility is inactive and has not operated since April 1997. Currently no waste streams is stored or treated at area IV. Waste streams include Alkali reactive metals (D001) and hydroxide solution (D002).

Regulatory Status: Permitted, undergoing closure

Regulated Units: Area IV regulated units include the Treatment Chamber in building T133 for the treatment of the on-site generated Alkali metal wastes (sodium or sodium potassium); Tanks T1 and T3 in building T029 for storage of sodium and potassium hydroxides) ; Tank T2 in Building T133 for the storage of sodium-potassium (Na K) and On-site generated hazardous waste Containers Storage Area in Building T029.

All of the above units are currently inactive.

Inspected by: Ahmed E. Hegab, Ph.D, Hazardous Substances Scientists (HSS)

Date of Inspection: July 19, 2000

Type of Inspection: Compliance Evaluation Inspection.

Facility Rep.: Roger Marshall, DOE Site Restoration, Manager
James Sherman, Environmental Affairs Officer
Gilbert L. Fuents, Environmental Engineer in charge

Type of Business: Boeing is an aerospace company. Santa Susana Field Laboratory (SSFL) principal business activities include rocket engine testing as well as research and development for aerospace, energy technology and laser technology.

II. CONSENT:

Consent to conduct inspection that involves: taking photographs, reviewing and copying records, questioning personnel and inspecting hazardous waste handling areas. Yes/No **Yes.**

Consent given by (name and title): Gilbert Fuents, Environmental Engineer in charge.

III. NARRATIVE OF OBSERVATIONS/DISCUSSION WITH OPERATOR:

On July 19, 2000, at approximately 1030 hours, I arrived at BC located at Top of Woolsey Canyon Road, Semi Hills, California 93063, Ventura County. I met with Gilbert L. Fuents and stated the purpose of my visit to conduct a routine compliance evaluation inspection. I asked him consent to conduct the walk-through inspection, to review records and plans and if necessary obtain photocopies of records or other applicable documents related to hazardous waste activities, take photographs and samples. Gilbert L. Fuents granted his consent to me. Then I asked him to explain the BC's operation, hazardous waste activities, major waste streams and how BC manages the hazardous waste streams. Mr. Fuents said that Area IV is inactive and all the hazardous waste activities were terminated since April 1997. It was formerly called Energy System Group Operation. In this area, operation was including the research and

development of the nuclear reactor subsystem and designs; thermal hydraulic structural testing of component for Department of Energy program; and development of co-generation power plant. Then he said "currently, the regulated units in Buildings T133 and T029 do not have any hazardous waste activity or even waste but only maintenance and weed abatement".

At about 1050 hours Mr. Fuentes and I arrived at Building T133. Mr. Fuentes stated that the unit in Building T133, was shut down and cleaned of any hazardous waste in 1997. Then he said that the only activity is the weekly inspection for maintenance, house keeping and weed abatement. I did not also observe any hazardous waste activity and the building was empty from any hazardous waste. Mr. Fuentes also escorted me to building T029 which was empty and I observed no violation in Building T133 or T029. During my walk-through of the facility we visited other generation areas. I inspected the 90-day hazardous waste storage (Department 543) and Building 352. I did not observe any violation in these areas.

At approximately 1242 hours, I completed the walk-through inspection and asked Mr. Fuentes to make available for review all plans and records pertaining to permitted Area IV and gave him a list of records I wanted to review. Mr. Fuentes then said that most of the records in Building 133 and the remaining document in the main office. Then, I reviewed the following documents:

IV. Record Review:

- a. **Manifests, Bills of Lading, LDR's, Exception Reports:**
Manifests were reviewed for years of 1996, 1997 and 1998. BC's Uniform Hazardous Waste Manifest Tracking logs were also reviewed.
No violations were observed.
- b. **Training Plan and Records:**
The hazardous material/waste training plan and records were reviewed.
No violations were observed.
- c. **Waste Analysis Plan and Records):**
Waste Analysis Plan and records are exempt based DTSC's letter dated 9-16-1999 (Attachment A)
- d. **Contingency Plan:**
The contingency plan was reviewed. No violations were observed.

- e. **Operation Log:**
Operation logs for the period of February 1997- present were reviewed.
No violations were observed.
- f. **Financial Responsibility:**
BC is exempt from the financial responsibility audit because it is a federal facility as the Department of Energy owns this facility.
- g. **Closure Plan:**
Closure plan was reviewed and no violation was noted.
- h. **Annual/ Biennial Reports:**
These reports are exempt based DTSC's letter dated 9-16-1999 (Attachment A).
- i. **Incident Report:**
None to report at this time, according to Gilbert Fuentis.
- j. **Inspection Records:**
The inspection logs for Tank 1 and Tank 2 were reviewed. No violations were observed.
- k. **SB 14 Plans:**
Not Applicable.
- l. **Part A:**
The revised Part A dated 12/2/1999, was reviewed and no violation was found.
- m. **Part B:**
The Part B was reviewed and no violation was noted.

V. **VIOLATIONS:**

No violations.

VI. **CONCLUSIONS:**

At approximately 1440 hours, on July 19, 2000, I held an exit interview with Roger Marshall, James Sherman, and Gilbert L. Fuentes. Then I told them that I did not observe any violations during my inspection and DTSC will send them a complete inspection report within 65 days. Then I gave Roger Marshall the Summary of Observations for his signature. I also asked him to make a copy of the complete signed document for his records (Attachment B).

VII. ATTACHMENTS:

- A. DTSC letter to BC dated 9-16-1999- 10 pages.
- B. Summary of Observation - 1 Page.

Ahmed E. Hegab

Ahmed E. Hegab
Hazardous Substances Scientists

9-17-2000

Date

ATTACHMENT

A

BNA08665420

HDMS00392059



Department of Toxic Substances Control



Winston H. Hickox
Secretary for
Environmental
Protection

Edwin F. Lowry, Director
1011 N. Grandview Avenue
Glendale, California 91201

Gray Davis
Governor

September 16, 1999

Ms. Majelle Lee
The Boeing Company
Rocketdyne Propulsion & Power
6633 Canoga Avenue MC T487
Post Office Box 7922
Canoga Park, California 91309-7922

Dear Ms. Lee:

**REQUEST FOR SUSPENSION OF PERMIT REQUIREMENTS FOR HAZARDOUS
WASTE MANAGEMENT FACILITY AT BOEING ROCKETDYNE SANTA SUSANA
FIELD LABORATORY (SSFL) AREA IV**

The Department of Toxic Substances Control (DTSC) reviewed your letter dated July 29, 1999 which asked DTSC to suspend certain permit requirements for the Hazardous Waste Management Facility (HWMF). A list of these requirements were enclosed with the letter.

DTSC issued a Hazardous Waste Facility Treatment and Storage Permit (93-3-TS-0021, CAD000629972) to Rockwell and to Energy Technology Engineering Center (ETEC, a part of the US Department of Energy) in November 1993. The HWMF is currently undergoing closure. Boeing notified DTSC that the HWMF was beginning closure with a letter dated July 21, 1998. DTSC reviewed an updated closure plan and issued a Notice of Deficiency on June 29, 1999. The Closure Plan is currently being revised. Meanwhile, the permitted facility remains inactive which includes two units -- Building 133 (treatment) and Building T029 (storage). A recent site visit by DTSC staff on August 17, 1999 confirms the apparent inactivity of these units. Boeing requested suspension of certain requirements applicable to the operation of an active facility but no longer applicable to an inactive and closing facility. Because the closure plan is currently being revised and has not been approved, permit requirements applicable to an active facility may still be enforced. Any concurrence to suspend these permit requirements is conditional upon the units remaining inactive and not treating or storing any waste material. Any concurrence to suspend these permit requirements can only be used up to the finalization of the Closure Plan, at which time the requirements of the approved Closure Plan takes precedence.

005841 *rc*

California Environmental Protection Agency
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HDMS e00392060

7 October 1999
In reply refer to 99RC-2722



Mr. Jose Kou
California Environmental Protection Agency
Department of Toxic Substances Control
Facilities Permitting Branch
Region 3
1011 North Grandview Avenue
Glendale, CA 91201

Subject: Administrative changes to 133-AN-0001, "Operation Plan - Hazardous Waste Management Facility, Santa Susana Field Laboratory, Ventura County, California", Energy Technology Engineering Center, Rocketdyne Division, Rockwell International, December 17, 1992.

Dear Mr. Kou:

In a recent letter you asked that Boeing NA, Rocketdyne Propulsion and Power submit administrative changes to the Hazardous Waste Management Facility Operation Plan to the Department of Toxic Substances Control as they occur throughout the closure process. In the interest of completeness, we are submitting the following information which reflect the administrative changes to the Operation Plan:

<u>Page</u>	<u>Section</u>	<u>Heading</u>	<u>New Information</u>
5	I.A.2.	Facility Name	Hazardous Waste Management Facility
5	I.A.4.	Mailing Address	P.O. Box 7922 Canoga Park, Ca 91309
5	I.A.6.	Contact Telephone	(818) 586-5283
6	I.A.7	SIC Code	99980-Miscellaneous
6	I.B.1	Operator Name	The Boeing Company

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<u>Page</u>	<u>Section</u>	<u>Heading</u>	<u>New Information</u>
7	I.B.2	Mailing Address	P.O. Pox 7922 Canoga Park, CA 91309
7	I.B.3	Operator Telephone	(818) 586-5283
7	I.C.1	Owner Name	U.S. Department of Energy Oakland Operations Office
7	I.C.2	Mailing Address	1301 Clay Street Oakland, CA 94612
7	I.C.3	Owner Telephone	(510) 637-1794
7	I.D.1	Contact Person	Majelle Lee
8	I.D.2	Title	Program Manager
8	I.D.3	Telephone	(818) 586-5283
8	I.D.4	Address	P.O. Box 7922 Canoga Park, CA 91309

If you have any questions regarding the updates to the Hazardous Waste Management Facility Operation Plan, please contact Brian Sujata at (818) 586-6043.

Majelle E. Lee
Program Manager
ETEC Closure Program

Shea- 086634

BNA08665423

HDMS00392062

Fuentes, Gilbert L

From: Sujata, Brian D
Sent: Thursday, November 04, 1999 4:17 PM
To: Amar, Ravnesh; Fuentes, Gilbert L; Marshall, Roger A; Moore, Roger M
Cc: Venable, Thomas C; Shestak, Steven L
Subject: HWMF Inspections During Closure

The Department of Toxic Substances Control recently concurred, with some conditions, Rocketdyne's request to suspend the Operation Plan requirements for the duration of the HWMF Closure. Two of the conditions are to maintain certain facility security standards and to keep the facility in a safe condition.

The HWMF inspection must now be conducted on a weekly basis; daily inspections are no longer required. In addition, a new inspection form has been developed to reflect the facility requirements while closure is taking place.



HWMF Inspection.DOC

I suggest that I meet with the HWMF facility personnel when the weekly inspections are started so that I may offer interpretive guidance in the use of the new form.

Brian

DTSC concurs with most of the proposed suspensions of permit requirement suspensions, as outlined in the July 29, 1999 enclosure. Specifically:

- 1) **Modify Operations Plan to update names and administrative changes:**
DTSC agrees to suspend the requirement of modifying the Operation Plan whenever names and administration changes occur. HOWEVER, Boeing-Rocketdyne must continue to submit this information to DTSC, when appropriate, while the closure plan is being revised. Submission of the information in a letter would be appropriate.
- 2) **Annual review and update of Waste Analysis Plan:**
DTSC agrees to suspend the requirement of reviewing and modifying the Waste Analysis Plan on an annual basis. The Waste Analysis Plan dealt with the waste generated during normal operation of the facility. When appropriate, Boeing is still required to properly test and manage any contaminated equipment or precipitation that has come in contact with contaminated equipment.
- 3) **Annual painting of scrubber tank and ancillary equipment:**
DTSC agrees to suspend the requirements of annually painting the scrubber tank and ancillary equipment.
- 4) **All other forms of scheduled maintenance:**
DTSC agrees to suspend the requirements of scheduled maintenance for the storage and treatment units. DTSC also agrees to suspend the recording requirements for the scheduled maintenance of the storage and treatment units. However, for safety and security reasons, Boeing is still required to perform certain maintenance tasks including, but not limited to, the maintenance of security fencing, maintenance of the structural integrity of the buildings and maintenance of all equipment and structures to prevent safety hazards. If appropriate, pest control must be maintained at these units to ensure worker safety.
- 5) **Daily/Weekly inspections to ensure containers, tanks and safety systems are in proper working order:**
DTSC agrees to suspend the requirements of daily and weekly inspections of containers, tanks and safety systems to ensure proper working orders. DTSC also agrees to suspend the recording requirements for these inspections. However, for safety and security reasons, Boeing is still required to provide, at a minimum, weekly inspections of the units to ensure the sites remain secure and are safe for workers to enter the sites.

BNA08665425

TANK T-2 is a double-walled tank which was used to store NaK prior to transferring the material into the treatment unit's burn pan. Although material from the tank has been removed, residual NaK may remain. Boeing informs DTSC that a direct inspection of the interior of Tank T-2 has not been performed and is waiting for the finalization of the Closure Plan. Until direct inspection of the interior of Tank T-2 is performed, Boeing must assume NaK residuals remain in the tank. Until directed otherwise, or until the finalization of the Closure Plan, Boeing must inspect and maintain Tank T-2 as if residual NaK remains in the tank. Boeing would not be required to inspect or maintain Tank T-2 at a level appropriate for an active facility.

- 6) **Biennial inspections of tanks and scrubber towers to measure wall thicknesses:**
DTSC agrees to suspend the requirements for biennial inspections of tanks and scrubber towers to measure wall thickness.
- 7) **Biennial inspections of the HWMF burn pan to determine damage and corrosion:**
DTSC agrees to suspend the requirements for biennial inspections of the HWMF burn pan to determine damage and corrosion.

With the above clarifications, DTSC concurs with Boeing's request to suspend Permit Requirements for the Hazardous Waste Management Facility, Permit No. 93-3-TS-0021 as specified in the enclosure to your July 29, 1999 letter (a copy has been enclosed). If you wish to discuss this matter further, you may contact Stephen Baxter, P.E., at (818) 551-2940.

Sincerely,



José Kou, P.E., Chief
Southern California Permitting Branch

Enclosure

cc: See next page

BN A08665426

HDMS e00392065

Ms. Majelle Lee
September 16, 1999
Page 4

cc: Mr. Steve Lafflam (w/enclosure)
The Boeing Company
Rocketdyne Propulsion & Power
6633 Canoga Avenue MC T4-87
P.O. Box 7922
Canoga Park, California 91309-7922

Ms. Karen Baker, CEG, CHG, Chief (w/enclosure) R4-2-55
Geology & Corrective Action Branch
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

Ms. Florence Gharibian, Chief (w/enclosure) R3-6
Southern California Statewide Compliance Branch
1011 North Grandview Avenue
Glendale, California 91201

Mr. Gerard Abrams (w/enclosure) R1-2
Hazardous Substances Engineering Geologist
Land Disposal Branch
Department of Toxic Substances Control
10151 Croydon Way, Suite 3
Sacramento, California 95827

Ms. Ann Spivey (w/enclosure) HQ-2
Fees Unit
Department of Toxic Substances Control
Post Office Box 806
Sacramento, California 95812-0806

BNA08665427

HDMS00392066

Ms. Majelle Lee
September 16, 1999
Page 5

bcc: Roberto Kou (w/enclosure) R3-6
Unit Chief
Statewide Compliance Division
Southern California Region

Stephen Baxter (w/enclosure) R3-4
Senior Hazardous Substances Engineer
Southern California Permitting Branch

Stephen Cain (w/enclosure) R3-2
Public Participation Specialist
Public Participation Unit

BNA08665428

HDMS00392067

ATTACHMENT

B

BNA08665429

HDMS00392068

SUMMARY OF OBSERVATIONS

On July 19, 2000, the Department of Toxic Substances Control (DTSC), California Environmental Protection Agency, conducted an inspection at:

Facility Name: Boeing Company

Facility Address: Top of Woolsey Canyon Rd. Simi Hills Ca. 93063

Mailing Address: P. O. Box 7922 Canoga Park Ca. 91309-7922

EPA ID Number: CAD 000 629 972

County Name: Ventura County

As a result of that inspection, no violations of hazardous waste laws, regulations, and requirements were discovered. DTSC will provide you a complete inspection report within 65 days of the date of this inspection.

DTSC greatly appreciates the efforts that you have made to comply with the hazardous waste laws and regulations.

Company Representative Accepting Summary

Signature Roger A. Marshall

Title Manager, DOE Site Restoration

Date 7-19-00

Name: Roger A. Marshall

Department Representative

Signature Ahmed E. Hegab

Title Haz. Sub. Scientist

Date 7-19-2000

Name: Ahmed E. Hegab, Ph.D.

DTSC

(3/95)

F-5

Page of

BNA08665430

HDMS00392069

United States Government

Department of Energy

memorandum

DATE: FEB 16 2001

REPLY TO
ATTN OF: EM-34 (R. Fleming, 301-903-7627)

SUBJECT: Review of the Department of Energy/Certification Docket-Energy Technology Engineering Center-654 Draft Docket for the Release of Building 4654 at the Energy Technology Engineering Center

TO: Henry DeGraca, Director, Oakland Environmental Programs Division,
Oakland Operations Office

The Draft Docket for the Release of Building 4654 at the Energy Technology Engineering Center, i.e. Certification Docket-Energy Technology Engineering Center-654, dated May 1999 has been reviewed. The draft docket was submitted by the Oakland Operations Office and supports release without radiological restrictions of Building 4654, the Interim Storage Facility.

Based on this review, it was determined that the draft docket documentation for Building 4654 should be revised to incorporate comments noted in the attachment. Following resolution of these comments, please resubmit the docket for approval.



Robert C. Fleming, Leader
Chicago/Oakland Team
Small Sites Closure Office
Office of Site Closure

Attachment

cc: J. Lehr, EM-34
D. Sutherland, OAK

Review of the Department Of Energy/Certification Docket-Energy Technology Engineering Center-654, Draft Docket for the Release of Building 4654 at the Energy Technology Engineering Center

Oakland Operations Office Request

In a memorandum dated August 31, 1999, the Department of Energy (DOE) Oakland Operations Office (OAK) requested Headquarters review of DOE/CD-Energy Technology Engineering Center (ETEC)-654, Draft Docket for the Release of Building 4654 at ETEC. In the memorandum, DOE/OAK requested: 1) approval for release of Building 4654 without radiological restrictions to Rockwell International (now Boeing Canoga Park), in accordance with the closeout provisions of the contract; and 2) authorization to remove this facility from the DOE/OAK real property records.

Background

ETEC conducted nuclear energy research and development programs between 1946 and 1995. Building 4654, the Interim Storage Facility, was constructed in 1958 to support the Sodium Reactor Experiment (SRE). It was originally used to store dummy and spent fuel elements, shipping storage casks, and the waste generated at the SRE. When the SRE ceased operating, the facility was used to store material from two other programs, the Organic Moderated Reactor Experiment and the Systems for Nuclear Auxiliary Power.

Seals and packing on some of the casks and equipment stored at the Interim Storage Facility (ISF) over the years deteriorated from exposure to the elements. Some low-level contamination was released into the asphalt surface near the casks and onto the soil just outside the ISF fence. Radioactive core components and material placed in the eight storage tubes had also contaminated the internal storage baskets and interior surfaces of the storage tubes.

Between 1984 and 1985, Building 4654 was decontaminated. Activities included performing a detailed radiation survey of the facility, removing surface and imbedded contamination, excavating and removing the fuel storage tubes, restoring the site to natural grade, and packaging and shipping the waste materials to the DOE Hanford (Washington) disposal site for burial.

The initial Rocketdyne radiological survey in 1984-1985 of the ISF determined the ISF to be suitable for release without restrictions. In 1995, at the request of DOE, the Oak Ridge Institute for Science and Education (ORISE) reviewed the 1984-1985 survey documentation. ORISE is routinely contracted by DOE to perform independent third party verification release surveys of sites throughout the DOE complex.

As a result of this independent review, ORISE suggested that additional sampling was required to adequately demonstrate that Building 4654 could be released without restrictions. Accordingly, in 1997, Rocketdyne arranged for subsurface core samples of the area to be taken at the direction of ORISE, and at the same time, took an additional 93 surface soil samples.

ORISE documented their verification survey in 1997 and Rocketdyne completed the final documentation of the surveys in 1999. Both surveys confirmed that the exposure rates and radionuclide concentration levels in soil at the ISF are less than the guideline criteria levels of release for unrestricted use.

DOE/OAK has certified that the subject property is in compliance with DOE decontamination criteria and standards established to protect members of the general public and occupants of the property. The State of California Department of Health Services has concurred that the proposed release guidelines provide adequate assurance for release without further radiological restrictions.

Comments

Based on this review, it is recommended that the draft docket documentation for Building 4654 be revised to incorporate the comments below.

- 1) The last sentence on page 1 in the section entitled "Introduction and Site History" of ORISE 97-1900, "Verification Survey of the Interim Storage Facility (T654), Santa Susana Field Laboratory, Rockwell International, Ventura County, California," Final Report, November 1997, states:

"Chemical contaminants, mainly chlorinated organic solvents, have also been identified in groundwater, primarily as a result of rocket engine testing."

No other statements pertaining to chemically hazardous constituents are contained in the verification report to indicate what if any action is being taken to address the chemical contamination, or even its relevancy with respect to the action to release Building 4654 from radiological controls. Therefore, it is suggested that a clarifying statement regarding this sentence be included in the Boeing Engineering Product Document, Number EID-04364, Final Report, Decontamination and Decommissioning of Interim Storage Facility 4654, May 20, 1999 (Draft Docket Exhibit IV).

The clarification should indicate that the chemically contaminated groundwater beneath the ETEC site is being remediated as part of the overall ETEC environmental restoration program. In addition, since it is not associated with operations at Building 4654, there is no reason to delay the release of Building 4654 from radiological restrictions.

- 2) The initial decontamination surveys were completed in 1985. However, ORISE was not requested to perform an independent verification survey of the decontamination results until 1995 and did not issue a final report until 1997. A short explanation of the nearly 10 year time delay between completing the initial survey and the conduct of the independent verification survey should be included in the Boeing Engineering Product Document, Number EID-04364, Final Report, Decontamination and Decommissioning of Interim Storage Facility 4654, May 20, 1999 (Draft Docket Exhibit IV).



Department of Energy
National Nuclear Security Administration
Service Center



February 1, 2005

Majelle Lee
Program Manager
DOE Site Closure
The Boeing Company
Rocketdyne Propulsion & Power
P.O. Box 7922
Canoga Park, CA 91309-7922

Subject: Release of Building 4654

Dear Ms. Lee:

Building 4654, the Interim Storage Facility, was constructed in 1958 to support the Sodium Reactor Experiment (SRE). It was originally used to store dummy and spent fuel elements, shipping storage casks, and the waste generated at the SRE. Since the SRE ceased operating the facility has been used to store material from two other programs, the Organic Moderated Reactor Experiment and the Systems for Nuclear Auxiliary Power. The facility decontamination was completed in 1985.

The site where Building 4654 stood has undergone a final status radiological survey by Boeing, and a verification survey by the Oak Ridge Institute of Science and Education (ORISE). The surveys confirmed that the DOE and DHS approved soil cleanup limits have been met.

Therefore the 4654 site is suitable for release for unrestricted use.

Sincerely,

Michael Lopez
Environmental Restoration
Project Manager



Linda S. Adams
Secretary for
Environmental Protection



Department of Toxic Substances Control

Maureen F. Gorsen, Director
1011 North Grandview Avenue
Glendale, California 91201



Arnold Schwarzenegger
Governor

MEMORANDUM

TO: DTSC File for:
Hazardous Waste Management Facility, Bldg 29 / 133
Santa Susana Field Laboratory, Area IV, Ventura County
EPA ID CAD000629972

FROM: Stephen Baxter, P.E.
Senior Hazardous Substances Engineer
Southern California Permitting and Corrective Action Branch

DATE: December 22, 2006

SUBJECT: DETERMINATION OF APPEAL FOR THE APPROVAL OF THE
CLOSURE PLAN FOR THE HAZARDOUS WASTE MANAGEMENT
FACILITY, AREA IV, SANTA SUSANA FIELD LABORATORY,
EPA ID AD000629972

The Department of Toxic Substances Control (DTSC) has resolved the issues concerning the appeal of DTSC's approval of the Closure Plan for the Hazardous Waste Management Facility (Bldg 29 and 133) located in Area IV of the Santa Susana Field Laboratory, Ventura County. DTSC denied the Petition for Review (Appeal request) on December 22, 2006 which allows the Closure Plan to be enacted as approved.

The Hazardous Waste Management Facility (HWMF) stored and treated alkali metals in Building 29 (storage) and Building 133 (treatment). The facility was owned by the U.S. Department of Energy (USDOE) and operated by USDOE and The Boeing Company (Boeing). Activity ceased in 1997 and DTSC received a closure notification letter dated July 21, 1998. Several draft revisions of the closure plan were subsequently reviewed.

Boeing submitted a Class 2 Permit Modification Request to DTSC dated January 23, 2004, which proposed final updates and modifications to the Closure Plan for the Hazardous Waste Management Facility (HWMF). A 60-day public comment period for the modified Closure Plan was held from January 30 to March 15, 2004. Upon public request, this comment period was extended to April 30, 2004. Meanwhile, Boeing held a public meeting on March 15, 2004 to present and discuss the modified Closure Plan.

After the comment period for the modified Closure Plan, DTSC develop an Initial Study and Negative Declaration (with mitigation measures) under the California Environmental Quality Act (CEQA). A public comment period for the draft Mitigated Negative Declaration was held from December 2, 2005 to January 17, 2006. (SCH # 2005121012)

DTSC developed a Response to Public Comments Document to address comments received during both comment periods. The Response to Public Comments Document (dated February 16, 2006) was finalized and reviewed prior to DTSC's decision for the Closure Plan.

DTSC approved the CEQA Mitigated Negative Declaration and then approved the Class 2 Permit Modification Closure Plan on February 16, 2006 (approval pursuant to CCR, title 22, section 66270.42). An approval letter of the same date was sent to the facility and a public notice was issued to the facility mailing list. Both the letter and the notice established a 30-day appeal period (pursuant to CCR, title 22, section 66271.18) for February 20 to March 21, 2006.

DTSC received two letters during the Appeal Period: one from Mr. Dave Einhorn, West Hills resident, dated March 17, 2006; and the other from Mr. Butch Britt, Ventura County Public Works Agency, dated March 2, 2006.

The Ventura County letter discussed transportation issues in the CEQA Mitigated Negative Declaration and the attached Transportation Plan. DTSC's appeal process (section 66271.18) is not applicable to CEQA issues; therefore, the letter did not present an "appeal" or "petition for review". The letter asked that the record be made aware of road conditions for Black Canyon Road and Box Canyon Road (letter attached). The letter was submitted to the administrative record and forwarded to Boeing and USDOE.

As previously mentioned, on December 22, 2006 DTSC issued an Order Denying the Petition for Review associated with Mr. Einhorn's letter. DTSC denied Mr. Einhorn's petition for review for reasons stated in the Appeal of Permit Decision. The decision was mailed to Mr. Einhorn on December 22, 2006 (letter and decision attached).

The Order represents DTSC's final permit decision for the HWMF Closure Plan, pursuant to section 66271.18(d). Resolution of these issues did not alter the Closure Plan. As of December 22, 2006, Boeing and USDOE may proceed to close the HWMF according to the approved Closure Plan.

APPENDIX B

ATTACHMENT B-2

**SUBSURFACE INFORMATION
(Electronic Copy)**

SOIL BORING LOGS

Boring ID: **HFBS0001**

Borehole Diam. (in.): 3-1/2	Total Depth (ft): 1.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268230.37	Easting (ft): 1785879.87	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-16-2008	Start Time: 11:45	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-16-2008	Finish Time: 13:01	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Paul	

Comments: Drilled in dirt roadway; sand, silt, and gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler	Soil Backfill Date: 04-16-2008	Backfill Time: 13:01

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SM	Silty Sand with Gravel, brown (10YR 4/3), dense, moist [Fill]	15	20	25	20	20
						2			Total Depth = 1.5 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01 and S01SP. Backfilled with native soil.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0002**

Borehole Diam. (in.): 3-1/2	Total Depth (ft): 4.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268219.67	Easting (ft): 1785882.78	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-16-2008	Start Time: 10:40	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-16-2008	Finish Time: 11:16	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Paul	

Comments: Grass, weeds, road gravel, and sand at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler	Soil Backfill Date: 04-16-2008	Backfill Time: 11:20

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			4.2		0		SM	Silty Sand with Gravel, dark brown (10YR 3/3), dense, moist, slight luster (mica) [Fill]	20	15	20	15	30
	S			0.0		4			↓ increase in moisture					
						6			Total Depth = 4.0 ft; refusal on Chatsworth Formation Sandstone.					
						8			Collected soil samples S01 and S02.					
						10			Backfilled with native soil.					
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0003**

Borehole Diam. (in.): 3-1/2; 2	Total Depth (ft): 10.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268247.69	Easting (ft): 1785926.16	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-17-2008	Start Time: 10:10	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-21-2008	Finish Time: 12:35	Drilling Contractor: B.L. Hall; Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger (04-17-2008); Geoprobe/Direct Push (04-21-2008)	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Paul; Danny	

Comments: Drilled in dirt roadway; sand, silt, and gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler; geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-21-2008	Backfill Time: 12:40

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			25.6		0		SM	Silty Sand with Gravel, brown (10YR 4/3), dense, moist, subangular gravel [Fill]	15	15	30	20	20
	S			0.8		4		SM	Silty Sand, dark yellowish brown (10YR 3/6), dense, moist, debris (wood fragments) [Fill]		15	40	20	25
	S					8		SC	Clayey Sand, dark yellowish brown (10YR 3/4), dense, moist, low plasticity fines, slightly mottled [Alluvium]		20	30	20	30
						10			Total Depth = 10.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01, S02, and S03. Original boring advanced with hand auger on 04-17-2008. Boring deepened on 04-21-2008 using direct push, then backfilled with native soil and bentonite.					
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0004**

Borehole Diam. (in.): 3-1/2	Total Depth (ft): 3.8	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268223.92	Easting (ft): 1785898.72	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-16-2008	Start Time:	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-16-2008	Finish Time:	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Paul	

Comments: Drilled in dirt roadway; sand, gravel, grass, and weeds at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler	Soil Backfill Date: 04-16-2008	Backfill Time: 14:30

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SM	Silty Sand with Gravel, brown (10YR 4/3), dense, moist, debris (asphalt fragments) [Fill]	20	10	30	15	25
	S			0.0		2			no debris					
						4			Total Depth = 3.8 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01 and S02. Backfilled with native soil.					
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0005**

Borehole Diam. (in.): 3-1/2; 2	Total Depth (ft): 5.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268235.56	Easting (ft): 1785906.17	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-17-2008	Start Time: 08:30	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-21-2008	Finish Time: 09:55	Drilling Contractor: B.L. Hall; Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger (04-17-2008); Geoprobe/Direct Push (04-21-2008)	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Paul; Danny	

Comments: Drilled in dirt roadway; sand and gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler; geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-21-2008	Backfill Time: 10:00

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			5.1		0		SM	Silty Sand with Gravel, brown (10YR 4/3), dense, moist, subangular to subrounded gravel [Fill]	20	10	25	20	25
	S			0.5		4		SM	Silty Sand, dark yellowish brown (10YR 4/6), medium dense, moist [Alluvium]		10	40	10	40
						6			Total Depth = 5.5 ft; no refusal. Collected soil samples S01, D01, and S02. Original boring advanced with hand auger on 04-17-2008. Boring deepened on 04-21-2008 using direct push, then backfilled with native soil and bentonite.					
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0006**

Borehole Diam. (in.): 3-1/2; 2	Total Depth (ft): 15.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268230.02	Easting (ft): 1785913.70	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-17-2008	Start Time: 09:07	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-21-2008	Finish Time: 11:00	Drilling Contractor: B.L. Hall; Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger (04-17-2008); Geoprobe/Direct Push (04-21-2008)	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Paul; Danny	

Comments: Drilled in dirt roadway; sand and gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler; geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-21-2008	Backfill Time: 11:00

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SM	Silty Sand with Gravel, brown (10YR 4/3), dense, moist, subangular to subrounded gravel [Fill]	20	20	25	20	15
	S			0.0		2			increase in gravel	30	15	20	20	15
	S			1.0		4		SM	Silty Sand with Gravel, dark yellowish brown (10YR 4/6), dense, moist [Alluvium]	20	20	25	20	15
				1.2		6								
						8		SM	Silty Sand, dark yellowish brown (10YR 3/4), dense, moist, roots and rootlets, slightly porous [Alluvium]		20	25	20	35
	S			1.0		10								
						12			Silty Sandstone, yellowish brown (10YR 5/6), dense, moist [Weathered Chatsworth Formation]		35	30	15	20
						14								
						16			Total Depth = 15.5 ft; refusal in Chatsworth Formation Sandstone. Collected soil samples S01, S02, S03, and S04. Original boring advanced with hand auger on 04-17-2008. Boring deepened on 04-21-2008 using direct push, then backfilled with native soil and bentonite.					
						18								
						20								

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Boring ID: **HFBS0007**

Borehole Diam. (in.): 3-1/2	Total Depth (ft): 2.8	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268232.97	Easting (ft): 1785894.60	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-16-2008	Start Time: 13:17	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-16-2008	Finish Time: 13:48	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Paul	

Comments: Drilled in dirt roadway; sand and gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler	Soil Backfill Date: 04-16-2008	Backfill Time: 13:50

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SM	Silty Sand with Gravel, brown (10YR 4/3), dense, moist, debris (wire) [Fill]	20	15	25	15	25
	S			0.0		2								
						4			Total Depth = 2.8 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01 and S02. Backfilled with native soil.					
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0008**

Borehole Diam. (in.): 3-1/2; 2	Total Depth (ft): 10.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268234.40	Easting (ft): 1785937.15	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-17-2008	Start Time: 09:32	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-21-2008	Finish Time: 13:00	Drilling Contractor: B.L. Hall; Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger (04-17-2008); Geoprobe/Direct Push (04-21-2008)	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Paul; Danny	

Comments: Drilled in dirt roadway; sand and gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler; geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-21-2008	Backfill Time: 13:05

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.1		0		SM	Silty Sand with Gravel, brown (10YR 4/3), dense, moist, subangular to subrounded gravel [Fill]	15	15	30	20	20
	S			1.3		4		SC	Clayey Sand, brown (10YR 5/3), dense, moist [Fill]		20	40	20	20
						6		SM	Silty Sand, black (10YR 2/1), dense, moist, debris (carbon and wood fragments) [Fill]	10	50	20	20	
						6		SC	Clayey Sand, dark yellowish brown (10YR 3/4), dense, moist, debris (wood) [Fill]	15	40	25	20	
						8		SC	Clayey Sand, grayish brown (10YR 5/2), dense, moist [Alluvium]	20	30	30	20	
	S			0.4		10			Silty Sandstone, pale brown (10YR 6/3), dense to very dense, moist [Weathered Chatsworth Formation]	20	50	10	20	
									Total Depth = 10.5 ft; refusal in Chatsworth Formation Sandstone.					
									Collected soil samples S01, S02, and S03.					
						12			Original boring advanced with hand auger on 04-17-2008. Boring deepened on 04-21-2008 using direct push, then backfilled with native soil and bentonite.					
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0009**

Borehole Diam. (in.): 3-1/2; 2	Total Depth (ft): 8.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268255.85	Easting (ft): 1785937.02	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-17-2008	Start Time: 12:10	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-21-2008	Finish Time: 13:40	Drilling Contractor: B.L. Hall; Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger (04-17-2008); Geoprobe/Direct Push (04-21-2008)	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Paul; Danny	
Comments: Drilled in dirt roadway; sand, gravel, grass, and weeds at surface		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler; geoprobe macrocore with acetate sleeve		Soil Backfill Date: 04-21-2008	Backfill Time: 13:45

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SM	Silty Sand with Gravel, brown (10YR 4/3), dense, moist, subangular to subrounded gravel, sandstone cobbles [Fill]	20	15	30	15	20
	S			4.2		4		SM	Silty Sand, black (10YR 2/1), medium dense, moist, organic debris (roots, carbon and wood fragments) [Fill]	10	40	30	20	
						6		SC	Clayey Sand, dark yellowish brown (10YR 3/4), dense, moist [Fill]	15	30	30	25	
	S			6.8		8		SM	Silty Sand, yellowish brown (10YR 5/4), dense to very dense, moist, weathered bedrock [Chatsworth Formation] Total Depth = 8.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01, S02, and S03. Original boring advanced with hand auger on 04-17-2008. Boring deepened on 04-21-2008 using direct push, then backfilled with native soil and bentonite.	15	50	15	20	
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0010**

Borehole Diam. (in.): 2	Total Depth (ft): 7.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268243.33	Easting (ft): 1785945.34	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-18-2008	Start Time: 09:20	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-18-2008	Finish Time: 09:50	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Danny	

Comments: Asphalt, sand, and gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve, grab	Soil Backfill Date: 04-18-2008	Backfill Time: 09:50

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S	100		2.4		0		SM	Silty Sand, brown (10YR 4/3), dense, moist, slight yellowish brown (10YR 3/4) mottling, few gravel, trace clay [Fill]	10	20	30	20	20
	S					2								
	S					4		SM	Silty Sand, very dark brown (10YR 2/2), medium dense to dense, moist [Paleosol - Alluvium]		25	30	25	20
	S	100				6		SM	Silty Sand, yellowish brown (10YR 5/4), dense, moist, weathered bedrock [Chatsworth Formation]		20	25	25	30
	S			2.5		8			Total Depth = 7.5 ft; refusal on Chatsworth Formation Sandstone.					
						10			Collected soil samples S01, S02, and S03.					
						12			Backfilled with native soil and bentonite.					
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0011**

Borehole Diam. (in.): 2	Total Depth (ft): 19.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268208.15	Easting (ft): 1785885.93	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-23-2008	Start Time: 13:25	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-23-2008	Finish Time: 14:20	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Drilled in paved area; asphalt 3 in. thick over 3 in. base	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-23-2008	Backfill Time: 14:40

Sample Interval Retained Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
									Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
					0			Asphalt 3 inches thick over 3 inches of base					
S S	100		0.0		2		SM	Silty Sand with Gravel, dark brown (10YR 3/3), medium dense to dense, moist, silt and clay fines, angular to subangular sandstone gravel [Fill]	15	15	30	15	25
S S	100		0.0		6		SM	Silty Sand, very dark grayish brown (10YR 3/2), medium dense to dense, moist, few gravel, debris (wood and carbon fragments) [Fill]	10	20	30	20	20
S S	100		0.0		10		SM	Silty Sand, very dark brown (10YR 2/2), dense, moist [Alluvium]		20	40	20	20
S S	100		0.0		18			Sandstone, brownish yellow (10YR 6/6), hard, moist [Chatsworth Formation]					
					20			Total Depth = 19.0 ft; refusal in Chatsworth Formation Sandstone. Collected soil samples S01, S02, S03, S04, and S05. Backfilled with native soil and bentonite.					

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Boring ID: **HFBS0012**

Borehole Diam. (in.): 2	Total Depth (ft): 12.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268234.63	Easting (ft): 1785955.81	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-18-2008	Start Time: 10:50	Logged By: A. Leavitt	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-18-2008	Finish Time: 11:13	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments:	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 04-18-2008
		Backfill Time:

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
				2.8		0		SM	Silty Sand, strong brown (7.5YR 4/6), loose, moist, weak cementation, trace clay			10	50	40
	S					2								
				40.3		4		SC	Clayey Sand, dark olive gray (5Y 3/2), medium dense, moist, weak cementation, low plasticity, strong organic odor			10	50	40
	S			91					↙ increase in clay					
				86		6		SM	Silty Sand, yellowish brown (10YR 5/4), loose, moist, weak cementation, no odor			20	50	30
				20		8								
	S			391		10		SC	Clayey Sand, dark olive gray (5Y 3/2), medium dense, moist, weak cementation, low plasticity, strong organic odor			10	50	40
	S			495		12			Total Depth = 12.0 ft; refusal in Chatsworth Formation Sandstone.					
						14			Collected soil samples S01, S02, S03, and S04.					
						16			Backfilled with native soil and bentonite. Nested soil vapor probes installed in nearby boring (HFBV0012).					
						18								
						20								

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Boring ID: **HFBS0012A**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 7.5	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268234.63	Easting (ft): 1785955.81	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-18-2008	Start Time: 08:50	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-18-2008	Finish Time: 09:15	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Mark and Kyle	

Comments: 2.5 ft W of asphalt curb, asphalt debris and nearby pothole	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 11-18-2008	Backfill Time: 09:20

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
				0.0		0		ML	Asphalt 3 inches thick Silt with Sand, dark yellowish brown (10YR 4/6), medium stiff, moist, low plasticity, very micaceous [Fill]			tr	20	80
		100				2		SM	← asphalt chunks Silty Sand, very pale brown (10YR 7/4), medium dense, moist			20	60	20
								ML	Silt with Sand, dark grayish brown (10YR 4/2), medium stiff, moist, low plasticity, micaceous			tr	20	80
				178		4								
	s	100				6		CL	Lean Clay, dark gray (10YR 4/1), medium stiff, moist, medium plasticity, trace silt, micaceous, strong diesel odor			tr	10	90
				7.1		8			Total Depth = 7.5 ft; refusal on weathered Chatsworth Formation Sandstone. Attempted one step-out boring; met refusal at 7.25 ft. Collected soil sample S002. Backfilled with geoprobe cuttings and asphalt surface patch.					
						10								
						12								
						14								
						16								
						18								
						20								

LOG OF BORING GROUP7_2008.GPJ BOEING.GDT 1/23/09

Boring ID: **HFBS0019**

Borehole Diam. (in.): 2	Total Depth (ft): 19.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268181.69	Easting (ft): 1785912.72	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-24-2008	Start Time: 07:30	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-24-2008	Finish Time: 10:20	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Drilled in paved area; asphalt 3 in. thick over 2 in. base	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-24-2008	Backfill Time: 10:30

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			Asphalt 3 inches thick over 2 inches of base					
	S			0.0		0		SM	Silty Sand with Gravel, dark yellowish brown (10YR 3/4), medium dense to dense, moist, subangular sandstone gravel, lustrous flakes (possible mica) [Fill]	15	20	30	15	20
	S	100				2								
				0.0		4								
	S					6								
	S	100				8		SP-SM	Poorly Graded Sand with Silt, dark brown (10YR 3/3), medium dense, moist [Fill]		20	40	30	10
				0.0		10		SM	Silty Sand, dark brown (10YR 3/3), dense, moist, few subrounded to rounded gravel, few roots [Alluvium]	10	20	35	20	15
	S					12			becomes slightly porous					
	S	100				14								
	S			0.0		16			slight increase in roots					
						18			Sandstone, brownish yellow (10YR 6/6), moderately hard, moist [Weathered Chatsworth Formation]					
	S	100				20			Total Depth = 19.0 ft; refusal in Chatsworth Formation Sandstone. Collected soil samples S01, D01, S02, S03, S04, and S05. Backfilled with native soil and bentonite.					

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Boring ID: **HFBS0022**

Borehole Diam. (in.): 2	Total Depth (ft): 19.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268173.88	Easting (ft): 1785908.13	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-24-2008	Start Time: 10:05	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-24-2008	Finish Time: 11:30	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	
Comments: Drilled in paved area; asphalt 3 in. thick over 2-1/2 in. base		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 04-24-2008	Backfill Time: 11:35

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			Asphalt 3 inches thick over 2-1/2 inches of base					
	S					0.5		SM	Silty Sand, dark yellowish brown (10YR 3/4), medium dense to dense, moist, few subangular sandstone gravel, luster (possible mica) [Fill]	10	20	35	15	20
	S	100				2.0								
				0.0		4.0								
	S					6.0								
	S	100				8.0			becomes dark brown (10YR 3/3), minor debris (wood and carbon fragments), no gravel or mica	20	30	30	20	
				0.0		10.0								
	S					12.0		SM	Silty Sand, dark brown (10YR 3/3), dense, moist, few gravel [Alluvium]	10	20	35	20	15
	S	100				14.0			few roots					
	S			0.0		16.0								
						18.0			Sandstone, brownish yellow (10YR 6/6), moderately hard, moist [Weathered Chatsworth Formation]					
	S			0.0		19.5			Collected soil samples S01, D01, S02, S03, S04, and S05. Backfilled with native soil and bentonite.					
	S					20.0			Total Depth = 19.5 ft; refusal in Chatsworth Formation Sandstone.					

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Boring ID: **HFBS0023**

Borehole Diam. (in.): 2	Total Depth (ft): 19.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268162.92	Easting (ft): 1785895.28	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-22-2008	Start Time: 13:20	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-22-2008	Finish Time: 14:15	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	
Comments: Drilled in paved area; asphalt 3 in. thick over 2 in. base		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 04-22-2008	Backfill Time: 14:20

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			Asphalt 3 inches thick over 2 inches of base					
	S							SM	Silty Sand with Gravel, dark yellowish brown (10YR 3/4), slight yellowish brown (10YR 4/6) mottling, dense, moist, subangular to subrounded sandstone gravel, slight luster (mica), debris (wood and carbon fragments) [Fill]	15	10	30	20	25
	S					2								
						4								
	S			0.2		6								
	S					8								
				0.1		10								
	S					12								
	S					14			large wood fragments					
	S			0.8		16		SM	Silty Sand, very dark brown (10YR 2/2), medium dense to dense, moist, debris (wood and carbon fragments) [Fill]		15	40	20	25
						18		SM	Silty Sand, dark yellowish brown (10YR 4/4), medium dense to dense, moist [Alluvium]		20	40	15	25
	S								Collected soil samples S01, D01, S02, S03, S04, and S05.					
	S			1.3					Backfilled with native soil and bentonite.					
						20			Total Depth = 19.5 ft; refusal in Chatsworth Formation Sandstone.					

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Boring ID: **HFBS0024**

Borehole Diam. (in.): 2	Total Depth (ft): 15.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268174.48	Easting (ft): 1785930.11	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-25-2008	Start Time: 11:21	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-25-2008	Finish Time: 11:40	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Concrete 5 in. thick over 4 in. pea gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-25-2008	Backfill Time: 12:15

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
				0.0		0			Concrete 5 inches thick over 4 inches of pea gravel					
	S							SC	Clayey Sand, dark yellowish brown (10YR 4/4), medium dense, moist [Fill]		10	25	30	35
	S					2								
				0.0		4								
	S													
	S			0.0		6		SM	Silty Sand, dark brown (10YR 3/3), medium dense, moist [Fill]			35	40	25
				0.1		8								
	S													
	S					10								
				0.7		12		SM	Silty Sand, very dark gray (10YR 3/1), medium dense, moist [Alluvium]			25	50	25
						14								
	S													
	S			0.3		16			Total Depth = 15.0 ft; refusal in Chatsworth Formation Sandstone. Collected soil samples S01, S02, S03, and S04. Backfilled with native soil.					
						18								
						20								

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Boring ID: **HFBS0025**

Borehole Diam. (in.): 2	Total Depth (ft): 17.3	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268165.71	Easting (ft): 1785932.96	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-25-2008	Start Time: 10:01	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-25-2008	Finish Time: 10:29	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Concrete 3 in. thick over 6 in. pea gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-25-2008	Backfill Time: 10:52

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			Concrete 3 inches thick over 6 inches of pea gravel					
	S			0.1		0.1		SC	Clayey Sand, dark yellowish brown (10YR 4/4), medium dense, moist [Fill]			35	30	35
				0.0		2								
				0.0		4		SM	Silty Sand, dark brown (10YR 3/3), medium dense, moist [Fill]			25	50	25
	S			0.1		10								
	S			0.1		14		SM	Silty Sand, yellowish brown (10YR 5/4), medium dense, moist [Alluvium]		10	40	20	30
	S			0.0		16								
	S			0.0		18								
						20			Total Depth = 17.3 ft; refusal in Chatsworth Formation Sandstone. Collected soil samples S01, S02, S03, S04, and S05. Backfilled with native soil and bentonite.					

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Boring ID: **HFBS0026**

Borehole Diam. (in.): 2	Total Depth (ft): 7.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268169.63	Easting (ft): 1785957.37	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-22-2008	Start Time: 10:35	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-22-2008	Finish Time: 11:10	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Drilled in paved area; asphalt 2 in. thick over 2 in. base	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-22-2008	Backfill Time: 11:10

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S					0		SM	Asphalt 2 inches thick over 2 inches of base					
	S					2		SM	Silty Sand with Gravel, dark yellowish brown (10YR 4/6), medium dense to dense, moist, subangular sandstone gravel, trace clay [Fill]	15	15	20	15	35
	S			29.0		4		SM	Silty Sand, very dark brown (10YR 2/2), dense, moist, debris (wood and carbon fragments) [Fill]		10	20	40	30
	S			30.3		6		SM	Silty Sand, yellowish brown (10YR 5/6), very dense, moist, weathered bedrock [Chatsworth Formation]		30	25	20	25
						8			Total Depth = 7.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01, S02, and S03. Backfilled with native soil and bentonite.					
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0027**

Borehole Diam. (in.): 2	Total Depth (ft): 13.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268150.08	Easting (ft): 1785940.68	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-24-2008	Start Time: 12:30	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-24-2008	Finish Time: 14:05	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Concrete 6-1/2 in. thick over 3 in. base at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-24-2008	Backfill Time: 14:10

Sample Interval Retained Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
									Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
					0			Concrete 6-1/2 inches thick over 3 inches of base					
S S	100		0.0		2		SM	Silty Sand with Gravel, dark yellowish brown (10YR 3/4), loose to dense, dry to moist, angular to subangular sandstone gravel and cobbles, wood debris [Fill]	20	15	25	15	25
S S	100		0.0		6		SP-SM	Poorly Graded Sand with Silt, very dark brown (10YR 2/2), medium dense to dense, moist, trace gravel, debris (roots, wood and carbon fragments) [Fill]	5	25	40	20	10
S S	100		0.0		10			becomes very dark brown (10YR 2/2) to black (10YR 2/1), slightly anoxic, no odor					
S S	100		0.0		12		SM	Silty Sand, dark yellowish brown (10YR 3/4), dense, moist, few gravel [Alluvium]	10	25	25	15	25
S S	100		0.0		14			Total Depth = 13.5 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01 (MS/MSD), S02, S03, and S04. One step-out 6 in. west to collect volume of soil. Backfilled with native soil and bentonite.					
					16								
					18								
					20								

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Boring ID: **HFBS0028**

Borehole Diam. (in.): 2	Total Depth (ft): 16.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268141.69	Easting (ft): 1785917.57	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-22-2008	Start Time: 12:05	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-22-2008	Finish Time: 13:00	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	
Comments: Drilled in paved area; asphalt 2 in. thick over 2 in. base		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 04-22-2008	Backfill Time: 13:00

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.9		0		SM	Asphalt 2 inches thick over 2 inches of base	15	20	35	15	15
	S					2								
	S					4								
	S			22.3		6			becomes very dark brown (10YR 2/2), medium dense to dense, debris (roots, wood and carbon fragments); increase in silt	15	10	25	20	30
	S					8								
	S			30.2		10								
	S					12			increase in gravel, decrease in silt	25	10	25	20	20
	S			12.1		14		SP-SM	Poorly Graded Sand with Silt, very dark brown (10YR 2/2), medium dense to dense, moist, few subangular to subrounded gravel [Fill]	10	20	40	20	10
	S					16			Total Depth = 16.0 ft; refusal on Chatsworth Formation Sandstone.					
	S			273		18			Collected soil samples S01, S02, S03, and S04.					
	S					20			Backfilled with native soil and bentonite.					

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Boring ID: **HFBS0029**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 9.8	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268136.42	Easting (ft): 1785944.92	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-25-2008	Start Time: 08:41	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-25-2008	Finish Time: 09:31	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Concrete pad 10-1/2 in. thick at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-25-2008	Backfill Time: 09:37

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
				0.0		0			Concrete pad 10-1/2 inches thick					
	S							SM	Silty Sand, yellowish brown (10YR 5/4), medium dense, moist		10	25	35	30
				0.0		4			cobbles					
	S			0.0				SC	Clayey Sand, dark brown (10YR 3/3), medium dense, moist		15	30	20	35
	S			0.4		8			← few pieces of broken cobble					
	S			0.1										
						10			Total Depth = 9.8 ft; refusal on Chatsworth Formation Sandstone.					
									Collected soil samples S01, S01SP, S02, and S03. One step-out to collect volume of soil for S01SP.					
									Backfilled with native soil and bentonite.					
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0030**

Borehole Diam. (in.): 2	Total Depth (ft): 6.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268245.82	Easting (ft): 1785959.21	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-18-2008	Start Time: 10:18	Logged By: A. Leavitt	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-18-2008	Finish Time: 10:28	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments:	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 04-18-2008
		Backfill Time: 10:43

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			1.9		0		SM	Silty Sand, dark brown (10YR 3/3), loose, weak cementation, moist [Fill]			10	50	40
	S			0.9		4		SC	Clayey Sand, dark yellowish brown (10YR 3/4), loose to medium dense, moist, weak cementation, low plasticity fines [Alluvium?] ↓ becomes yellowish red (5YR 4/6)			10	50	40
						8			Total Depth = 6.5 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01 and S02. Backfilled with native soil and bentonite.					
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0031**

Borehole Diam. (in.): 2	Total Depth (ft): 8.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268252.77	Easting (ft): 1785973.47	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-18-2008	Start Time: 11:55	Logged By: A. Leavitt	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-18-2008	Finish Time:	Drilling Contractor: Strongarm	Field Instrumentation: N/A
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments:	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 04-18-2008
		Backfill Time:

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0		SM	Silty Sand, reddish brown (5YR 4/3), loose, moist, weak cementation			10	50	40
						2			becomes yellowish brown (10YR 5/4)					
						4			becomes strong brown (7.5YR 4/6), with trace clay					
						6		SC	Clayey Sand, strong brown (7.5YR 4/6), medium dense, moist, weak cementation, low plasticity fines			10	50	40
						8		SM	Silty Sand, pale brown (10YR 6/3), loose, moist, weak cementation			20	60	20
						10			Total Depth = 8.0 ft; refusal on Chatsworth Formation Sandstone.					
						12			Collected soil samples S01, S02, and S03.					
						14			Backfilled with native soil and bentonite.					
						16								
						18								
						20								

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Boring ID: **HFBS0032**

Borehole Diam. (in.): 2	Total Depth (ft): 7.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268263.41	Easting (ft): 1786025.99	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-23-2008	Start Time: 10:00	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-23-2008	Finish Time: 10:30	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Grass and weeds at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-23-2008	Backfill Time: 10:31

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SM	Silty Sand, brown (10YR 5/3), dense, dry to moist, porous [Fill]		10	40	20	30
	S					2		SC	Clayey Sand, yellowish brown (10YR 5/6), dense, moist, subrounded to rounded sand grains, rootlets [Alluvium]		20	20	20	40
	S			0.0		4								
	S					6								
	S			0.0					Sandstone, brownish yellow (10YR 6/6), hard, moderate cementation, moist [Weathered Chatsworth Formation]					
						8			Total Depth = 7.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01, S02, and S03. Backfilled with native soil and bentonite.					
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0033**

Borehole Diam. (in.): 2	Total Depth (ft): 1.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268227.09	Easting (ft): 1786052.45	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-23-2008	Start Time: 10:40	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-23-2008	Finish Time: 10:50	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Grass and weeds at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-23-2008	Backfill Time: 10:52

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
0 - 0.5	S			0.5		0		SM	Silty Sand, dark yellowish brown (10YR 4/4), dense, dry to moist [Fill]		15	40	20	25
						2			Total Depth = 1.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0034**

Borehole Diam. (in.): 2	Total Depth (ft): 1.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268188.50	Easting (ft): 1786078.16	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-23-2008	Start Time: 10:53	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-23-2008	Finish Time: 11:05	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Grass and weeds at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-23-2008	Backfill Time: 11:05

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
0 - 0.5	S			0.0		0		SM	Silty Sand, grayish brown (10YR 5/2), medium dense, dry, few gravel, debris (metal, concrete, rusty spring) [Fill]	5	15	40	20	20
						2			Total Depth = 1.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0035**

Borehole Diam. (in.): 2	Total Depth (ft): 0.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268161.88	Easting (ft): 1786105.41	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-23-2008	Start Time: 11:10	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-23-2008	Finish Time: 11:30	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Grass and weeds at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-23-2008	Backfill Time: 11:30

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	s			0.0		0		SM	Silty Sand, yellowish brown (10YR 5/6), dense, dry, few gravel, rootlets [Fill]	5	20	30	15	30
						1			Total Depth = 0.5 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						2								
						3								
						4								
						5								
						6								
						7								
						8								
						9								
						10								

Boring ID: **HFBS0037**

Borehole Diam. (in.): 2	Total Depth (ft): 1.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268177.53	Easting (ft): 1786145.39	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-23-2008	Start Time: 12:30	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-23-2008	Finish Time: 12:39	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Grass and weeds at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-23-2008	Backfill Time: 12:40

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
0 - 0.5	S			0.0		0			Sandstone, brownish yellow (10YR 6/6), moderately hard, dry to moist, minor silt [Weathered Chatsworth Formation]		30	30	30	10
						2			Total Depth = 1.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0039/HFSV0039**

Borehole Diam. (in.): 2	Total Depth (ft): 8.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268027.16	Easting (ft): 1785936.67	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-23-2008	Start Time: 08:05	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-23-2008	Finish Time: 08:25	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Asphalt, grass, and weeds at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-23-2008	Backfill Time: 08:40

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SM	Silty Sand with Gravel, dark yellowish brown (10YR 3/4), dense, moist, sandstone gravel, rootlets, porous [Fill]	15	20	30	10	25
	S			0.0		4			Yellow Vapor Probe Installation (SVS01) Hydrated bentonite seal ... 0-4.5 ft #3 sand filterpack ... 4.5-5.5 ft Perforated HDPE tubing ... 4.75-5.25 ft					
				0.0		6			Silty Sandstone, yellowish brown (10YR 5/4), dense to very dense, moist [Weathered Chatsworth Formation]	30	20	30	20	
						8			Red Vapor Probe Installation (SVS02) Hydrated bentonite seal ... 5.5-7 ft #3 sand filterpack ... 7-8 ft Perforated HDPE tubing ... 7.25-7.75 ft					
						10			Total Depth = 8.0 ft; refusal on Chatsworth Formation Sandstone.					
						12			Collected soil samples S01 and S02.					
						14			Nested (dual completion) soil vapor probes installed as detailed above.					
						16								
						18								
						20								

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Boring ID: **HFBS0040**

Borehole Diam. (in.): 2	Total Depth (ft): 1.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268048.42	Easting (ft): 1785986.32	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-23-2008	Start Time: 07:18	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-23-2008	Finish Time: 07:55	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Asphalt, grass, and weeds at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-23-2008	Backfill Time: 07:55

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SM	Silty Sand with Gravel, dark yellowish brown (10YR 3/4), medium dense to dense, moist, subangular sandstone gravel, slightly porous [Fill]	15	15	35	15	20
	S					2			Total Depth = 1.5 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01 and S01SP. Four step-outs required to collect sample volume. Backfilled with native soil.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0041**

Borehole Diam. (in.): 2	Total Depth (ft): 1.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268121.74	Easting (ft): 1785964.17	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-22-2008	Start Time: 08:50	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-22-2008	Finish Time: 09:10	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	
Comments: Drilled in dirt roadway; sand and gravel at surface		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 04-22-2008	Backfill Time: 09:20

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			5.2		0		SM	Silty Sand, yellowish brown (10YR 5/6), dense, moist [Fill]		20	35	25	20
	S								Silty Sandstone, yellowish brown (10YR 5/4), hard, moist [Chatsworth Formation]		30	30	15	25
						2			Total Depth = 1.5 ft; refusal on Chatsworth Formation Sandstone.					
									Collected soil samples S01 and S02.					
									Backfilled with native soil and bentonite.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0042**

Borehole Diam. (in.): 3	Total Depth (ft): 1.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268107.58	Easting (ft): 1785942.14	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-28-2008	Start Time: 09:13	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-28-2008	Finish Time: 09:18	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments:	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler		Soil Backfill Date: 04-28-2008
		Backfill Time: 09:23

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SM	Silty Sand, dark yellowish brown (10YR 4/4), medium dense, moist			15	50	35
						2			Total Depth = 1.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0043/HFSV0043**

Borehole Diam. (in.): 2	Total Depth (ft): 11.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268104.35	Easting (ft): 1785848.98	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-30-2008	Start Time: 09:00	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-30-2008	Finish Time: 09:31	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Asphalt (old paved roadway) at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-30-2008	Backfill Time: 09:45

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S	100		0.0		0		SM	Silty Sand with Gravel, dark yellowish brown (10YR 3/4), medium dense to dense, moist, subangular sandstone gravel, roots and rootlets [Fill]	20	20	30	10	20
	S					2								
	S					4			Yellow Vapor Probe Installation (SVS01) Hydrated bentonite seal ... 0-3.8 ft #3 sand filterpack ... 3.8-5.3 ft Perforated HDPE tubing ... 4-5 ft					
	S	100		0.0		6								
				0.0		8			Red Vapor Probe Installation (SVS02) Hydrated bentonite seal ... 5.3-8.8 ft #3 sand filterpack ... 8.8-10.3 ft Perforated HDPE tubing ... 9-10 ft					
				0.0		10			Silty Sandstone, brownish yellow (10YR 6/6), hard, moist [Weathered Chatsworth Formation]					
						12			Total Depth = 11.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01 and S02. Nested (dual completion) soil vapor probes installed as detailed above.					
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0043A**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 10.5	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268104.35	Easting (ft): 1785848.98	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-17-2008	Start Time: 11:15	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-17-2008	Finish Time: 11:50	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Walt and Kyle	
Comments: Loose soil and gravel over asphalt, 3 ft S of chain link fence		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 11-17-2008	Backfill Time: 12:00

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			Asphalt 3 inches thick					
		75				2		ML	Silt with Sand, light yellowish brown (10YR 6/4), stiff, dry, low plasticity, micaceous, breaks along horizontal bedding planes		tr		20	80
				0.5		4		ML	Sandy Silt, very pale brown (10YR 7/3), medium stiff, dry, low plasticity, micaceous		10		30	60
		75				6								
				0.5		8			becomes pale brown (10YR 6/3), decrease in moisture					
		100				10								
				0.4		12			Total Depth = 10.5 ft; refusal on weathered Chatsworth Formation Sandstone.					
						14			Collected soil samples S002 and S003.					
						16			Backfilled with geoprobe cuttings and asphalt surface patch.					
						18								
						20								

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Boring ID: **HFBS0044/HFSV0044**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 19.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268154.53	Easting (ft): 1785858.28	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-28-2008	Start Time: 09:44	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-28-2008	Finish Time: 10:30	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Four nested soil vapor probes installed in boring (SVS01 - SVS04)	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-28-2008	Backfill Time: 12:20

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SM	Silty Sand, yellowish brown (10YR 5/4), medium dense, moist, occasional angular gravel to 1 inch dia. [Fill]	5	15	40	25	15
	S					2								
				0.0		4			← cobble					
	S			0.0		6		SM	Silty Sand, light yellowish brown (10YR 6/4) mottled with dark yellowish brown (10YR 4/4), medium dense, moist [Alluvium]			20	40	40
						8			Clear Vapor Probe Installation (SVS02) Hydrated bentonite seal ... 5-8.5 ft #3 sand filterpack ... 8.5-10 ft Perforated HDPE tubing ... 8.75-9.75 ft					
	S			0.0		10		ML/CL	Clayey Silt, dark brown (10YR 3/3), medium stiff to stiff, moist, trace fine sand [Alluvium]				5	95
						12		SM	Silty Sand, yellowish brown (10YR 5/4), medium dense, moist, occasional gravel to 1 inch dia. at 11.5-12 ft [Alluvium]	5	20	30	30	15
				0.0		14			Blue Vapor Probe Installation (SVS03) Hydrated bentonite seal ... 10-13.5 ft #3 sand filterpack ... 13.5-15 ft Perforated HDPE tubing ... 13.75-14.75 ft					
						16								
						18		SC	Clayey Sand, dark brown (10YR 3/3), medium dense, moist [Alluvium]			20	50	30
				0.0		20			Red Vapor Probe Installation (SVS04) Hydrated bentonite seal ... 15-16.75 ft #3 sand filterpack ... 16.75-18.25 ft Perforated HDPE tubing ... 17-18 ft Collected soil samples S01, S02, and S03. Four nested soil vapor probes installed as detailed above. Total Depth = 19.5 ft; refusal on Chatsworth Formation Sandstone.					

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Boring ID: **HFBS0045/HFSV0045**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 17.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268223.28	Easting (ft): 1785860.85	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-28-2008	Start Time: 12:51	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-28-2008	Finish Time: 13:25	Drilling Contractor: Strongarm	Field Instrumentation: N/A
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Three nested soil vapor pobes installed in boring (SVS01 - SVS03)	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-28-2008	Backfill Time: 14:15

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S					0		SM	Silty Sand, light yellowish brown (10YR 6/4), loose, moist, occasional gravel to 1 inch dia. [Fill]	5	10	35	30	20
	S					2		ML	Sandy Silt, dark brown (10YR 3/3), stiff, moist [Alluvium]			10	35	55
	S					4			Yellow Vapor Probe Installation (SVS01) Hydrated bentonite seal ... 0-3.5 ft #3 sand filterpack ... 3.5-5 ft Perforated HDPE tubing ... 3.75-4.75 ft occasional gravel to 1 inch dia.					
	S					10			Blue Vapor Probe Installation (SVS02) Hydrated bentonite seal ... 5-8.5 ft #3 sand filterpack ... 8.5-10 ft Perforated HDPE tubing ... 8.75-9.75 ft occasional gravel to 3/4 inch dia.					
						16			Red Vapor Probe Installation (SVS03) Hydrated bentonite seal ... 10-15 ft #3 sand filterpack ... 15-17 ft Perforated HDPE tubing ... 15.75-16.75 ft					
						18			Total Depth = 17.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01, S02, and S03. Three nested soil vapor probes installed as detailed above.					
						20								

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Boring ID: **HFBS0047/HFSV0047**

Borehole Diam. (in.): 2	Total Depth (ft): 8.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268164.61	Easting (ft): 1785958.98	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-22-2008	Start Time: 11:30	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-22-2008	Finish Time: 11:50	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Drilled in paved area; asphalt 2 in. thick over 2 in. base	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-22-2008	Backfill Time: 11:55

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SM	Asphalt 2 inches thick over 2 inches of base					
	S					2			Silty Sand with Gravel, dark yellowish brown (10YR 3/4), dense, moist, subangular to subrounded gravel [Fill]	15	20	30	10	25
						4			becomes dark yellowish brown (10YR 4/6), subangular gravel	15	25	25	20	15
	S			15		6			<u>Yellow Vapor Probe Installation (SVS01)</u> Hydrated bentonite seal ... 0-4.6 ft #3 sand filterpack ... 4.6-5.6 ft Perforated HDPE tubing ... 4.75-5.25 ft					
						8			becomes very dark brown (10YR 2/2), medium dense	15	5	40	20	20
	S			0.0		10			<u>Red Vapor Probe Installation (SVS02)</u> Hydrated bentonite seal ... 5.6-7 ft #3 sand filterpack ... 7-8 ft Perforated HDPE tubing ... 7.25-7.75 ft					
						12			Silty Sandstone, very dense, moist [Weathered Chatsworth Formation]	30	30	20	20	
						14			Total Depth = 16.0 ft; refusal on Chatsworth Formation Sandstone.					
						16			Collected soil samples S01, S02, and S03.					
						18			Two nested soil vapor probes installed as detailed above.					
						20								

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Boring ID: **HFBS0048**

Borehole Diam. (in.): 2	Total Depth (ft): 18.8	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268188.94	Easting (ft): 1785910.67	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-24-2008	Start Time: 08:00	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-24-2008	Finish Time:	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	
Comments: Drilled in paved area; asphalt 3 in. thick over 2 in. base		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 04-24-2008	Backfill Time:

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			Asphalt 3 inches thick over 2 inches of base					
	S			0.0		2		SM	Silty Sand, dark yellowish brown (10YR 3/4), medium dense to dense, moist, few subangular sandstone gravel, luster (possible mica) [Fill]	10	20	40	15	15
	S			0.0		8			becomes dark brown (10YR 3/3), decrease in gravel, minor roots and wood debris, slightly porous	5	20	40	20	15
						10		SM	Silty Sand, dark brown (10YR 3/3), medium dense, moist, few subrounded to rounded gravel [Alluvium]	10	20	35	20	15
						16			becomes dark yellowish brown (10YR 3/6), dense to very dense, without gravel	20	30	30	20	
	S					18			Sandstone, brownish yellow (10YR 6/6), moderately hard, moist [Weathered Chatsworth Formation]					
						20			Total Depth = 18.8 ft; refusal in Chatsworth Formation Sandstone. Collected soil samples S01, S02, and S03. Backfilled with bentonite.					

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Boring ID: **HFBS0049**

Borehole Diam. (in.): 2	Total Depth (ft): 2.2	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268109.04	Easting (ft): 1786036.91	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-18-2008	Start Time: 07:50	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-18-2008	Finish Time: 08:25	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Danny	

Comments: Grass, weeds, and bedrock at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-18-2008	Backfill Time: 08:30

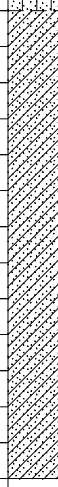
Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.6		0		SM	Silty Sand with Gravel, yellowish brown (10YR 5/4), dense, moist, sandstone gravel [Alluvium]	15	15	30	20	20
	S					2			Total Depth = 2.2 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01 and D01. Backfilled with native soil and bentonite.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0051**

Borehole Diam. (in.): 3-1/2; 2	Total Depth (ft): 15.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268234.60	Easting (ft): 1785908.63	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-17-2008	Start Time: 10:45	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-21-2008	Finish Time: 10:20	Drilling Contractor: B.L. Hall; Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger (04-17-2008); Geoprobe/Direct Push (04-21-2008)	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Paul; Danny	

Comments: Drilled in dirt roadway; sand and gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler; geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-21-2008	Backfill Time: 10:22

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			17.2		0		SM	Silty Sand with Gravel, brown (10YR 4/3), dense, moist, subangular and subrounded gravel [Fill]	15	15	30	20	20
	S			1.0		4		SM	Silty Sand, dark yellowish brown (10YR 3/6), dense, moist [Alluvium]		15	30	25	30
						6			becomes very dark brown (10YR 2/2), medium dense, slight decrease in fines	20	30	25	25	
				0.7		8								
				2.3		10		SC	Clayey Sand, dark brown (10YR 3/3), medium dense, moist, slight organic odor [Alluvium]	20	25	30	25	
						12			becomes dark yellowish brown (10YR 3/6), dense, slightly porous, with roots and rootlets, slight increase in fines, no odor	15	30	25	30	
	S					16			Total Depth = 15.5 ft; refusal on Chatsworth Formation Sandstone.					
						18			Collected soil samples S01, S02, and S03.					
						20			Original boring advanced with hand auger on 04-17-2008. Boring deepened on 04-21-2008 using direct push, then backfilled with native soil and bentonite.					

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Boring ID: **HFBS0052**

Borehole Diam. (in.): 3-1/2	Total Depth (ft): 5.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268281.62	Easting (ft): 1785887.35	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-17-2008	Start Time: 12:30	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-17-2008	Finish Time: 12:58	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Paul	

Comments: Weeds, grass, and debris (tar/asphalt) at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler	Soil Backfill Date: 04-17-2008	Backfill Time: 13:00

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			4.9		0		SM	Silty Sand, brown (10YR 4/3), dense, moist, few subangular to subrounded gravel [Fill]	10	20	30	15	25
	S			0.0		4		SM	Silty Sand, very dark grayish brown (10YR 3/2), dense, moist, trace to few subrounded gravel, slight luster (possible mica) [Alluvium/Colluvium]	5	20	35	20	20
						6			Total Depth = 5.0 ft; no refusal. Collected soil samples S01 and S02. Backfilled with native soil.					
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFB0052A/HFSV0052A**

Borehole Diam. (in.): 3-1/4	Total Depth (ft): 12.8	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268293.56	Easting (ft): 1785880.69	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-14-2008	Start Time: 08:20	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-14-2008	Finish Time: 10:00	Drilling Contractor: Jacob & Hefner Assoc.	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Rob Giberson	
Comments: Brush and concrete debris at surface, black film (melted tar) 6 ft to S		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 11-14-2008	Backfill Time: 10:55

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			3.1		0		ML	Silt with Sand, yellowish brown (10YR 5/6), soft, dry, low plasticity, fine gravel-size angular to subangular gray sandstone fragments, micaceous [Fill] ↓ becomes brown (7.5YR 4/3), slight increase in moisture	tr		tr	15	85
	S			1.4		2			<u>Blue Vapor Probe Installation (SVS001)</u> Hydrated bentonite seal ... 0-3.75 ft #3 sand filterpack ... 3.75-5.25 ft Perforated HDPE tubing ... 4-5 ft					
						4			<u>Green Vapor Probe Installation (SVS002)</u> Hydrated bentonite seal ... 5.25-7.75 ft #3 sand filterpack ... 7.75-9.25 ft Perforated HDPE tubing ... 8-9 ft			tr	15	85
	S			0.2		6			<u>Red Vapor Probe Installation (SVS003)</u> Hydrated bentonite seal ... 9.25-11.5 ft #3 sand filterpack ... 11.5-12.8 ft Perforated HDPE tubing ... 11.75-12.75 ft					
						8		ML	Silt with Sand, brownish yellow (10YR 6/6), soft, moist, low plasticity, micaceous, mottled with orange oxidation zones [Alluvium] Total Depth = 12.8 ft; refusal on boulder or Chatsworth Formation Sandstone. Collected soil samples S001, S001SP, S002, and S003. Nested soil vapor probes HFSV0052A S001, S002, and S003 installed as detailed above.			5	10	85
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0053**

Borehole Diam. (in.): 3-1/2; 2	Total Depth (ft): 17.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268245.81	Easting (ft): 1785880.15	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-17-2008	Start Time: 10:50	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-21-2008	Finish Time: 08:50	Drilling Contractor: B.L. Hall; Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger (04-17-2008); Geoprobe/Direct Push (04-21-2008)	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Paul; Danny	

Comments: Drilled in dirt roadway; sand and gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler; geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-21-2008	Backfill Time: 08:55

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			42.8		0		SM	Silty Sand with Gravel, brown (10YR 4/3), dense, moist, subangular to subrounded gravel [Fill]	15	15	35	15	20
	S			0.0		4		SM	Silty Sand, very dark brown (10YR 2/2), medium dense, moist, trace to few subangular gravel, slight luster (possible mica) [Fill]	5	15	35	20	25
				1.0		8		SM	Silty Sand, dark yellowish brown (10YR 3/6) and yellowish brown (10YR 5/4) mottled, dense, moist, silt and clay fines, trace to few gravel, slightly porous [Alluvium]	5	10	40	20	25
	S			47.3		10			becomes very dark brown (10YR 2/2), no gravel		15	40	20	25
				17.0		16		SC	Clayey Sand, light brownish gray (10YR 6/2), yellowish brown (10YR 5/6), and greenish gray (Gley 1 5/1) mottled, medium dense, moist, plastic fines, odor and staining [Alluvium]		15	20	20	45
						18			Total Depth = 17.5 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01, S02, and S03. Original boring advanced with hand auger on 04-17-2008. Boring deepened on 04-21-2008 using direct push, then backfilled with native soil and bentonite.					

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Boring ID: **HFBS0053A**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 18.0	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268245.81	Easting (ft): 1785880.15	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-18-2008	Start Time: 11:00	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-18-2008	Finish Time: 11:30	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Mark and Kyle	
Comments: Loose soil at surface, gravel road 2 ft to S, brush 2.5 ft to N		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 11-18-2008	Backfill Time: 11:30

Sample Interval Retained Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
									Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
					0		GP-GM	Poorly Graded Gravel with Silt and Sand, yellow (10YR 8/6), very loose, dry, fine gravel-size rock fragments, micaceous	70			20	10
	75		0.5		2		SM	Silty Sand, dark yellowish brown (10YR 4/6), medium dense, moist, micaceous		tr	10	60	30
					4		SM/ML	orange oxidation					
	100				6		SM/ML						
			0.7		8		SM/ML	Silty Sand / Sandy Silt, dark brown (10YR 3/3), medium dense, moist, trace clay, micaceous				50	50
	100				10		SM/ML						
					12		SM/ML	becomes strong brown (7.5YR 4/6), increase in clay					
	100				14		SM	Silty Sand, mottled yellowish brown (10YR 5/8) and yellow (10YR 8/6), medium dense, moist, micaceous, oxidation throughout			40	20	40
	100				16		SM						
					18		SM						
					20			Total Depth = 18.0 ft; refusal on boulder or Chatsworth Formation Sandstone. Collected soil samples S001, S002, S003, S004, and S005. Backfilled with geoprobe cuttings.					

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Boring ID: **HFBS0054**

Borehole Diam. (in.): 3-1/2; 2	Total Depth (ft): 16.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268239.42	Easting (ft): 1785897.24	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-17-2008	Start Time: 12:00	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-21-2008	Finish Time: 09:15	Drilling Contractor: B.L. Hall; Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger (04-17-2008); Geoprobe/Direct Push (04-21-2008)	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Paul; Danny	

Comments: Drilled in dirt roadway; sand and gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler; geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-21-2008	Backfill Time: 09:20

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			2.8		0		SM	Silty Sand with Gravel, brown (10YR 4/3), dense, moist [Fill]	15	15	30	20	20
	S			0.6		4		SM	Silty Sand, light yellowish brown (10YR 6/4), dense, moist [Alluvium]		15	40	20	25
						6			becomes dark yellowish brown (10YR 4/6)					
				1.2		8			becomes very dark brown (10YR 2/2), slight increase in moisture and fines		5	40	25	30
				1.2		12		SC	Clayey Sand, dark yellowish brown (10YR 4/4), medium dense, moist [Alluvium]		5	30	40	25
	S			1.6		16			Total Depth = 16.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01, S02, and S03. Original boring advanced with hand auger on 04-17-2008. Boring deepened on 04-21-2008 using direct push, then backfilled with native soil and bentonite.					
						18								
						20								

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Boring ID: **HFBS0054A**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 15.5	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268239.42	Easting (ft): 1785897.24	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-18-2008	Start Time: 10:10	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-18-2008	Finish Time: 10:30	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Mark and Kyle	

Comments: Advanced in gravel roadway, no debris or brush	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 11-18-2008	Backfill Time: 10:35

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S					0		GP	Poorly Graded Gravel with Sand, light yellowish brown (10YR 6/4), loose, dry, fine gravel, micaceous	70		15	15	
						2		ML	Silt with Sand, dark yellowish brown (10YR 4/6), medium stiff, moist, low plasticity, micaceous			10	15	75
				480		4			becomes dark yellowish brown (10YR 4/4) with patches of orange oxidation, decrease in sand, slightly clayey fines				15	85
	S					6								
				63		8								
	S					10		SM/ML	Silty Sand / Sandy Silt, dark yellowish brown (10YR 3/6), medium dense / medium stiff, moist, slightly clayey				50	50
						12								
						14			orange oxidation					
	S					16		SM	Silty Sand, yellowish brown (10YR 5/8), moist, micaceous, orange oxidation throughout			5	60	35
						18			Total Depth = 15.5 ft; refusal on boulder or Chatsworth Formation Sandstone.					
						20			Collected soil samples S001, S002, S003, and S004.					
									Backfilled with geoprobe cuttings.					

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Boring ID: **HFBS0055**

Borehole Diam. (in.): 2	Total Depth (ft): 3.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268198.05	Easting (ft): 1785995.99	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-18-2008	Start Time: 08:39	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-18-2008	Finish Time: 08:55	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Danny	

Comments: Drilled in dirt parking area; sand and gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 04-18-2008	Backfill Time: 09:00

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S	100		35.2		0		SM	Silty Sand, yellowish brown (10YR 5/4), dense, moist, few gravel [Fill]	10	15	35	20	20
	S			40.8		2			Silty Sandstone, yellowish brown (10YR 5/4), dense to very dense, moist [Weathered Chatsworth Formation]					
						4			Total Depth = 3.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01, D01, and S02. Backfilled with native soil and bentonite.					
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0055A**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 2.3	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268198.05	Easting (ft): 1785995.99	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-18-2008	Start Time: 09:35	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-18-2008	Finish Time: 09:55	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Mark and Kyle	

Comments: Gravel and soil at surface, asphalt road 7 ft to W, concrete debris 4 ft to S	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 11-18-2008	Backfill Time: 10:00

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S	100		31.2		0		GP	Poorly Graded Gravel with Sand, brownish yellow (10YR 6/6), medium dense, dry [Fill]	70		5	20	5
	S					2		SM	Silty Sand, yellowish brown (10YR 5/4), medium dense, dry, trace fine gravel, micaceous [Fill]	tr			70	30
						4			Total Depth = 2.3 ft; refusal on Chatsworth Formation Sandstone (outcrop observed 7 ft S of hole). Collected soil samples S001 and S002. Backfilled with geoprobe cuttings.					
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0056**

Borehole Diam. (in.): 3	Total Depth (ft): 1.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268268.17	Easting (ft): 1785772.72	Job Number: 1891451	Site: Building 4133
Drill Start Date: 05-06-2008	Start Time: 09:29	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 05-06-2008	Finish Time: 09:38	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	
Comments: Fill debris and weeds at surface		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler		Soil Backfill Date: 05-06-2008	Backfill Time: 09:44

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 s				0.0		0		SW	Well Graded Sand with Gravel, yellowish brown (10YR 5/4), loose, dry, coarse angular gravel to 3 inches dia., trace fines	15	25	30	25	5
						2			Total Depth = 1.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0057**

Borehole Diam. (in.): 3	Total Depth (ft): 1.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268317.00	Easting (ft): 1785646.97	Job Number: 1891451	Site: Building 4133
Drill Start Date: 05-06-2008	Start Time: 10:01	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 05-06-2008	Finish Time:	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	

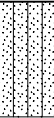
Comments: Thin layer of ash at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler	Soil Backfill Date: 05-06-2008	Backfill Time:

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 s				0.0		0		SM	Silty Sand, yellowish brown (10YR 5/4), loose to medium dense, moist		10	30	40	20
						2			Total Depth = 1.5 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0058**

Borehole Diam. (in.): 3	Total Depth (ft): 0.8	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268265.65	Easting (ft): 1785632.88	Job Number: 1891451	Site: Building 4133
Drill Start Date: 05-06-2008	Start Time: 10:16	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 05-06-2008	Finish Time:	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	

Comments: Thin layer of ash at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler	Soil Backfill Date: 05-06-2008	Backfill Time:

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SM	Silty Sand, yellowish brown (10YR 5/4), medium dense, moist		20	20	40	20
						1			Total Depth = 0.8 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						2								
						3								
						4								
						5								
						6								
						7								
						8								
						9								
						10								

Boring ID: **HFBS0059**

Borehole Diam. (in.): 3	Total Depth (ft): 0.3	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268298.18	Easting (ft): 1785608.12	Job Number: 1891451	Site: Building 4133
Drill Start Date: 05-06-2008	Start Time: 10:26	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 05-06-2008	Finish Time: 10:31	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	
Comments: Thin layer of ash at surface (not included in sample)		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Hand trowel		Soil Backfill Date: 05-06-2008	Backfill Time: 10:35

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
0 - 0.3	S			0.0		0		SM	Silty Sand, yellowish brown (10YR 5/4), medium dense, moist		10	25	40	25
						1			Total Depth = 0.3 ft (4 in.); refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						2								
						3								
						4								
						5								
						6								
						7								
						8								
						9								
						10								

Boring ID: **HFBS0060**

Borehole Diam. (in.): 3	Total Depth (ft): 1.3	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268220.30	Easting (ft): 1785717.78	Job Number: 1891451	Site: Building 4133
Drill Start Date: 05-06-2008	Start Time: 10:54	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 05-06-2008	Finish Time: 11:02	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	

Comments:	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler	Soil Backfill Date: 05-06-2008	Backfill Time: 11:07

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 s				0.0		0		SM	Silty Sand, yellowish brown (10YR 5/4), medium dense, moist		10	30	45	15
						2			Total Depth = 1.3 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S01 and S01SP. Backfilled with native soil.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0061**

Borehole Diam. (in.): 3	Total Depth (ft): 0.3	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268136.74	Easting (ft): 1785712.81	Job Number: 1891451	Site: Building 4133
Drill Start Date: 05-06-2008	Start Time: 12:24	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 05-06-2008	Finish Time: 12:30	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	
Comments: Downgradient of 55-gallon drum; weeds and shrubs at surface		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Hand trowel		Soil Backfill Date: 05-06-2008	Backfill Time: 12:36

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
0 - 0.3	S			0.0		0		SM	Silty Sand, yellowish brown (10YR 5/4), medium dense, moist		15	30	40	15
						1			Total Depth = 0.3 ft (3 in.); refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						2								
						3								
						4								
						5								
						6								
						7								
						8								
						9								
						10								

Boring ID: **HFBS0062**

Borehole Diam. (in.): 3	Total Depth (ft): 1.3	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268189.39	Easting (ft): 1785682.97	Job Number: 1891451	Site: Building 4133
Drill Start Date: 05-06-2008	Start Time: 11:56	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 05-06-2008	Finish Time: 12:07	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	
Comments: Downgradient of 55-gallon drum; weeds and shrubs at surface		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler		Soil Backfill Date: 05-06-2008	Backfill Time: 12:10

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 s				0.0		0		SM	Silty Sand, yellowish brown (10YR 5/4), medium dense, moist		10	35	35	20
						2			Total Depth = 1.3 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0062A**

Borehole Diam. (in.): 3	Total Depth (ft): 1.3	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268189.39	Easting (ft): 1785682.97	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-21-2008	Start Time: 10:00	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-21-2008	Finish Time: 10:35	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Hodges	
Comments: Downgradient of 55-gallon drum; dry leaves, twigs, and brush at surface		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 11-21-2008	Backfill Time: 10:40

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 s				5.8		0		SM/ML	Silty Sand / Sandy Silt, brown (10YR 5/3), loose, dry, micaceous			20	30	50
						2			Total Depth = 1.3 ft; refusal on weathered Chatsworth Formation Sandstone. Collected soil sample S001. Backfilled with auger cuttings.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0063**

Borehole Diam. (in.): 3	Total Depth (ft): 0.8	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268159.23	Easting (ft): 1785780.28	Job Number: 1891451	Site: Building 4133
Drill Start Date: 05-07-2008	Start Time: 09:13	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 05-07-2008	Finish Time: 09:25	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	
Comments: Grass, weeds, and thin layer of asphalt at surface		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler		Soil Backfill Date: 05-07-2008	Backfill Time: 09:34

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SP	Poorly Graded Sand, yellowish brown (10YR 5/4), medium dense, moist, trace gravel and fines	5	20	35	35	5
						1			Total Depth = 0.8 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						2								
						3								
						4								
						5								
						6								
						7								
						8								
						9								
						10								

Boring ID: **HFBS0063A**

Borehole Diam. (in.): 3	Total Depth (ft): 1.3	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268159.23	Easting (ft): 1785780.28	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-21-2008	Start Time: 08:35	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-21-2008	Finish Time: 09:00	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Hodges	
Comments: Dry brush, concrete debris, and bricks at surface		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 11-21-2008	Backfill Time: 09:00

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 s				6.8		0		SM/ML	Silty Sand with Gravel / Sandy Silt with Gravel, grayish brown (10YR 5/2), very loose, dry, micaceous [Fill]	20	5	5	20	50
						2			Total Depth = 1.3 ft; refusal on boulder or Chatsworth Formation Sandstone. Collected soil sample S001. Backfilled with auger cuttings.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0064**

Borehole Diam. (in.): 3	Total Depth (ft): 1.3	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268244.07	Easting (ft): 1785526.70	Job Number: 1891451	Site: Building 4133
Drill Start Date: 05-06-2008	Start Time: 13:16	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 05-06-2008	Finish Time: 13:26	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	

Comments:	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler	Soil Backfill Date: 05-06-2008	Backfill Time: 13:30

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 s				0.0		0		SM	Silty Sand, yellowish brown (10YR 5/4), loose to medium dense, moist		10	40	35	15
						2			Total Depth = 1.3 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S01 along with MS/MSD. Backfilled with native soil.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0065**

Borehole Diam. (in.): 3	Total Depth (ft): 0.3	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268202.42	Easting (ft): 1785483.71	Job Number: 1891451	Site: Building 4133
Drill Start Date: 05-05-2008	Start Time: 13:18	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 05-05-2008	Finish Time: 13:26	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger / Hand Trowel	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	
Comments: Layer of ash 1/4 inch thick at surface (not included in sample)		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Hand trowel		Soil Backfill Date: 05-05-2008	Backfill Time: 13:32

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
0.0 - 0.3	S			0.0		0		SM	Silty Sand, yellowish brown (10YR 5/4), loose, moist		20	30	35	15
						1			Total Depth = 0.3 ft (4 in.); refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						2								
						3								
						4								
						5								
						6								
						7								
						8								
						9								
						10								

Boring ID: **HFBS0072**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 1.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268207.01	Easting (ft): 1786198.34	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-28-2008	Start Time: 08:02	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-28-2008	Finish Time: 08:11	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments:	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 04-28-2008 Backfill Time: 08:17

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
0 - 0.5	S			0.0		0		SM	Silty Sand, light yellowish brown (10YR 6/4), loose, dry		10	40	35	15
						2			Total Depth = 1.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Two step-outs required for sample volume. Backfilled with native soil and bentonite.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0073**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 10.5	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268234.85	Easting (ft): 1786251.50	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-28-2008	Start Time: 08:26	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-28-2008	Finish Time: 08:38	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments:	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 04-28-2008
		Backfill Time: 08:49

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.0		0		SC	Clayey Sand, dark yellowish brown (10YR 4/4), medium dense, moist [Fill]		10	40	25	25
	S					2								
				0.0		4								
	S					6		SM	Silty Sand, yellowish brown (10YR 5/4), medium dense, moist [Alluvium]			40	30	30
	S					8			← calcium carbonate nodules					
				0.0		10			↓ becomes light yellowish brown (10YR 6/4), increase in moisture, increase in coarse sand, decrease in fines		20	25	40	15
	S					12			Total Depth = 10.5 ft; refusal on Chatsworth Formation Sandstone.					
	S					14			Collected soil samples S01, S02, and S03.					
						16			Backfilled with native soil and bentonite.					
						18								
						20								

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Boring ID: **HFBS0074**

Borehole Diam. (in.): 3	Total Depth (ft): 0.3	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268142.19	Easting (ft): 1785702.24	Job Number: 1891451	Site: Building 4133
Drill Start Date: 05-06-2008	Start Time: 12:13	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 05-06-2008	Finish Time: 12:20	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	

Comments:	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler		Soil Backfill Date: 05-06-2008
		Backfill Time: 12:21

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
0	s			0.0		0		SM	Silty Sand, yellowish brown (10YR 5/4), medium dense, moist		10	25	50	15
						1			Total Depth = 0.3 ft (4 in.); refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						2								
						3								
						4								
						5								
						6								
						7								
						8								
						9								
						10								

Boring ID: **HFBS0074A**

Borehole Diam. (in.): 3	Total Depth (ft): 2.5	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268142.19	Easting (ft): 1785702.24	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-21-2008	Start Time: 09:20	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-21-2008	Finish Time: 09:55	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Hodges	
Comments: Boulders, concrete debris, bricks, and pipe at surface; rusty barrel nearby		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 11-21-2008	Backfill Time: 09:55

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 s				0.7		0		SM	Silty Sand, yellowish brown (10YR 5/4), loose, dry, fine gravel-size subrounded sandstone fragments, slightly micaceous	tr		10	50	40
						2								
						4			Total Depth = 2.5 ft; refusal on boulder or Chatsworth Formation Sandstone. Collected soil sample S001. Backfilled with auger cuttings.					
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0075**

Borehole Diam. (in.): 3	Total Depth (ft): 1.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft):	Easting (ft):	Job Number: 1891451	Site: Building 4133
Drill Start Date: 05-06-2008	Start Time: 08:03	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 05-06-2008	Finish Time: 08:11	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	

Comments: Rusted 55-gallon drum atop soil at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Slide hammer with drive sampler	Soil Backfill Date: 05-06-2008	Backfill Time: 08:17

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 s				0.0		0		SM	Silty Sand, light yellowish brown (10YR 6/4), loose, moist		15	30	40	15
						2			Total Depth = 1.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S01. Backfilled with native soil.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0075A**

Borehole Diam. (in.): 3	Total Depth (ft): 1.5	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft):	Easting (ft):	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-24-2008	Start Time: 11:25	Logged By: S. Aichner	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-24-2008	Finish Time: 11:55	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Benny and Ben	
Comments: Topsoil at surface		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 11-24-2008	Backfill Time: 11:50

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 s				0.3		0		SM	Silty Sand, yellowish brown (10YR 5/4), loose, dry, fine gravel, micaceous, contains organic debris, no staining or odor	tr	tr	5	55	40
						2			Total Depth = 1.5 ft; refusal on weathered Chatsworth Formation Sandstone. Collected soil sample S001. Backfilled with auger cuttings.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0076**

Borehole Diam. (in.): 3	Total Depth (ft): 1.5	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268229.22	Easting (ft): 1785600.27	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-20-2008	Start Time: 10:15	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-20-2008	Finish Time: 10:40	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Hodges	
Comments: Dry brush, twigs, and leaves in small wash 12 ft W of gravel road		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 11-20-2008	Backfill Time: 10:50

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			0.7		0		SM	Silty Sand, pale brown (10YR 6/3), very loose, dry, fine gravel-size angular sandstone fragments, micaceous [Alluvium]	tr		30	40	30
						2			Total Depth = 1.5 ft; refusal on Chatsworth Formation Sandstone (outcrops observed nearby).					
						4			Collected soil sample S001.					
						6			Backfilled with auger cuttings.					
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0077**

Borehole Diam. (in.): 3	Total Depth (ft): 1.3	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268208.85	Easting (ft): 1785621.07	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-20-2008	Start Time: 11:00	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-20-2008	Finish Time: 11:50	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Hodges	
Comments: Dry brush on slope, exposed bedrock 3 ft S and 3 ft N of hole		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 11-20-2008	Backfill Time: 11:55

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 S				1.4		0		SM	Silty Sand, yellowish brown (10YR 5/4), very loose, dry, fine gravel-size subangular sandstone fragments, very micaceous [Alluvium]	tr		20	40	40
						2			Total Depth = 1.3 ft; refusal on Chatsworth Formation Sandstone; attempted two step-out borings and met refusal at same depth. Collected soil sample S001. Backfilled with auger cuttings.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0078**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 8.0	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268324.61	Easting (ft): 1785929.32	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-19-2008	Start Time: 08:25	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-19-2008	Finish Time: 09:00	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken and Dan	

Comments: Dry leaves and twigs in cleared area 3 ft W of asphalt road	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 11-19-2008	Backfill Time: 09:05

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			1.2		0		SM	Silty Sand, yellowish brown (10YR 5/4), loose, dry, micaceous [Alluvium]			20	40	40
	S			1.6		4								
						8			Total Depth = 8.0 ft; refusal on Chatsworth Formation Sandstone (outcrops observed nearby). Collected soil samples S001 and S002. Backfilled with geoprobe cuttings.					
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0079**

Borehole Diam. (in.): 3	Total Depth (ft): 0.8	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268301.57	Easting (ft): 1785872.48	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-19-2008	Start Time: 12:30	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-19-2008	Finish Time: 12:40	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	
Comments: Augered 4 ft W of chain link fence, concrete debris and brush nearby		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 11-19-2008	Backfill Time: 13:50

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 s				3.9		0		SM	Silty Sand, yellowish brown (10YR 5/6), very loose, dry, fine gravel-size subangular sandstone fragments, micaceous	5		15	35	45
						2			Total Depth = 0.8 ft; refusal on Chatsworth Formation Sandstone. Collected soil sample S001. Backfilled with auger cuttings.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0080**

Borehole Diam. (in.): 3	Total Depth (ft): 1.3	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268293.57	Easting (ft): 1785831.16	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-19-2008	Start Time: 13:00	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-19-2008	Finish Time: 13:30	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Cisneros	
Comments: Sampled 20 ft W of staked location, in dense brush and trees		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 11-19-2008	Backfill Time: 13:35

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			3.4		0		SM	Silty Sand, yellowish brown (10YR 5/4), very loose, dry, micaceous		10	20	30	40
						2			Total Depth = 1.3 ft; refusal on Chatsworth Formation Sandstone; shallow refusal confirmed by one step-out boring and outcrop observed 4 ft to S of boring. Collected soil sample S001. Backfilled with auger cuttings.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0081**

Borehole Diam. (in.): 3	Total Depth (ft): 1.5	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268101.25	Easting (ft): 1785821.95	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-20-2008	Start Time: 12:55	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-20-2008	Finish Time: 13:30	Drilling Contractor: B.L. Hall	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Hodges	
Comments: Soil, brush, dried vegetation, and asphalt debris at surface		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 11-20-2008	Backfill Time: 13:35

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 S				0.9		0		SM	Silty Sand, light brownish gray (10YR 6/2), very loose, dry, micaceous, coarser sand grains appear to be asphaltic [Fill]			15	40	45
						2			Total Depth = 1.5 ft; refusal on Chatsworth Formation Sandstone; attempted two step-out borings, 1 ft and 2.5 ft to S and met similar refusal. Collected soil sample S001. Backfilled with auger cuttings.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0082**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 11.0	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268091.21	Easting (ft): 1785846.39	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-17-2008	Start Time: 13:35	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-17-2008	Finish Time: 13:50	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Walt and Kyle	

Comments: Sand and gravel at surface	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 11-17-2008	Backfill Time: 13:55

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	s	75		2.1		0		ML	Silt with Sand, dark yellowish brown (10YR 4/4), medium stiff, low plasticity, micaceous				20	80
						2			↓ becomes mottled dark yellowish brown (10YR 4/4) and gray (10YR 5/1)					
	s	100				4								
						6								
				0.5		8								
	s	100				10								
				0.4		12			Total Depth = 11.0 ft; refusal on Chatsworth Formation Sandstone. Collected soil samples S001, D001, S002, and S003. Backfilled with hydrated bentonite.					
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0083**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 12.5	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268231.25	Easting (ft): 1785926.59	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-17-2008	Start Time: 10:20	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-17-2008	Finish Time: 11:00	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Walt and Kyle	
Comments: Advanced 4 ft N of asphalt curb, concrete debris 3 ft W of hole		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 11-17-2008	Backfill Time: 11:00

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S	75		0.6		0		ML	Sandy Silt, dark yellowish brown (10YR 4/4), medium stiff, moist, micaceous ← asphalt 1/2 inch thick		5		35	60
	S	100		0.4		4			becomes mottled very dark grayish brown (10YR 3/2) and yellowish brown (10YR 5/6) } black (10YR 3/1) staining					
	S	100				8		ML	Silt with Sand, dark yellowish brown (10YR 4/4), medium stiff, moist, micaceous				20	80
	S	100				10		ML	Sandy Silt, yellow (10YR 7/6), medium stiff, moist, micaceous, appears oxidized				40	60
		100		3.1		12			Total Depth = 12.5 ft; refusal on boulder or Chatsworth Formation Sandstone. Collected soil samples S001, S002, and S003. Backfilled with hydrated bentonite.					
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0084/HFSV0084**

Borehole Diam. (in.): 3-1/2	Total Depth (ft): 2.3	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268261.12	Easting (ft): 1785943.70	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-13-2008	Start Time: 10:00	Logged By: S. Dawson	Reviewed By: C. Carter, P.G.
Drill Finish Date: 11-13-2008	Finish Time: 11:00	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: J. Osorio	
Comments: Augered 6 ft from gravel road, near concrete and wood debris		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 11-13-2008	Backfill Time: 11:00

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			4.8		0		SM	Silty Sand, pale brown (10YR 6/3), loose, dry [Fill]	tr	tr		60	40
	S			0.7		2			Total Depth = 2.3 ft; refusal on weathered Chatsworth Formation Sandstone. Attempted two step-out borings, 1.5 ft to N and 8 ft to NW of original location; both met similar refusal. Collected soil samples S001 (original location) and S002 (step-out 1 ft to N). No soil vapor probe installed due to shallow refusal; backfilled all borings with auger cuttings.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFBS0085/HFSV0085**

Borehole Diam. (in.): 3-1/2	Total Depth (ft): 4.8	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268221.62	Easting (ft): 1785959.60	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-13-2008	Start Time: 12:30	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-13-2008	Finish Time: NR	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: J. Osorio / J. Vasquez	

Comments: Augered through asphalt surface, no debris	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head	Soil Backfill Date: 11-13-2008	Backfill Time: NR

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			Asphalt 3 inches thick, no base					
	S			0.5		0.5		ML	Sandy Silt, yellowish brown (10YR 5/4), soft, moist, trace fine gravel-size angular fragments of grayish green micaceous sandstone [Alluvium]	tr			40	60
						2			← 2-inch-thick layer of coarse gravel-size sandstone fragments					
	S			6.5		4		ML	Red Vapor Probe Installation (SVS001) Hydrated bentonite seal ... 0-3.25 ft #3 sand filterpack ... 3.25-4.8 ft Perforated HDPE tubing ... 3.5-4.5 ft				20	80
				0.4		4.5		SM	Silt with Sand, very dark grayish green (GLE Y1 5G 3/1), soft, moist, nonplastic, slightly micaceous, slight odor [Alluvium]					
						4.8			Silty Sand, mottled yellowish brown (10YR 5/6) and grayish brown (10YR 5/2), loose, moist, fine to coarse subangular gravel [Alluvium]	tr			70	30
						6			Total Depth = 4.8 ft; refusal on boulder or Chatsworth Formation Sandstone. Attempted one step-out boring 1 ft to S and met refusal at 4.5 ft.					
						6			Collected soil samples S001 and S002.					
						6			Soil vapor probe HFSV0085 S001 installed as detailed above.					
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0086**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 10.5	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268242.69	Easting (ft): 1785974.63	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-17-2008	Start Time: 12:50	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-17-2008	Finish Time: 13:20	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Walt and Kyle	
Comments: Advanced 5 ft E of asphalt-paved road, sand and gravel at surface		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 11-17-2008	Backfill Time: 13:25

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			2.3		0		ML	Sandy Silt, yellowish brown (10YR 5/4), soft, dry, low plasticity, micaceous		tr	10	30	60
	S					2								
	S					4								
						6			↓ becomes very pale brown (10YR 7/3), stiff, decrease in sand, low mica content	tr		30	70	
				3.6		8			↓ becomes grayish brown (10YR 5/2) mottled with yellowish brown (10YR 5/6) oxidation					
	S			2.2		10								
						12			Total Depth = 10.5 ft; refusal on weathered Chatsworth Formation Sandstone. Collected soil samples S001, S002, and S003. Backfilled with hydrated bentonite.					
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0093(relocated)**

Borehole Diam. (in.): 3-1/4	Total Depth (ft): 4.5	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268149.00	Easting (ft): 1785852.68	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-24-2008	Start Time: 13:00	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-24-2008	Finish Time: 13:30	Drilling Contractor: Jacob & Hefner Assoc.	Field Instrumentation: N/A
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Rob Giberson	
Comments: Augered 15 ft N of original HFBS0093; twigs and leaves at surface		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 11-24-2008	Backfill Time: 13:35

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 S						0		SM	Silty Sand, yellowish brown (10YR 5/4), dry [Fill]		5	20	40	35
 S						4		ML	Sandy Silt, brownish yellow (10YR 6/6), soft, dry, coarse gravel-size rounded sandstone fragments, nonplastic, micaceous [Fill] Total Depth = 4.5 ft; refusal on boulder or Chatsworth Formation Sandstone. Collected soil samples S001 and S002. Backfilled with auger cuttings.	5			30	65
						2								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0094**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 3.0	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268253.05	Easting (ft): 1786025.70	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-19-2008	Start Time: 10:15	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-19-2008	Finish Time: 10:35	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken and Dan	

Comments: Advanced in weathered asphalt at northern end of culvert, dry brush nearby	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 11-19-2008	Backfill Time: 10:40

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			Asphalt 3 inches thick					
	S			1.1				SM	Silty Sand, yellowish brown (10YR 5/4), loose, dry, fine gravel-size subangular sandstone fragments, micaceous	5		20	30	45
	S			1.1		2			becomes light gray (10YR 7/1)					
						4			Total Depth = 3.0 ft; refusal on Chatsworth Formation Sandstone (outcrop observed 10 ft W of boring). Attempted two step-out borings to S; met refusal at similar depth in each.					
									Collected soil samples S001 and S002.					
									Backfilled with auger cuttings and asphalt surface patch.					
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0095**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 1.0	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268221.24	Easting (ft): 1786049.46	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-19-2008	Start Time: 09:50	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-19-2008	Finish Time: 10:00	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken and Dan	

Comments: Advanced in asphalt culvert, 3 ft E of pipe; dry brush nearby	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 11-19-2008	Backfill Time: 10:05

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			2.2		0		SM/ML	Asphalt 3 inches thick Silty Sand / Sandy Silt, dark yellowish brown (10YR 4/4), loose, moist, coarse sand-size subangular sandstone fragments, micaceous Total Depth = 1.0 ft; refusal on Chatsworth Formation Sandstone (outcrop observed 8 ft to W). Attempted step-out boring 1 ft to N; met similar refusal. Collected soil sample S001. Backfilled with auger cuttings and asphalt surface patch.		tr	10	40	50
						2								
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0096**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 1.5	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268185.36	Easting (ft): 1786075.06	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-19-2008	Start Time: 09:30	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-19-2008	Finish Time: 09:40	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken and Dan	
Comments: Advanced in asphalt culvert, 3 ft E of pipe; dry brush nearby		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 11-19-2008	Backfill Time: 09:45

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			18.7		0		SM/ML	Asphalt 3 inches thick Silty Sand / Sandy Silt, yellowish brown (10YR 5/4), loose, moist, gravel-size angular sandstone fragments, micaceous	tr		10	40	50
						2			Total Depth = 1.5 ft; refusal on Chatsworth Formation Sandstone (outcrop observed nearby). Collected soil sample S001. Backfilled with auger cuttings and asphalt surface patch.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0097**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 2.0	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268155.52	Easting (ft): 1786103.85	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-18-2008	Start Time: 13:40	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-18-2008	Finish Time: 13:50	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Mark and Kyle	

Comments: Advanced in asphalt culvert, 2 ft N of pipe	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve	Soil Backfill Date: 11-18-2008	Backfill Time: 13:55

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			2.3		0		SM	Asphalt 3 inches thick Silty Sand, very pale brown (10YR 7/3), loose, dry			15	50	35
						2			Total Depth = 2.0 ft; refusal on Chatsworth Formation Sandstone (outcrop observed 3 ft to E). Collected soil sample S001. Backfilled with auger cuttings and asphalt surface patch.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0098**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 1.0	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268171.70	Easting (ft): 1786147.80	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-19-2008	Start Time: 09:10	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-19-2008	Finish Time: 09:20	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken and Dan	
Comments: Advanced in asphalt culvert, 3 ft N of pipe; dry leaves and twigs in culvert		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 11-19-2008	Backfill Time: 09:25

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			8.8		0		SM/ML	Asphalt 3 inches thick Silty Sand / Sandy Silt, dark yellowish brown (10YR 4/6), loose, moist, fine gravel-size angular sandstone fragments, micaceous Total Depth = 1.0 ft; refusal on Chatsworth Formation Sandstone (weathered sandstone in tip, outcrop observed nearby). Attempted one step-out boring 1 ft to SW; met similar refusal. Collected soil sample S001. Backfilled with auger cuttings and asphalt surface patch.	tr		10	40	50
						2								
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0099**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 1.5	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268203.86	Easting (ft): 1786202.34	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-19-2008	Start Time: 08:35	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-19-2008	Finish Time: 09:05	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken and Dan	
Comments: Advanced in asphalt culvert, 3 ft NW of pipe; dry leaves and twigs in culvert		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 11-19-2008	Backfill Time: 09:05

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
	S			4.3		0		SM	Asphalt 3 inches thick Silty Sand, yellow (10YR 7/8), loose, dry, fine gravel-size angular sandstone fragments, micaceous	10		15	35	40
						2			Total Depth = 1.5 ft; refusal on Chatsworth Formation Sandstone (weathered sandstone in tip, outcrop observed nearby). Attempted one step-out boring 1 ft to W; met similar refusal. Collected soil sample S001. Backfilled with auger cuttings and asphalt surface patch.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0100**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 8.8	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268233.18	Easting (ft): 1786254.56	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-18-2008	Start Time: 13:05	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-18-2008	Finish Time: 13:40	Drilling Contractor: Strongarm	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Mark and Kyle	
Comments: Advanced in asphalt culvert, 3 ft N of pipe and pump; dry leaves and twigs		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve		Soil Backfill Date: 11-18-2008	Backfill Time: 13:45

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			Asphalt 3 inches thick					
	s							SM	Silty Sand, very pale brown (10YR 7/3), loose, dry, trace orange oxidation			15	40	45
		100				2								
				0.7		4								
	s													
		75				6								
				0.5		8			orange oxidation becomes more prevalent					
	s	100		0.4										
						10			Total Depth = 8.8 ft; refusal on boulder or Chatsworth Formation Sandstone. Collected soil samples S001, S002, and S003. Backfilled with auger cuttings and asphalt surface patch.					
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0101**

Borehole Diam. (in.): 3	Total Depth (ft): 0.8	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268238.51	Easting (ft): 1785829.36	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-20-2008	Start Time: 13:35	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-20-2008	Finish Time: 14:05	Drilling Contractor: B.L. Hall	Field Instrumentation: N/A
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ben Hodges	
Comments: Augered 14 ft W of chain link fence, 3 ft N of 8-ft drop, dry brush nearby		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 11-20-2008	Backfill Time: 14:05

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 s						0		SM/ML	Silty Sand / Sandy Silt, very pale brown (10YR 7/4), loose, dry, fine gravel-size subrounded sandstone fragments, slightly micaceous [Fill]	5		15	30	50
						2			Total Depth = 0.8 ft; refusal on coarse gravel and/or cobbles. Attempted two step-out borings; both met similar refusal. Collected soil sample S001. Backfilled with auger cuttings. Note: Subgrade exposure south of boring suggests coarse gravel and/or cobbles to at least 6 ft below ground surface.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

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Boring ID: **HFBS0101A**

Borehole Diam. (in.): 3-1/2	Total Depth (ft): 2.0	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268238.51	Easting (ft): 1785832.00	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 12-03-2008	Start Time: 12:15	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 12-03-2008	Finish Time: 12:45	Drilling Contractor: None (MWH personnel)	Field Instrumentation: PID
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Hand Auger	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: S. Dawson	
Comments: Augered 3 ft W of HFBS0101, 15 ft SW of chain link fence		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Grab from auger head		Soil Backfill Date: 12-03-2008	Backfill Time: 12:55

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
 s				8.3		0		SM/ML	Silty Sand / Sandy Silt, yellow (10YR 7/6), loose, moist (dry in top 3 in.), fine gravel-size subrounded fragments of weakly indurated sandstone, slightly micaceous [Fill]	5		10	35	50
						2			Total Depth = 2.0 ft; refusal on cobbles. Collected soil sample S001. Backfilled with auger cuttings.					
						4								
						6								
						8								
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFSV0012**

Borehole Diam. (in.): 2	Total Depth (ft): 7.9	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268234.63	Easting (ft): 1785955.81	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-30-2008	Start Time:	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-30-2008	Finish Time:	Drilling Contractor: Strongarm	Field Instrumentation: N/A
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	
Comments: Boring drilled for soil vapor probe installation only		Well Comp. Date: N/A	Completion Time: N/A
Samplers: No samples collected		Soil Backfill Date: 04-30-2008	Backfill Time:

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			No sampling or logging performed. Boring advanced to install soil vapor probes. Refer to Log of Boring HFBS0012 for lithology at this location.					
						2								
						4			<u>Yellow Vapor Probe Installation (SVS01)</u> Hydrated bentonite seal ... 0-2.9 ft #3 sand filterpack ... 2.9-4.3 ft Perforated HDPE tubing ... 3-4 ft					
						6			<u>Red Vapor Probe Installation (SVS02)</u> Hydrated bentonite seal ... 4.3-5.9 ft #3 sand filterpack ... 5.9-7.3 ft Perforated HDPE tubing ... 6-7 ft					
						8			Total Depth = 7.9 ft. No soil samples collected. Nested soil vapor probes installed as detailed above.					
						10								
						12								
						14								
						16								
						18								
						20								

Boring ID: **HFSV0045**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 17.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268223.28	Easting (ft): 1785860.85	Job Number: 1891451	Site: Building 4133
Drill Start Date: 04-28-2008	Start Time:	Logged By: M. Baumgardner	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 04-28-2008	Finish Time:	Drilling Contractor: Strongarm	Field Instrumentation: N/A
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	
Comments: Boring drilled 7.5 ft west of HFBS0045 to install duplicate set of vapor probes		Well Comp. Date: N/A	Completion Time: N/A
Samplers: No samples collected		Soil Backfill Date: 04-28-2008	Backfill Time:

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			No sampling or logging performed. Boring advanced to install duplicate set of three soil vapor probes. Refer to Log of Boring HFBS0045 for lithology.					
						2								
						4			<u>Yellow Vapor Probe Installation (SVS01)</u> Hydrated bentonite seal ... 0-4 ft #3 sand filterpack ... 4-5 ft Perforated HDPE tubing ... 4.25-4.75 ft					
						6								
						8			<u>Blue Vapor Probe Installation (SVS02)</u> Hydrated bentonite seal ... 5-9 ft #3 sand filterpack ... 9-10 ft Perforated HDPE tubing ... 9.25-9.75 ft					
						10								
						12								
						14								
						16			<u>Red Vapor Probe Installation (SVS03)</u> Hydrated bentonite seal ... 10-16 ft #3 sand filterpack ... 16-17 ft Perforated HDPE tubing ... 16.25-16.75 ft					
						18			Total Depth = 17.0 ft. No soil samples collected. Three nested soil vapor probes installed as detailed above.					
						20								

LOG OF BORING GROUP7_2008.GPJ MWH WC.GDT 9/7/08

Boring ID: **HFSV0048**

Borehole Diam. (in.): 2	Total Depth (ft): 19.0	Project: Group 7 SSFL RFI Data Gap Sampling	
Northing (ft): 268188.94	Easting (ft): 1785910.67	Job Number: 1891451	Site: Building 4133
Drill Start Date: 05-05-2008	Start Time:	Logged By: A. Goldenberg	Reviewed By: B. Martasin, P.G.
Drill Finish Date: 05-05-2008	Finish Time:	Drilling Contractor: Strongarm	Field Instrumentation: N/A
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: Ken Lauerman	

Comments: Boring drilled for soil vapor probe installation only	Well Comp. Date: N/A	Completion Time: N/A
Samplers: No samples collected	Soil Backfill Date: 05-05-2008	Backfill Time:

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			No sampling or logging performed. Boring advanced to install soil vapor probes. Refer to Log of Boring HFBS0048 for lithology at this location.					
						2								
						4								
						6								
						8								
						10								
						12								
						14			<u>Orange Vapor Probe Installation (SVS01)</u> Hydrated bentonite seal ... 0-13.9 ft #3 sand filterpack ... 13.9-15.3 ft Perforated HDPE tubing ... 14-15 ft					
						16								
						18			<u>Blue Vapor Probe Installation (SVS02)</u> Hydrated bentonite seal ... 15.3-17.6 ft #3 sand filterpack ... 17.6-19 ft Perforated HDPE tubing ... 17.9-18.9 ft					
						20			Total Depth = 19.0 ft. No soil samples collected. Two nested soil vapor probes installed as detailed above.					

LOG OF BORING GROUP7_2008.GPJ MWH WC.GDT 9/7/08

Boring ID: **HFSV0083**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 12.8	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268232.83	Easting (ft): 1785927.15	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-14-2008	Start Time: NR	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-14-2008	Finish Time: NR	Drilling Contractor: Strongarm	Field Instrumentation: N/A
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: J. Osorio / J. Vasquez	

Comments: Boring advanced for soil vapor probe installation only	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve (no samples retained)	Soil Backfill Date: 11-14-2008	Backfill Time: NR

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			Boring advanced for soil vapor probe installation only; no sampling or logging performed. Subsurface conditions are assumed similar to co-located soil boring HFSV0083. Refer to Log of Boring HFSV0083 for lithology.					
						2								
						4			Blue Vapor Probe Installation (SVS001) Hydrated bentonite seal ... 0-3.75 ft #3 sand filterpack ... 3.75-5.25 ft Perforated HDPE tubing ... 4-5 ft					
						6								
						8			Green Vapor Probe Installation (SVS002) Hydrated bentonite seal ... 5.25-7.75 ft #3 sand filterpack ... 7.75-9.25 ft Perforated HDPE tubing ... 8-9 ft					
						10								
						12			Red Vapor Probe Installation (SVS003) Hydrated bentonite seal ... 9.25-11.5 ft #3 sand filterpack ... 11.5-12.8 ft Perforated HDPE tubing ... 11.75-12.75 ft					
						14			Total Depth = 12.8 ft. No soil samples collected. Nested soil vapor probes HFSV0083 S001, S002, and S003 installed as detailed above.					
						16								
						18								
						20								

LOG OF BORING GROUP7_2008.GPJ BOEING.GDT 1/23/09

Boring ID: **HFSV0086**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 9.8	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268242.69	Easting (ft): 1785974.63	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-14-2008	Start Time: NR	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-14-2008	Finish Time: NR	Drilling Contractor: Strongarm	Field Instrumentation: N/A
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: J. Osorio / J. Vasquez	
Comments: Boring advanced for soil vapor probe installation only		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve (no samples retained)		Soil Backfill Date: 11-14-2008	Backfill Time: NR

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			Boring advanced for soil vapor probe installation only; no sampling or logging performed. Subsurface conditions are assumed similar to co-located soil boring HFS0086. Refer to Log of Boring HFS0086 for lithology.					
						2								
						4			Blue Vapor Probe Installation (SVS001) Hydrated bentonite seal ... 0-3.75 ft #3 sand filterpack ... 3.75-5.25 ft Perforated HDPE tubing ... 4-5 ft					
						6								
						8			Red Vapor Probe Installation (SVS002) Hydrated bentonite seal ... 5.25-8.5 ft #3 sand filterpack ... 8.5-9.8 ft Perforated HDPE tubing ... 8.75-9.75 ft					
						10			Total Depth = 9.8 ft. No soil samples collected. Nested soil vapor probes HFSV0086 S001 and S002 installed as detailed above.					
						12								
						14								
						16								
						18								
						20								

LOG OF BORING GROUP7_2008.GPJ BOEING.GDT 1/23/09

Boring ID: **HFSV0091**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 5.5	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268185.53	Easting (ft): 1785974.41	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-13-2008	Start Time: 08:30	Logged By: S. Dawson	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-13-2008	Finish Time: 09:15	Drilling Contractor: Strongarm	Field Instrumentation: N/A
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: J. Osorio	
Comments: Advanced through asphalt surface, no debris or brush in immediate vicinity		Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve (no samples retained)		Soil Backfill Date: 11-13-2008	Backfill Time: 09:30

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
				20		0		SP-SM	Asphalt 3 inches thick, no base	tr		20	70	10
				0.0		2		SM	Silty Sand, dark yellowish brown (10YR 3/4), dense, moist, slightly clayey, no cementation [Fill]			10	70	20
				0.9		4		SP-SM	Poorly Graded Sand with Silt, yellowish brown (10YR 5/4), medium dense, moist, no cementation [Fill]			20	70	10
									Red Vapor Probe Installation (SVS001) Hydrated bentonite seal ... 0-4.25 ft #3 sand filterpack ... 4.25-5.5 ft Perforated HDPE tubing ... 4.5-5.5 ft					
						6			Total Depth = 5.5 ft; refusal on boulder or Chatsworth Formation Sandstone. Attempted step-out boring 1 ft to N and met similar refusal. No soil samples collected. Soil vapor probe HFSV0090 S001 installed as detailed above.					
						8								
						10								
						12								
						14								
						16								
						18								
						20								

LOG OF BORING GROUP7_2008.GPJ BOEING.GDT 1/23/09

Boring ID: **HFSV0092**

Borehole Diam. (in.): 2-1/4	Total Depth (ft): 7.9	Project: SSFL Group 7 RFI Sampling - November 2008	
Northing (ft): 268302.28	Easting (ft): 1785945.53	Job Number: 1891589.021101	Site: Building 4133
Drill Start Date: 11-14-2008	Start Time: 08:15	Logged By: C. Carter	Reviewed By: S. Valenzuela, P.G.
Drill Finish Date: 11-14-2008	Finish Time: 08:45	Drilling Contractor: Strongarm	Field Instrumentation: N/A
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe/Direct Push	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: J. Vasquez	

Comments: Advanced in middle of asphalt road running through vegetated area	Well Comp. Date: N/A	Completion Time: N/A
Samplers: Geoprobe macrocore with acetate sleeve (no samples retained)	Soil Backfill Date: 11-14-2008	Backfill Time: NR

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0			Asphalt 3 inches thick, no base					
								ML	Silt with Sand, dark brown (7.5YR 3/4), very stiff to hard, dry, nonplastic, slightly micaceous, laminated (up to 5 mm) [Alluvium]				15	85
		80				2		SP-SM	Poorly Graded Sand with Silt, yellowish brown (10YR 5/4 to 5/6), medium dense to dense, dry to moist, subangular sandstone gravel to 3/4 inch dia. (1-1/2-inch-dia. sandstone fragment at 3.5 ft), slightly micaceous [Alluvium]	tr		10	80	10
				2.7		4			<u>Blue Vapor Probe Installation (SVS001)</u> Hydrated bentonite seal ... 0-3.2 ft #3 sand filterpack ... 3.2-4.8 ft Perforated HDPE tubing ... 3.5-4.5 ft ▾ subangular to subrounded gravel to 1 inch dia. ▾ becomes yellowish brown (10YR 3/4), slight decrease in fines					
		100				6			<u>Red Vapor Probe Installation (SVS002)</u> Hydrated bentonite seal ... 4.8-6.2 ft #3 sand filterpack ... 6.2-7.9 ft Perforated HDPE tubing ... 6.5-7.5 ft ▾ becomes dense to very dense					
				2.6		8			Total Depth = 7.9 ft; refusal on Chatsworth Formation Sandstone. Attempted one step-out boring to W; met refusal on cobble or bedrock at 2.9 ft.					
						10			No soil samples collected.					
						12			Step-out boring backfilled with hydrated bentonite. Nested soil vapor probes HFSV0092 S001 and S002 installed in original boring as detailed above.					
						14								
						16								
						18								
						20								

LOG OF BORING GROUP7_2008.GPJ BOEING.GDT 1/23/09

Boring ID: **HFSV0200**

Borehole Diam. (in.): 2	Total Depth (ft): 7.5	Project: Group 1A Data Gap Sampling	
Northing (ft):	Easting (ft):	Job Number:	Site:
Drill Start Date: 04-30-2008	Start Time:	Logged By: B. Martasin	Reviewed By:
Drill Finish Date: 04-30-2008	Finish Time:	Drilling Contractor: Strongarm	Field Instrumentation:
Depth 1st H ₂ O (ft): N/A	Date / Time: N/A	Drill Rig Type/Method: Geoprobe	
Depth H ₂ O After Drilling (ft): N/A	Date / Time: N/A	Driller's Name: K. Laverman	

Comments:	Well Comp. Date: N/A	Completion Time: N/A
Samplers:	Soil Backfill Date: 04-30-2008	Backfill Time:

Sample Interval Retained	Sample Type	Recovery (%)	Blow Count/6"	PID (ppm)	Water Level	Depth (feet)	Graphic Log	USCS Soil Classification	Description	Est. % of Soil				
										Gravel	Coarse Sand	Med. Sand	Fine Sand	Silt/Clay
						0								
						2								
						4			Vapor Probe Installation Hydrated bentonite seal ... 0-3.5 ft #3 sand filterpack ... 3.5-4.5 ft SV probe at 4 ft					
						6								
						8			Vapor Probe Installation Hydrated bentonite seal ... 4.5-6.5 ft #3 sand filterpack ... 6.5-7.5 ft SV probe at 7 ft					
									Total Depth = 7.5 ft					
						10								
						12								
						14								
						16								
						18								
						20								

WELL LOGS

GROUNDWATER RESOURCES CONSULTANTS, INC.

TABLE A-96

LITHOLOGIC LOG OF MONITOR WELL RD-19

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0 - 4	SILTY SAND	Light brown, fine-grained, some gravel, very slightly moist, no odor.
4 - 61	SANDSTONE	Yellow-brown, fine-grained, well sorted, poorly cemented, friable, slightly moist. From 17 to 19 feet, fracture containing silt and tree roots. From 35 to 37 feet, shale lens, grey, fine grained. At 40 feet, moisture content increases. From 52 to 53 feet, shale lens.
61 - 135	SILTSTONE	Blue-grey, slightly moist, no odor, contains yellow brown sandstone interbeds. From 81 to 84 feet, sandstone interbed. At 100 feet, encountered groundwater.

TOTAL DEPTH OF BOREHOLE: 135 FEET

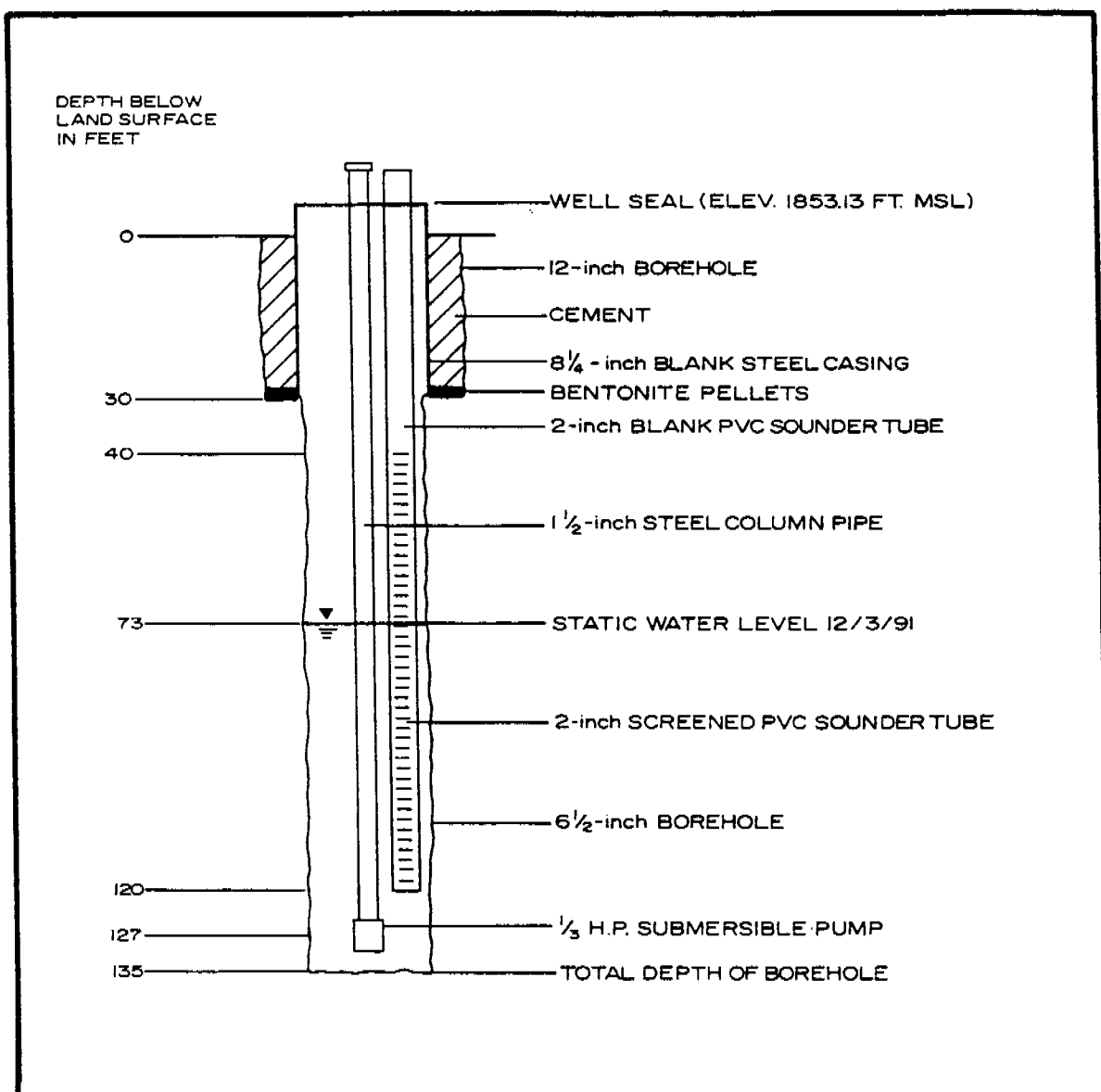


FIGURE E-21
SCHEMATIC DIAGRAM OF MONITOR WELL RD-19

TABLE C-1
RD-85 CORE DRILLING DATA
BOEING SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Logged By: Chris Brooks			Client: Boeing - ETEC			Job No: 26411-037																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Boring Number/Location: RD-85			Drilling Co: WDC Exploration			Date Started: 8/3/2004																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Length, Kelly: 10' Rods: 20'			Collars: --			Bit: 7" Height of K.B.: Date Finished: 8/4/2004																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Type/Diameter of Bit: coring/5" OD			Drilling Fluid: Air			Rig Type: Speedstar 30K																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Depth (feet)	Core		Color	Moisture Content (Air Rotary)	Core Run No.	Minutes/Run	HNU	Description	Fracture Profile	Analytical Sample	Particle Size Distribution %				Sorting	Grain Shape				Apparent Density				Plasticity				Odor Gas, etc (Air Rotary)				Rxn w/ HCL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
	% Rec	Rqd									Boulders	Cobbles	Gravel	Sand		Silt & Clay	Well	Poor	Angular	Subangular	Rounded	Subrounded	Very Loose	Loose	Compact	Dense	Very Dense	None	Low	Medium	High	None	Weak	Moderate	Strong																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
75								bluish gray sandstone; predominantly medium/coarse grained, slightly moist, moderately hard, relatively homogeneous, no evidence of fractures, relatively soft in bottom 3" of core																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								

GROUNDWATER RESOURCES CONSULTANTS, INC.

TABLE A-36

LITHOLOGIC LOG OF MONITOR WELL RS-25

DEPTH INTERVAL (feet)	DESCRIPTION OF MATERIAL	
0.0 - 9.0	SILTY CLAY/SAND	Light brown, slightly moist.
9.0 - 13.5	SILTY CLAY	Dark brown, moist.
		At 9.0 feet, zone of burned vegetation, barbed wire, mottled soil, black, orange and brown

TOTAL DEPTH OF BOREHOLE: 13.5 FEET

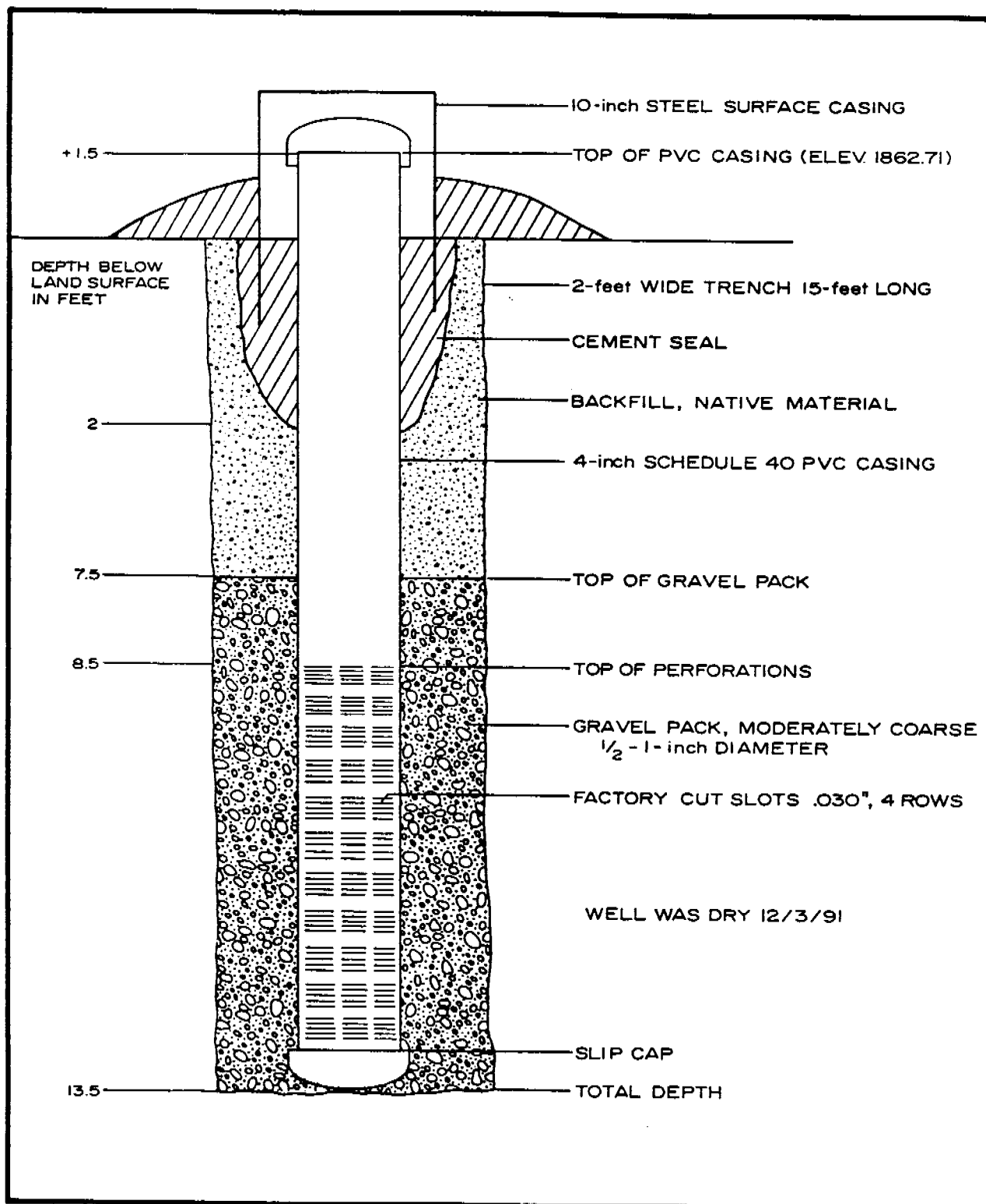


FIGURE C-25
SCHEMATIC DIAGRAM OF SHALLOW ZONE
MONITOR WELL RS-25

APPENDIX B

ATTACHMENT B-3

DATA QUALITY, VALIDATION AND LABORATORY REPORTS
(Electronic Copies Available on Request)

ATTACHMENT B-4

**BUILDING EVALUATION DOCUMENTATION LOGS
(Electronic Copy)**

Building Feature Documentation Logs

This attachment contains Building Feature Documentation Logs and map(s) showing the building feature locations. As required by DTSC, building feature inspections were performed and sampling requirements were determined consistent with the Standard Operating Procedures: Building Feature Evaluation and Sampling (MWH/CH2M HILL, 2008).

The logs presented in this attachment describe building feature conditions at the time of the site inspection, and they reflect sample recommendations as of the inspection date. The map(s) show recommended sample locations for both pre- and post-demolition samples.

Consistent with the standard operating procedures referenced above, pre-demolition samples were collected and analyzed prior to the publication of this report. In addition, post-demolition samples were collected for buildings that were demolished prior to the publication of this report. Therefore, since the map shows all recommended samples (both pre-demolition and post demolition), it should be noted that some of the locations have been sampled as of the date of this report, while others have not. For pre-demolition samples that were recommended as a result of the inspection, sample identification numbers are included on the logs. To further clarify:

- For building features where pre-demolition samples were warranted, sampling was completed, and the sample identification number(s) are presented on these logs. The sample locations and identification numbers are presented together on map(s) in the main body of this Appendix.
- For building features where post-demolition sampling was recommended and the buildings were demolished prior to the date of this report, samples were collected. The sample locations and identification numbers are presented together on map(s) in the main body of this Appendix.
- For building features where post-demolition sampling was recommended but buildings were not demolished prior the date of this report, samples will be collected at a later date. Recommended sample locations are shown on the map(s) within this attachment, but not on map(s) in the main body of this Appendix; sample identification numbers have not yet been assigned.

Base Map Legend

- Study Areas

RFI Groups

Existing Building or Structure

Removed Building or Structure

Sumps

Awnings

Other Tanks
(R) = Removed Tank

Petroleum Fuel/Oil Tank

Well

Dirt Roads

Excavation

Trench

Surface Water Divide

Elevation Contour

Gutters

Pipe

A/C Paving

Concrete

Retaining Wall

Fences

Bedrock Outcrops

Miscellaneous Infrastructure
- Bathroom Sinks

Floor Drain

Trench

Crack in Concrete Floor

Door

Soil Pre-Demo Sample Locations

Soil/Soil Vapor Pre-Demo Sample Locations

Post-Demo Sample Location

Tank

Storage Area

Sump

Cracks in Concrete

Air Scrubber

Figure Legend

- Bathroom Sinks

Floor Drain

Trench

Crack in Concrete Floor

Door

Soil Pre-Demo Sample Locations

Soil/Soil Vapor Pre-Demo Sample Locations

Post-Demo Sample Location

Tank

Storage Area

Sump

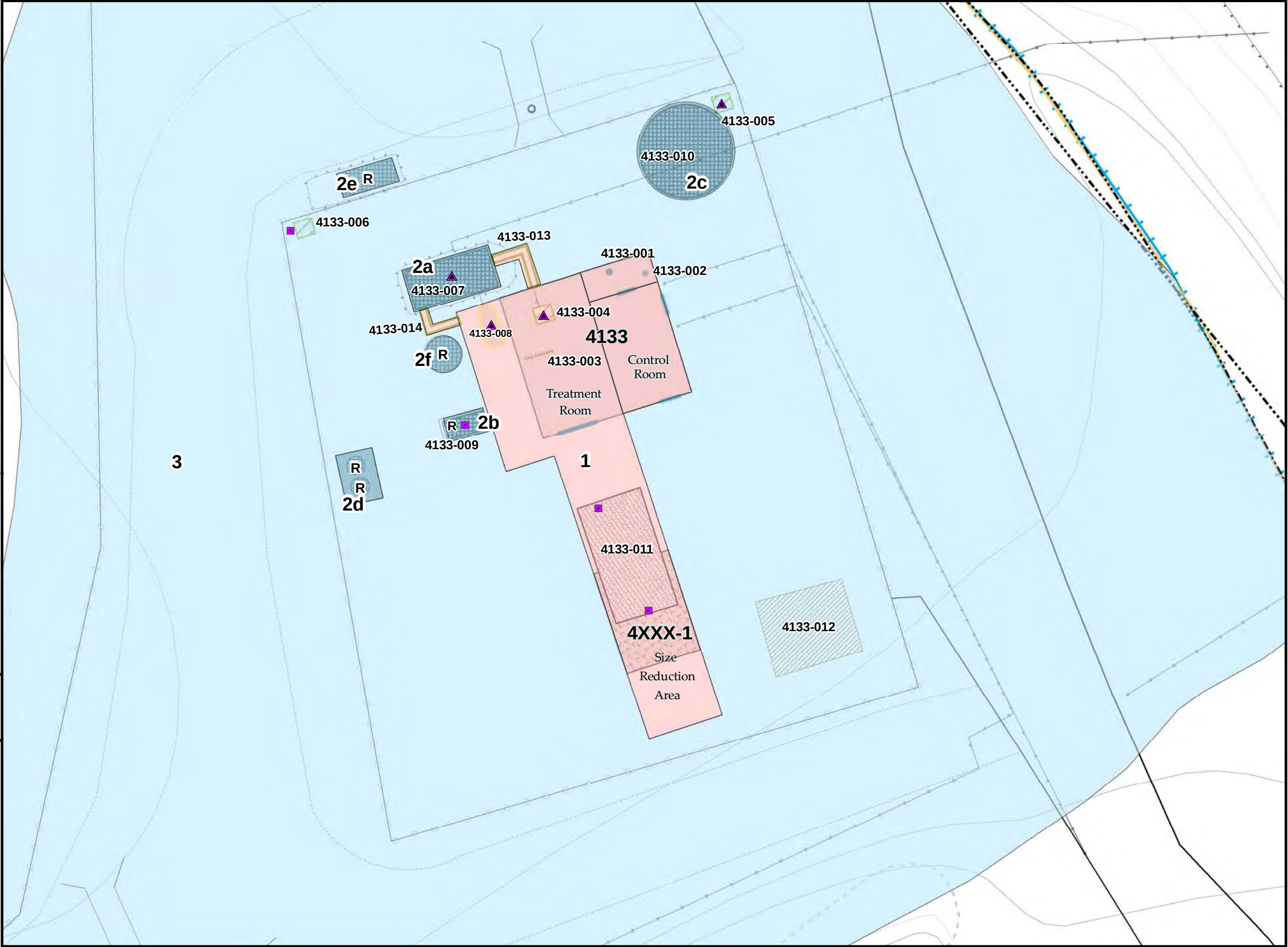
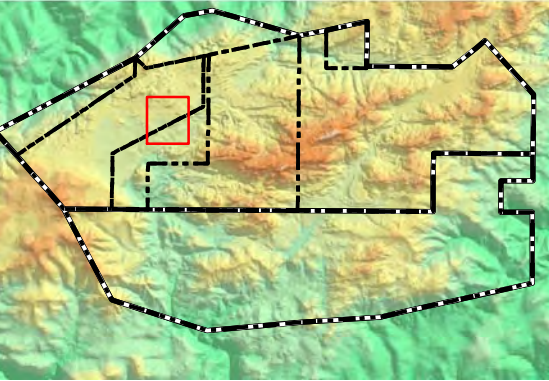
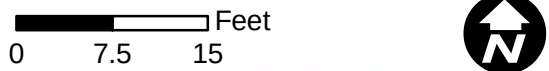
Cracks in Concrete

Air Scrubber

Chemical Use Area

- Multiple Use
- Metal
- Potential

Document: BFD_Bldg4133.mxd Date: March 12, 2009



S A N T A S U S A N A F I E L D L A B O R A T O R Y

Internal Building Features
Building 4133
Group 7

FIGURE B-4A

Base Map Legend

- Study Areas

RFI Groups

Existing Building or Structure

Removed Building or Structure

Sumps

Awnings

Other Tanks
(R) = Removed Tank

Petroleum Fuel/Oil Tank

A/C Paving

Concrete

Retaining Wall

Fences

Bedrock Outcrops

Miscellaneous
Infrastructure
- Well

Dirt Roads

Excavation

Trench

Surface Water Divide

Elevation Contour

Gutters

Pipe

Figure Legend

- Bathroom Sinks

Floor Drain

Trench

Crack in Concrete Floor

Door

Soil Pre-Demo Sample Locations

Soil/Soil Vapor Pre-Demo Sample Locations

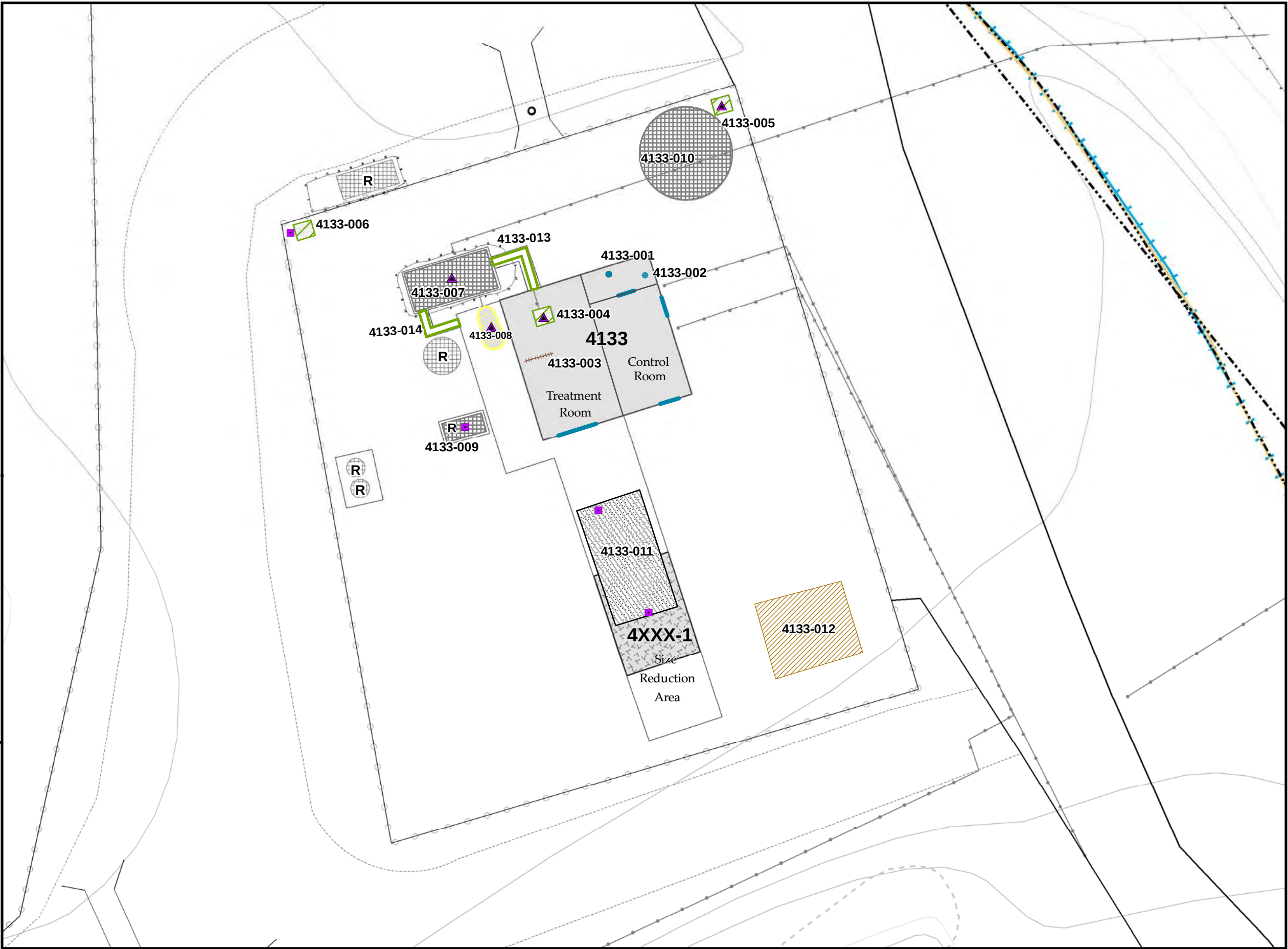
Post-Demo Sample Location
- Tank

Storage Area

Sump

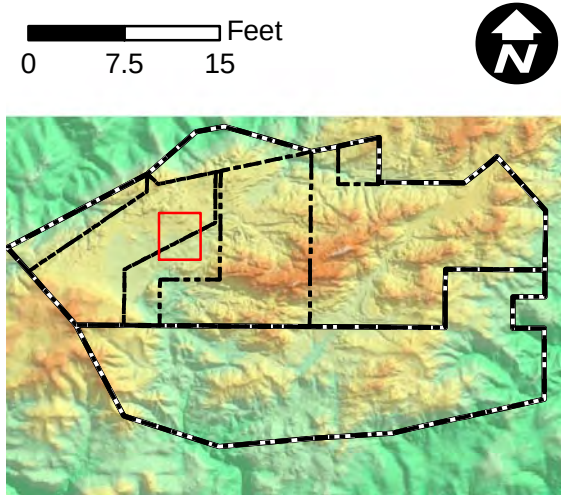
Cracks in Concrete

Air Scrubber



Document: BFD_Bldg4133.mxd

Date: March 12, 2009



S A N T A S U S A N A F I E L D L A B O R A T O R Y

Internal Building Features
Building 4133
Group 7

FIGURE B-4B

TABLE B-4A
B4133 RFI SITE BUILDING FEATURE COORDINATES
(Page 1 of 1)

Group Number	RFI Site	Building Number	Feature ID	Easting	Northing
7	4133	4133	4133-001	1785934.59	268201.849
7	4133	4133	4133-002	1785940.084	268201.622
7	4133	4133	4133-003	1785923.71	268189.09
7	4133	4133	4133-004	1785924.436	268195.361
7	4133	4133	4133-005	1785951.723	268227.654
7	4133	4133	4133-006	1785887.898	268208.544
7	4133	4133	4133-007	1785909.838	268200.693
7	4133	4133	4133-008	1785916.478	268193.465
7	4133	4133	4133-009	1785912.19	268178.354
7	4133	4133	4133-010	1785943.618	268219.528
7	4133	4133	4133-011	1785937.268	268158.208
7	4133	4133	4133-012	1785964.625	268147.59
7	4133	4133	4133-013	1785921.553	268205.169
7	4133	4133	4133-014	1785907.029	268192.953

Building Feature Documentation Log
Feature Number: 4133-001
Santa Susana Field Laboratory, Ventura County, California

Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Sink: Bathroom**
Operational Use / Process: **Sanitary waste conveyance**
Associated Chemicals: **None**
Discharge: **Yes**
Size: **Area (LxWxH in inches): 18 x 22 x 6**
Construction Material: **Porcelain**
Status: **Closed/Inactive**



Feature Condition:

General Condition: **Intact**
Debris: **No**
Staining: **Yes (rust only)**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Unlikely**

Additional Information:

Proximity to Nearest Chemical Use Area:
Inside Building 4133, chemical use area 1
Likelihood of Impact from Other Source:
Potential
Comments: **Sink connects to sanitary sewer system.**
GPS Coordinates:

Sampling Information:

Sampling Warranted?: **Yes, inspect and sample, if warranted**
Sampling Description/Notes: **Sample if staining/impact is detected**
Sampling Type: **Soil**
Sample ID Number(s):
Analyses: **VOCs, SVOCs, metals, TPH, pH**

Building Feature Documentation Log
Feature Number: 4133-002
Santa Susana Field Laboratory, Ventura County, California

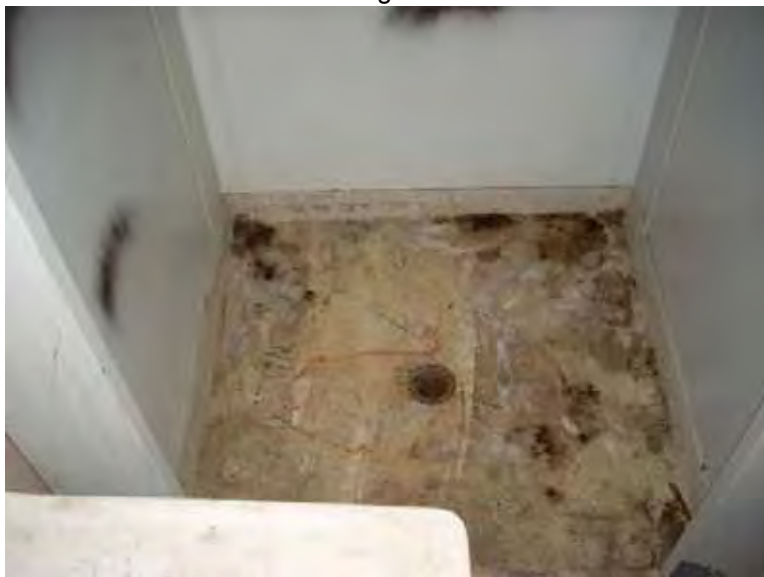
Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Floor Drain**
Operational Use / Process: **Sanitary waste conveyance**
Associated Chemicals: **None**
Discharge: **Yes**
Size: **Pipe Diameter (inches): 2**
Construction Material: **Metal**
Status: **Closed/Inactive**

Photo 1-Looking Down and East



Feature Condition:

General Condition: **Intact**
Debris: **No**
Staining: **Yes (rust and dirt)**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Unlikely**

Additional Information:

Proximity to Nearest Chemical Use Area:
Inside Building 4133, chemical use area 1
Likelihood of Impact from Other Source:
Potential
Comments: **Drain connects to sanitary sewer system.**
GPS Coordinates:

Sampling Information:

Sampling Warranted?: **Yes, inspect and sample, if warranted**
Sampling Description/Notes: **Sample if staining/impact is detected**
Sampling Type: **N/A**
Sample ID Number(s):
Analyses: **VOCs, SVOCs, metals, TPH, pH**

Building Feature Documentation Log
Feature Number: 4133-003
Santa Susana Field Laboratory, Ventura County, California

Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Cracked Concrete**
Operational Use / Process: **The area was used to burn sodium metal and sodium-potassium alloy**
Associated Chemicals: **Metals (Na and NaK), Bases (sodium and potassium hydroxides)**
Discharge: **No**
Size: **Length (inches): 50**
Construction Material: **Concrete**
Status: **Closed/Inactive**



Feature Condition:

General Condition: **Compromised, cracked**
Debris: **No**
Staining: **No**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Potential impact from use of area as a sodium burn facility**

Additional Information:

Proximity to Nearest Chemical Use Area: **Inside Building 4133, chemical use area 1**
Likelihood of Impact from Other Source: **Likely**
Comments:
GPS Coordinates:

Sampling Information:

Sampling Warranted?: **Yes, inspect soil beneath concrete and sample, if warranted**
Sampling Description/Notes: **Sample if staining/impact is detected**
Sampling Type: **Soil**
Sample ID Number(s):

Building Feature Documentation Log
Feature Number: 4133-003
Santa Susana Field Laboratory, Ventura County, California

Analyses: VOCs, SVOCs, metals, TPH, pH

Building Feature Documentation Log
Feature Number: 4133-004
Santa Susana Field Laboratory, Ventura County, California

Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Sump**
Operational Use / Process: **Waste collection**
Associated Chemicals: **Metals (Na and NaK), Bases (sodium and potassium hydroxides)**
Discharge: **Yes**
Size: **Area (LxWxH in inches): 16 x 21 x 27**
Construction Material: **Concrete**
Status: **Closed/Inactive**

Feature Condition:

General Condition: **Intact**
Debris: **No**
Staining: **Yes (rust only)**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Likely**

Additional Information:

Proximity to Nearest Chemical Use Area:
Inside Building 4133, chemical use area 1
Likelihood of Impact from Other Source:
Potential
Comments: **Sump collects wasted generated in Treatment Room and discharges into tank T-1.**
GPS Coordinates:

Sampling Information:

Sampling Warranted?: **Yes, sample post-demolition**
Sampling Description/Notes: **Sample soil beneath concrete due to feature's known chemical use**
Sampling Type: **Soil**
Sample ID Number(s):
Analyses: **VOCs, SVOCs, metals, TPH, pH**

Photo 1-Looking Down and South



Photo 2 -Looking Northwest



Building Feature Documentation Log
Feature Number: 4133-005
Santa Susana Field Laboratory, Ventura County, California

Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Sump**
Operational Use / Process: **Waste and stormwater collection**
Associated Chemicals: **Metals, Bases (sodium and potassium hydroxides)**
Discharge: **No**
Size: **Area (LxWxD in inches)(approximate): 18 x 18 x 33**
Construction Material: **Concrete**
Status: **Closed/Inactive; however, still collects stormwater runoff**

Feature Condition:

General Condition: **Intact, water levels collected indicate no discharge from sump**
Debris: **No**
Staining: **No**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Potential**

Additional Information:

Proximity to Nearest Chemical Use Area: **Northeast of 4133, in chemical use area 3**
Likelihood of Impact from Other Source: **Potential impact due to documented spills in area**
Comments: **This sump is a collection point and does not discharge to another location. On 05/27/09 a water level of 21.5 inches was recorded. On 06/02/09 a water level of 21.5 inches was recorded, indicating no discharge from the sump.**
GPS Coordinates:

Sampling Information:

Photo 1-Looking North



Photo 2 -Looking North



Building Feature Documentation Log
Feature Number: 4133-005
Santa Susana Field Laboratory, Ventura County, California

Sampling Warranted?: Yes, sample
post-demolition

Sampling Description/Notes: Sample soil at
sump due to known spills in the area

Sampling Type: Soil

Sample ID Number(s):

Analyses: VOCs, SVOCs, metals, TPH, pH

Building Feature Documentation Log
Feature Number: 4133-006
Santa Susana Field Laboratory, Ventura County, California

Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Sump**
Operational Use / Process: **Waste and stormwater collection**
Associated Chemicals: **Metals, Bases (sodium and potassium hydroxides)**
Discharge: **No**
Size: **Area (LxWxD in inches)(approximate): 18 x 18 x 33**
Construction Material: **Concrete**
Status: **Closed/Inactive; however, still collects stormwater runoff**

Feature Condition:

General Condition: **Intact, water levels collected indicate no discharge from sump**
Debris: **No**
Staining: **No**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Potential**

Additional Information:

Proximity to Nearest Chemical Use Area: **Northwest of 4133, in chemical use area 3**
Likelihood of Impact from Other Source: **Potential impact due to documented spills in area**
Comments: **This sump is a collection point and does not discharge to another location. On 05/27/09 a water level of 18.5 inches was recorded. On 06/02/09 a water level of 18.5 inches was recorded, indicating no discharge from the sump.**
GPS Coordinates:

Sampling Information:

Photo 1-Looking North



Photo 2 -Looking North



Building Feature Documentation Log
Feature Number: 4133-006
Santa Susana Field Laboratory, Ventura County, California

Sampling Warranted?: Yes, sample
pre-demolition

Sampling Description/Notes: One sample
was collected adjacent to the northwest
sump

Sampling Type: Soil

Sample ID Number(s): HFBS0011

Analyses: VOCs, SVOCs, metals, TPH, pH

Building Feature Documentation Log
Feature Number: 4133-007
Santa Susana Field Laboratory, Ventura County, California

Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Underground Storage Tank**
Operational Use / Process: **Sodium hydroxide and potassium hydroxide storage**
Associated Chemicals: **Bases (sodium and potassium hydroxides)**
Discharge: **Yes**
Size: **Volume (gallons): 1,318**
Construction Material: **Metal**
Status: **Closed/Inactive**

Feature Condition:

General Condition: **Intact**
Debris: **No**
Staining: **No**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Likely due to documented spills**

Additional Information:

Proximity to Nearest Chemical Use Area: **Tank T-1, chemical use area 2a**
Likelihood of Impact from Other Source: **Potential impact due to documented spills in area**
Comments: **This tank collects discharge from the Treatment Room and the Air Scrubber.**
GPS Coordinates:

Sampling Information:

Sampling Warranted?: **Yes, sample post-demolition**
Sampling Description/Notes: **Sample soil beneath concrete due to feature's known chemical use and documented spills**
Sampling Type: **Soil**

Photo 1-Looking East



Photo 2 -Looking South



Building Feature Documentation Log
Feature Number: 4133-007
Santa Susana Field Laboratory, Ventura County, California

Sample ID Number(s):

Analyses: metals, pH

Building Feature Documentation Log
Feature Number: 4133-008
Santa Susana Field Laboratory, Ventura County, California

Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Air Scrubber**
Operational Use / Process: **Removal of sodium and potassium oxides from air**
Associated Chemicals: **Metals (sodium and potassium compounds), Bases (sodium and potassium hydroxides)**
Discharge: **Yes**
Size: **Various scrubber and pipe sizes**
Construction Material: **Metal**
Status: **Closed/Inactive**

Feature Condition:

General Condition: **Intact**
Debris: **No**
Staining: **No**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Likely due to documented spills**

Additional Information:

Proximity to Nearest Chemical Use Area: **On the concrete pad outside the Treatment Room, chemical use area 1**
Likelihood of Impact from Other Source: **Potential impact due to documented spills in area**
Comments: **Discharges waste into tank T-1**
GPS Coordinates:

Sampling Information:

Sampling Warranted?: **Yes, sample post-demolition**
Sampling Description/Notes: **Sample soil beneath concrete due to feature's known chemical use and documented spills**
Sampling Type: **Soil**
Sample ID Number(s):

Photo 1-Looking East and Up



Photo 2 -Looking East and Down



Building Feature Documentation Log
Feature Number: 4133-008
Santa Susana Field Laboratory, Ventura County, California

Analyses: VOCs, metals, TPH, pH

Photo 3 -Looking Down



Building Feature Documentation Log
Feature Number: 4133-009
Santa Susana Field Laboratory, Ventura County, California

Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Removed tank (AST) feature outline**
Operational Use / Process: **Storage of sodium-potassium alloy**
Associated Chemicals: **Metals (NaK)**
Discharge: **No**
Size: **Removed Tank Volume (gallons): 300**
Construction Material: **Asphalt**
Status: **Removed**

Feature Condition:

General Condition: **Compromised, cracked**
Debris: **No**
Staining: **Yes (rust only)**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Potential**

Additional Information:

Proximity to Nearest Chemical Use Area:
Tank T-2, chemical use area 2b
Likelihood of Impact from Other Source:
Likely impact due to documented spills in area, compromised asphalt, and elevated sodium levels in soil sampling
Comments: **Tank was used for short term NaK storage and as a NaK feeder system into the Treatment Room**
GPS Coordinates:

Sampling Information:

Sampling Warranted?: **Yes, sample pre-demolition**
Sampling Description/Notes: **One sample was collected at the former location of tank T-2**
Sampling Type: **Soil**
Sample ID Number(s): **HFBS0022**

Photo 1-Looking East



Photo 2 -Looking East



Building Feature Documentation Log
Feature Number: 4133-009
Santa Susana Field Laboratory, Ventura County, California

Analyses: VOCs, metals, TPH, pH, fluoride

Building Feature Documentation Log
Feature Number: 4133-010
Santa Susana Field Laboratory, Ventura County, California

Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Aboveground Storage Tank**
Operational Use / Process: **Sodium hydroxide and potassium hydroxide storage**
Associated Chemicals: **Bases (sodium and potassium hydroxides)**
Discharge: **No**
Size: **Volume (gallons): 5,190**
Construction Material: **HDPE (polyethylene tank)**
Status: **Closed/Inactive**

Feature Condition:

General Condition: **Compromised, hole was cut into tank after use period**
Debris: **No**
Staining: **No**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Potential**

Additional Information:

Proximity to Nearest Chemical Use Area: **Tank T-3, chemical use area 2c**
Likelihood of Impact from Other Source: **Potential impact due to documented spills in area**
Comments: **Tank was used to store waste pumped out of tank T-1**
GPS Coordinates:

Sampling Information:

Sampling Warranted?: **Yes, inspect and sample, if warranted**
Sampling Description/Notes: **Sample if staining/impact is detected**
Sampling Type: **Soil**
Sample ID Number(s):

Photo 1-Looking East



Photo 2 -Looking North



Building Feature Documentation Log
Feature Number: 4133-010
Santa Susana Field Laboratory, Ventura County, California

Analyses: metals, pH

Building Feature Documentation Log
Feature Number: 4133-011
Santa Susana Field Laboratory, Ventura County, California

Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Cracked Concrete**
Operational Use / Process: **Area was used to reduce the size of contaminated equipment**
Associated Chemicals: **Metals, Kerosene**
Discharge: **No**
Size: **Area (LxW inches): 220 x 110**
Construction Material: **Concrete**
Status: **Closed/Inactive**

Feature Condition:

General Condition: **Compromised, cracked**
Debris: **No**
Staining: **No**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Potential impact due to use of kerosene to cut sodium contaminated metal equipment**

Additional Information:

Proximity to Nearest Chemical Use Area: **In Size Reduction Area, chemical use area 1**
Likelihood of Impact from Other Source: **Potential impact due to documented spills in area**
Comments:
GPS Coordinates:

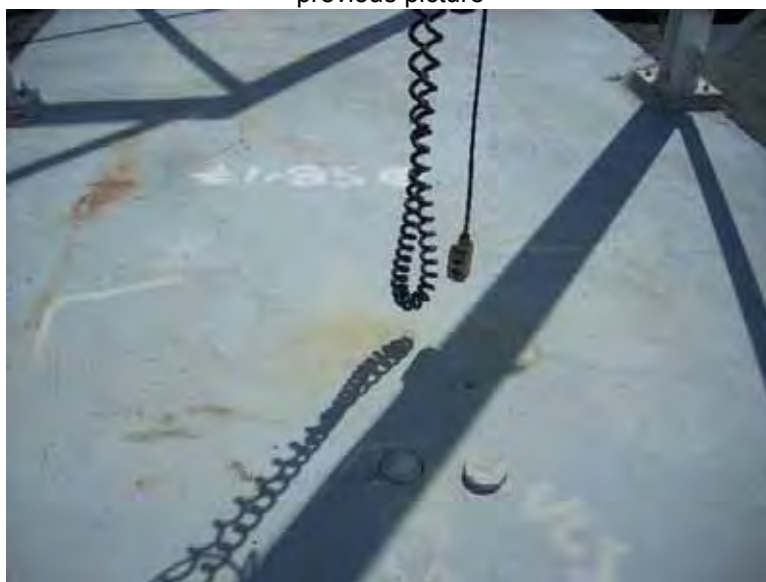
Sampling Information:

Sampling Warranted?: **Yes, sample pre-demolition**
Sampling Description/Notes: **HFBS0025 is approx. 10 feet to the north of HFBS0027**
Sampling Type: **Soil**
Sample ID Number(s): **HFBS0025 and HFBS0027**
Analyses: **metals, TPH, pH**

Photo 1-Looking South



Photo 2 -Looking South, from approx. 8 feet to the south of the previous picture



Building Feature Documentation Log
Feature Number: 4133-011
Santa Susana Field Laboratory, Ventura County, California

Photo 3 -Looking South



Building Feature Documentation Log
Feature Number: 4133-012
Santa Susana Field Laboratory, Ventura County, California

Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Storage Area**
Operational Use / Process: **Drum and equipment storage**
Associated Chemicals: **Unknown, drums currently empty**
Discharge: **No**
Size: **Area (LxW inches): 166 x 144**
Construction Material: **Asphalt**
Status: **Active**

Feature Condition:

General Condition: **Intact**
Debris: **No**
Staining: **No**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Potential**

Additional Information:

Proximity to Nearest Chemical Use Area: **In the southeast portion of chemical use area 3**
Likelihood of Impact from Other Source: **Potential impact due to documented spills in area**
Comments:
GPS Coordinates:

Sampling Information:

Sampling Warranted?: **Yes, inspect and sample, if warranted**
Sampling Description/Notes: **Sample if staining/impact is detected**
Sampling Type: **Soil**
Sample ID Number(s):
Analyses: **VOCs, SVOCs, metals, TPH, pH**

Photo 1-Looking South



Photo 2 -Looking East



Building Feature Documentation Log
Feature Number: 4133-013
Santa Susana Field Laboratory, Ventura County, California

Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Trench**
Operational Use / Process: **Secondary containment for Treatment Room drain pipe**
Associated Chemicals: **Bases (sodium and potassium hydroxides)**
Discharge: **No**
Size: **Other: 20 inches wide and 30 inches deep**
Construction Material: **Concrete**
Status: **Closed/Inactive**

Feature Condition:

General Condition: **Intact, plates removed and trenches were inspected**
Debris: **No**
Staining: **No**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Potential**

Additional Information:

Proximity to Nearest Chemical Use Area: **Northwest corner of chemical use area 1**
Likelihood of Impact from Other Source: **Potential impact due to documented spills in area**
Comments:
GPS Coordinates:

Sampling Information:

Sampling Warranted?: **Yes, inspect and sample, if warranted**
Sampling Description/Notes: **Sample if staining/impact is detected**
Sampling Type: **Soil**
Sample ID Number(s):
Analyses: **metals, pH**

Photo 1-Looking South



Photo 2 -Looking West



Building Feature Documentation Log
Feature Number: 4133-014
Santa Susana Field Laboratory, Ventura County, California

Feature Location:

RFI Site: **B4133** RFI Reporting Group: **7**
Building Number: **4133**
Building Owner: **DOE**
Building Name: **Sodium Burn Facility**
Building Use: **Alkali metal treatment and storage facility. Previously labeled Building 4724 Contaminated Sodium Facility.**

Feature Description:

Feature Type: **Trench**
Operational Use / Process: **Secondary containment for air scrubber drain pipe**
Associated Chemicals: **Bases (sodium and potassium hydroxides)**
Discharge: **No**
Size: **Other: 14 inches wide and 12 inches deep**
Construction Material: **Concrete**
Status: **Closed/Inactive**

Feature Condition:

General Condition: **Intact, plates were removed and trenches were inspected**
Debris: **No**
Staining: **No**
Odor: **No**
PID Reading: **N/A**
Likelihood of Impact from Feature: **Potential**

Additional Information:

Proximity to Nearest Chemical Use Area: **Northwest corner of chemical use area 1**
Likelihood of Impact from Other Source: **Potential impact due to documented spills in area**
Comments:
GPS Coordinates:

Sampling Information:

Sampling Warranted?: **Yes, inspect and sample, if warranted**
Sampling Description/Notes: **Sample if staining/impact is detected**
Sampling Type: **Soil**
Sample ID Number(s):
Analyses: **metals, pH**

Photo 1-Looking East



Photo 2 -Looking North

