

**GROUP 8 – WESTERN PORTION OF AREA IV
RCRA FACILITY INVESTIGATION REPORT
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA**

VOLUME III – RFI SITE REPORTS

APPENDIX D

FORMER SODIUM DISPOSAL FACILITY (SWMU 7.3)

Prepared For:

THE BOEING COMPANY

AND

THE UNITED STATES DEPARTMENT OF ENERGY

Prepared By:

**MWH
618 Michillinda Ave, Suite 200
Arcadia, CA 91007**

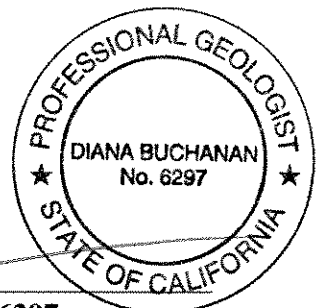
September 2007



**Wonnie Kim
Site Manager**



**Diana L. Buchanan P.G. 6297
Project Manager**



APPENDIX D TABLE OF CONTENTS

<u>Section No.</u>	<u>Page No.</u>
D.1 INTRODUCTION.....	1-1
D.1.1 Report Organization.....	1-2
D.1.2 Historical Reference Documents	1-3
D.2 SITE HISTORY, CHEMICAL USE AND CURRENT CONDITIONS.....	2-1
D.2.1 SWMUs and AOCs the FSDF RFI Site.....	2-2
D.2.2 FSDF RFI Site History	2-2
D.2.3 FSDF RFI Site Chemical Use Areas.....	2-8
D.2.4 Site Conditions.....	2-9
D.3 NATURE AND EXTENT OF CHEMICAL IMPACTS	3-1
D.3.1 Sampling Objectives	3-1
D.3.2 Sampling Scope	3-2
D.3.3 Key Decision Points.....	3-4
D.3.4 Soil Matrix and Soil Vapor Findings.....	3-5
D.3.5 Groundwater Findings	3-12
D.3.6 Surface Water Findings.....	3-14
D.4 RISK ASSESSMENT FINDINGS SUMMARY	4-1
D.4.1 Key Decision Points.....	4-1
D.4.2 Human Heath Risk Assessment Findings	4-2
D.4.3 Ecological Risk Assessment Findings	4-3
D.5 FSDF RFI SITE ACTION RECOMMENDATIONS.....	5-1
D.5.1 RFI Reporting Requirements	5-1
D.5.2 Basis for Site Action Recommendations	5-2
D.5.3 FSDF RFI Site Recommendations.....	5-4
D.6 REFERENCES.....	6-1

LIST OF TABLES

Table No.

D.2-1	FSDF RFI Site Building Inventory
D.2-2	FSDF RFI Site Tank Inventory
D.2-3	FSDF RFI Site Transformer Inventory
D.2-4	FSDF RFI Site Documented Chemical Use
D.3-1A	FSDF RFI Site Sampling Summary
D.3-1B	FSDF RFI Site Soil Vapor Sampling and Analytical Summary
D.3-1C	FSDF RFI Site Soil Matrix Sampling and Analytical Summary
D.3-1D	FSDF RFI Site Surface Water Sampling and Analytical Summary
D.3-2A	Description of Chemical Use Areas and Soil Sampling Results Summary
D.3-2B	FSDF RFI Site Summary and Evaluation of Groundwater Sampling Results
D.3-2C	FSDF RFI Site Surface Water Data Summary
D.3-2D	FSDF RFI Site Removed Soil Maximum Concentrations
D.3-3A	FSDF RFI Site Analytical Data Screening Summary and Data Quality (Soil)
D.3-3B	FSDF RFI Site Analytical Data Screening Summary and Data Quality (Soil Vapor)
D.3-3C	FSDF RFI Site Analytical Data Screening Summary and Data Quality (Surface Water)
D.4-1	Chemicals of Potential Concern for Human Health
D.4-2	Human Health Risk Estimates
D.4-3	Human Health Risk Assessment Uncertainty Analysis
D.4-4	Summary of Chemicals of Potential Ecological Concern
D.4-5	Risk Estimates for Ecological Receptors
D.4-6	Ecological Risk Assessment Uncertainty Analysis
D.5-1	FSDF RFI Site Surficial Media Site Action Recommendations
D.5-2	Summary of FSDF RFI Site CMS Area Recommendations

LIST OF FIGURES

Figure No.

D.1-1	FSDF RFI Site Location Map
D.2-1	FSDF RFI Site Chemical Use Areas
D.2-2A,B,C	FSDF RFI Site Sample Locations
D.2-2D	FSDF RFI Site Cross Section Locations
D.2-3A,B	Surficial Cross Sections
D.2-4	FSDF RFI Site Soil Disturbance Areas
D.3-1	FSDF RFI Site VOC Chemical Data Results
D.3-2	FSDF RFI Site SVOC / TPH Chemical Data Results
D.3-3A,B	FSDF RFI Site PCB / Dioxin Chemical Data Results
D.3-4A,B	FSDF RFI Site Metals / Perchlorate / pH Chemical Data Results
D.3-5A,B	FSDF Channel All Chemicals Results
D.4-1	Human Health Risk Assessment Conceptual Site Model
D.4-2	Ecological Risk Assessment Conceptual Site Model
D.5-1	FSDF RFI Site Surficial Media Site Action Recommendations

** FSDF RFI Site figures typically split into northern (“A”) and southern (“B”) sections; an additional figure is included to display sampling locations for clarity.*

LIST OF ATTACHMENTS

Attachment No.

D-1	Regulatory Agency Correspondence (Electronic Copy)
D-2	Subsurface Information (Electronic Copy)
D-3	Data Quality, Validation and Laboratory Reports (Electronic Copy)
D-4	Topographic Changes resulting from the Interim Measure (Electronic Copy)
D-5	Additional FSDF 2000 IM Bedrock Sample Results (Electronic Copy)

LIST OF ACRONYMS AND ABBREVIATIONS

AI	Atomics International
AOC	Area of Concern
AMEC	AMEC Earth and Environmental
AST	aboveground storage tank
BBI	Brandeis-Bardin Institute
Boeing	The Boeing Company
bgs	below ground surface
B009 LF	Building 009 Leach Field
B056	Building 056
B100	Building 100
B886	Building 886
BMP	best management practice
BTEX	benzene, toluene, ethylbenzene and xylenes
CAC	Channel A Confirmation
CBC	Channel B Confirmation
CCC	Channel C Confirmation
CCR	Current Conditions Report
CF	Chatsworth formation
CFOU	Chatsworth Formation Operable Unit
CMS	Corrective Measures Study
COPC	chemical of potential concern
CPEC	chemical of potential ecological concern
DCA	dichloroethane
DCE	dichloroethene
DHS	Department of Health Services
Dioxins/Furans	(a) - <i>see table below</i>
DOE	United States Department of Energy
DQO	Data Quality Objective
DTSC	Department of Toxic Substances Control
ECL	Environmental Chemistry Laboratory
EIR	Environmental Impact Report
EPC	exposure point concentration
EM	electromagnetic
ERA	ecological risk assessment
ESADA	Empire State Atomic Development Authority
ETEC	Energy Technology and Engineering Center
FSDF	Former Sodium Disposal Facility
FLUTe	Flexible Liner Underground Technology

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

GRC	Groundwater Resource Consultants, Inc.
GWCC	groundwater comparison concentration
HAR	Hydrogeologic Assessment Report
HI	hazard index
HRA	human health risk assessment
HQ	hazard quotient
HSA	Historical Site Assessment
H&A	Haley and Aldrich
ICF	ICF Kaiser Engineers
ILCR	incremental lifetime cancer risk
IM	Interim Measures
IMWP	Interim Measures Work Plan
IT	IT Corporation
LLID	large leak injector device
LLRW	low level radioactive waste
LMEC	Liquid Metal Engineering Center
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
msl	mean sea level
MWH	Montgomery Watson Harza
NAA	North American Aviation
NaK	sodium potassium
ND	not detected
NFA	no further action
NPDES	National Pollutant Discharge Elimination System
NRC	United States Nuclear Regulatory Commission
NSGW	near-surface groundwater
Ogden	Ogden Environmental and Energy Services Company, Inc.
OMR	Organic Moderated Reactor
ORISE	Oak Ridge Institute of Science and Education
OU	operable unit
PAH	polynuclear aromatic hydrocarbon
PC	Perimeter Confirmation
PCS	Perimeter Confirmation South
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
pg/g	picograms per gram
QA	quality assurance

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

RBSL	risk-based screening level
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
Rocketdyne	Rocketdyne Propulsion and Power
RWQCB	Los Angeles Regional Water Quality Control Board
SAIC	Science Applications International Corporation
SRAM	Standardized Risk Assessment Methodology
SSFL	Santa Susana Field Laboratory
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TCDD TEQ	2,3,7,8-tetrachlorodibenzodioxin toxic equivalency
TDS	total dissolved solids
TEQ	toxicity equivalency quotient
TIC	tentatively identified compound
TOC	top of casing
TCE	trichloroethene
TPCA	Toxic Pits Cleanup Act
TPH	total petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
µg/dl	micrograms per deciliter
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
UW	University of Waterloo
VOC	volatile organic compound
WPA	RFI Work Plan Addendum
WPAA	RFI Work Plan Addendum Amendments

(a) Definition of dioxin/furan congeners

PCDD/PCDDs	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

(a) Definition of dioxin/furan congeners

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 Equivalency Quotient (normalized to 2,3,7,8 TCDD)

D.1 INTRODUCTION

This appendix to the Group 8 Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report presents findings and recommendations based on the results of the investigation conducted at the Former Sodium Disposal Facility (FSDF) RFI Site of the Santa Susana Field Laboratory (SSFL). The FSDF RFI Site is comprised of one Solid Waste Management Unit (SWMU), SWMU 7.3. 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 FSDF RFI Site is one of four RFI sites included in the Group 8 RFI Report. The location of the FSDF RFI Site within the SSFL and Group 8 Reporting Area is shown on Figure D.1-1. An RFI site is an area that includes at least one SWMU, and/or an AOC and some adjacent land for the purpose of characterization. The other three Group 8 RFI sites are the Building 056 Landfill (B056 Landfill) (SWMU 7.1), the Empire State Atomic Development Authority (ESADA) (SWMU 7.9), and the Building 009 Leach Field (B009 LF) (an Area IV AOC). The FSDF RFI Site is located in the central portion of the Group 8 Reporting Area, north of the ESADA RFI Site, west of the B009 LF RFI Site, and southwest of the B056 Landfill RFI Site (Figure D.1-1).

The FSDF RFI Site, located within Area IV of the SSFL, was operated by the Energy Technology and Engineering Center (ETEC) of Rockwell International (now The Boeing Company), on behalf of the United States Department of Energy (DOE). Prior to 1978, ETEC was formerly known as the Liquid Metal Engineering Center (LMEC).

The SSFL RFI was conducted to (1) characterize the presence of SSFL-operation-related chemicals in environmental media; (2) estimate risks to human health and the environment (i.e., the ecosystem); (3) gather data for the next phase of RCRA Corrective Action and the Corrective Measures Study (CMS); and, (4) 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 FSDF RFI Site characterization presented in this appendix comprises data for both the Surficial OU and the 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 (CF). The CFOU includes Chatsworth formation bedrock and deeper groundwater that occurs within the unweathered bedrock of the Chatsworth formation.

D.1.1 Report Organization

This FSDF RFI Site Report provides detailed sampling data and evaluation pertaining to the FSDF RFI Site, including the relevant information needed to evaluate the completeness of characterization, risk assessment results, and site recommendations. This information is presented in sections organized as follows:

- **Section D.2 – Site History, Chemical Use, and Current Conditions.** Presents the site history and chemical use, and the current conditions including geology and groundwater conditions. Changes in site conditions and soil disturbance areas are also described.
- **Section D.3 – Nature and Extent of Chemical Impacts.** Presents a summary of Surficial OU, NSGW, and CFOU characterization information for the FSDF RFI Site.
- **Section D.4 – Risk Assessment Findings Summary.** Presents a summary of the human health risk assessment (HRA) and ecological risk assessment (ERA) results; complete FSDF RFI Risk Assessment included as Attachment F4 of Appendix F.
- **Section D.5 – Site Actions Recommendations.** Presents a summary of FSDF areas recommended for either (1) no further action (NFA), or (2) further evaluation in the CMS. CMS Areas recommended for stabilization measures to prevent contaminant migration are also identified, if any.
- **Section D.6 – References.** Includes a summary of cited references.

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

- **Attachment D-1:** Site-specific regulatory agency documents and correspondence.
- **Attachment D-2:** Subsurface information (soil boring, trench, piezometer, and well logs).
- **Attachment D-3:** Data quality, validation and laboratory reports.

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

- **Figure D.1-1:** Presents the location of the FSDF RFI Site within the SSFL and the Group 8 Reporting Area.

- Figure D.2-1: Presents a plan view of the FSDF RFI Site, showing known and potential chemical use areas. Tables D.2-1 through D.2-4 present summaries of buildings, tanks, transformers, and chemicals used at the FSDF RFI Site.
- Figure D.2-2: Presents a plan view of the FSDF RFI Site, showing soil and vapor sampling locations, and nearby monitoring wells.
- Figure D.2-3A through D.2-3B: Present geologic cross-sections across the FSDF RFI Site.
- Figures D.3-1 through D.3-5B: Present characterization details for all soil and vapor sampling at the FSDF RFI Site. Soil and vapor sampling results are shown on the maps and correlate with appropriate sections of Table D.3-2A.
- Table D.3-2B through D.3-2D: Presents summaries of groundwater characterization, surface water results, and data from soils removed from the site during cleanup actions.

Information regarding Group 8 area-wide conditions, transport and fate of chemicals between RFI sites, and other evaluations of area-wide issues are contained in the Group 8 RFI Report and appendices. Pertinent appendices to this Group 8 RFI Report are:

- **Appendix E:** Presents information regarding groundwater conditions in the Group 8 Reporting Area, including the FSDF 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 F:** Presents risk assessment information, including risk calculations, result tables, all transport and fate modeling (except groundwater), and a description of any methodology variances from the Standardized Risk Assessment Methodology (SRAM) Work Plan.

D.1.2 Historical Reference Documents

Historical documents for the Group 8 Reporting Area are being submitted to DTSC along with this report (Boeing, 2007c). These documents represent a compilation of information from multiple sources that were searched in an attempt to find SSFL documents relevant to the Group 8 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 8 Reporting Area. Documents pertaining to the entire SSFL are also included if they have relevant information also specific to Group 8. These documents were reviewed to (1) determine 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 FSDF 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 D.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 report is 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). This report contains:
 - 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). This report contains:
 - 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.
 - Description of SWMUs and AOCs, including 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], RFI Work Plan Addendum Amendments (WPAA); Ogden 2000a and b]. These reports contain:
 - 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). This report contains:
 - 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). This report contains:
 - 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, 2003b). This report contain:
 - Nature and extent of near-surface groundwater 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, 2000a; MWH, 2002 and 2003a). These reports contain:
 - 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], 2006a).
 - First Quarter 2006 Groundwater Monitoring Report (H&A, 2006b).
 - Second Quarter 2006 Groundwater Monitoring Report (H&A, 2006c).
 - Third Quarter 2006 Groundwater Monitoring Report (H&A, 2006d).

- Historical Site Assessment (HSA; 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.

D.2 SITE HISTORY, CHEMICAL USE AND CURRENT CONDITIONS

The FSDF RFI Site is approximately 4.3 acres and is located in the western portion of Area IV at the SSFL. The site location within the SSFL is shown on Figure D.1-1, which also shows the Group 8 Reporting Area boundary. The site layout and the locations of identified and potential chemical use areas are shown on Figure D.2-1. The sampling locations and the locations of surficial cross-sections across the site are shown on Figures D.2-2A through D.2-2D.

During the RFA, various SMWUs and AOCs within the SSFL were identified. The Building 886 FSDF was identified as SWMU 7.3 in the RFA (SAIC, 1991 and 1994). No other SWMUs or AOCs were identified in the RFA within the boundary of the FSDF RFI Site as it is defined in this report (Figure D.2-1).

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 FSDF RFI Site. As provided in the documents submitted in conjunction with this report (Boeing, 2007c), thousands of records (some dating back to 1957) were reviewed to identify areas of potential environmental concern at the Group 8 RFI sites or elsewhere within the Group 8 Reporting Area. As described in Section 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 FSDF RFI Site boundary was defined to include operations associated with the SWMU identified above, but also nearby facilities or features that warranted assessment in the RFI. These include the former investigation area near the southern RFI site boundary, the potential debris area in the southwestern portion of the RFI site, and the FSDF Pistol Range in the northern portion of the RFI site. Known and potential chemical use areas at the FSDF RFI Site are shown on Figure D.2-1.

The following sections describe SWMU, site history and operations, chemical uses, and current conditions at the FSDF RFI Site.

D.2.1 SWMUs and AOCs the FSDF RFI Site

The FSDF was used to clean metallic sodium and sodium/potassium mixtures (NaK) from equipment and for waste disposal. The FSDF RFI Site contains a single SWMU (SAIC, 1994). A brief description of the SWMU that is included in this RFI Site Report is presented below.

Building 886 FSDF (SWMU 7.3)

The FSDF site was primarily used during the 1960s and 1970s to clean residual metallic sodium and NaK from testing equipment such as pumps, valves, pipe elbows, etc. by an exothermic reaction with water (ICF, 1997). Components were either steam cleaned with a steam lance, or placed in water in the former Upper or Lower Ponds, which were low-lying areas surrounded by earthen berms.

Combustible materials used as heat transfer agents, including kerosene, organic solvents, biphenyls, and terphenyls, were also disposed in the former FSDF ponds (GRC, 1990). The combustible materials were generated in the Liquid Metals Research program operations (Rockwell, 1987). In addition, the Upper and Lower Ponds were used for the burning of non-radioactive waste organic liquids (ICF, 1997). West of the ponds, the Western Debris Area was used to store components and barrels (Ebasco, 1991).

D.2.2 FSDF RFI Site History

A summary of the site chronology, including descriptions of site operations and investigation activities for the FSDF RFI Site, is presented below. Facility correspondence, investigation reports, waste disposal records, facility maps, drawings, photographs, and personnel interview records were reviewed and evaluated to compile the site history information presented below (Boeing, 2007c). Primary sources of information include the following:

- Hydrogeologic Assessment Report (HAR), Lower Pond, Building 866 (B886) FSDF (GRC, 1990)
- RFA (SAIC, 1991 and 1994)
- FSDF Closure Plan (Ebasco, 1991)
- CCR (ICF, 1993)
- RFI WPA (Ogden, 1996)

- FSDF Characterization Report (ICF, 1997)
- FSDF Interim Measure (IM) Work Plan (IT, 1999)
- Draft Docket for the Release of Building 4886 as part of the Energy Technology Engineering Center Closure (DOE, 1999)
- FSDF IM Implementation Report (IT, 2002)
- Aerial Photographic Analysis (USEPA, 1997)
- Area IV HSA (Sapere, 2005)

Site Chronology

1950s – 1970s	The FSDF Pistol Range was used by Rocketdyne security personnel for pistol target practice and training. The area consisted of an asphalt pad, a target area, consisting of four or five covered shooting stations on a concrete pad, and a downfield berm situated against a rock outcrop approximately 90 feet to the northwest (Sapere, 2005).
Early 1960s-1976	The FSDF site was used to clean metallic sodium and NaK from testing components such as pumps, valves, etc. The area was used to treat sodium and NaK by an exothermic reaction with water. Combustible materials used as heat transfer agents, including kerosene, organic solvents, biphenyls, and terphenyls, were also disposed of in the former ponds (GRC, 1990). The FSDF included a rectangular, concrete-lined pool filled with water, two water-filled unlined ponds (the Upper and Lower Ponds), a small building (Building 886), and a steam lance. A kerosene-powered boiler was used to generate steam for the steam lance (MWH, 2006c). Components were cleaned by being placed on a concrete slab, opened to expose the sodium or NaK, and then washed with water (SAIC, 1994). The washed items were often placed into the water-filled ponds, where they remained until any residual sodium and/or NaK had reacted. The items were then retrieved and disposed of offsite. Some components containing small amounts of radioactive material were inadvertently buried in trenches and scattered on the surface, although the facility was not intended for handling these materials (ICF, 1993).

1968	Aerial photographs (Boeing, 2007c) indicate that there was a large fire in Area IV. Although the FSDF RFI Site area was not burned, the FSDF channels were within the burned areas.
1976 - mid 1980s	The FSDF site became inactive in 1976 (ICF, 1993). Residual debris was cleared and disposed of as scrap metal, and all equipment/containers (referred to as tanks in the RFA) were removed and transferred to either Building 029 for secured storage or to the new Sodium Burn Facility at Building 133 (SWMU, 7.2) (SAIC, 1994). The FSDF access gate was locked, and only documented items were admitted although reportedly unlabeled materials were left at the gate for disposal (SAIC, 1994; Ebasco, 1991). The pool and ponds were drained and surveyed for radioactivity. Radioactive contamination was found in the Lower Pond, concrete pool walls, and in other localized areas. To decontaminate these areas small pieces of debris (e.g., pipes, machined metal parts, and tubes) were excavated and properly disposed offsite as low-level radioactive waste (Ebasco, 1991).
1979	Aerial photographs indicate that drums and other debris were placed in the drainage west of FSDF (Boeing, 2007c).
1980	Radiation surveys identified cesium-137 and strontium-90 in the Lower Pond area (IT, 1999), and approximately 20 cubic yards of soil were removed (ICF, 1993) and properly disposed offsite as low-level radioactive waste.
1987	As part of a Phase II Site Characterization Study (Rockwell, 1987), 23 trenches were excavated, and soil samples were collected from trenches in the Lower Pond and Western areas. Air in the trenches was monitored using a Miran 1B detector, and five targeted chemicals in one trench on the eastern side of the Lower Pond were present at concentrations considered to be significant: carbon tetrachloride, ethanolamine, ammonia, tetrahydrofuran, and hydrazine (Rockwell, 1987).
1987	A radiological survey was conducted to characterize the ponds and the areas outside of the ponds. The results of this survey indicated that no migration or deposition of radioactive contaminants has occurred from the Upper and Lower Ponds to surrounding areas (Rockwell, 1988).

1990	The Los Angeles Regional Water Quality Control Board (RWQCB) ordered that Rockwell characterize the Lower Pond (RWQCB, 1990). In June 1990, the Hydrogeologic Assessment Report prepared (GRC, 1990) was issued (DOE, 2000).
1991	The RWQCB determined that the Lower Pond should be considered for cleanup under the Toxic Pit Cleanup Act (TPCA) and required a Closure Plan (RWQCB, 1991; Attachment D-1). The Closure Plan, which addressed the Lower Pond, Upper Pond, and the Western Debris Area were submitted in 1991 (DOE, 2000).
1991	A baseline radiological survey was performed in response to the RWQCB order to remove all contaminated materials from the Lower Pond. Results indicated that only localized contamination remained (Rockwell, 1992b).
1992-1993	The RWQCB and DTSC jointly approved the Lower Pond Closure Plan with modifications (RWQCB, 1992a). Soil excavation was initiated, and approximately 12,000 cubic yards were removed (ICF, 1997). In 1992, the RWQCB notified Rockwell that all Board requirements had been met for the closure of the Lower Pond (RWQCB, 1992b). The first shipment of hazardous soil waste, which only included soils that did not originate in a radioactive materials management area, were disposed offsite at a Class I Landfill operated by Chemical Waste Management in Kettleman City (DOE, 2000). Soil that contained low-level radioactive wastes (LLRW), including mixed waste and soils classified as radioactive only, were disposed at the United States Nuclear Regulatory Commission (NRC) licensed LLRW disposal site operated by Envirocare in Olive, Utah (DOE, 2000). At that time, further action at the site was halted pending determination of cleanup goals and confirmation sample collection. Oversight of the continued cleanup activities was transferred to DTSC with implementation of the Closure Plan. During this cleanup activity, contaminated pieces of zirconium metal (lathe turnings) were found in the Western Debris Area, along with remains of containers. The turnings, containers, and surrounding soil were also removed during the 1992 excavation (Rockwell 1992a). A small amount of asbestos was reportedly removed from the excavation in 1993 (Rockwell, 1993).

1992 and 1994	Multi-media sampling of FSDF drainage channels and analysis for chemicals and radionuclides was performed (McLaren/Hart, 1993 and 1995a).
1994	Upon the completion of the remediation activities, a post-remedial ambient gamma survey was performed, covering the Lower and Upper Pond areas and downgradient channels. Results of this survey show that the ambient gamma exposure rates of the FSDF are comparable to those of the surrounding land. (Rockwell, 1994).
1995	A comprehensive sampling investigation was performed at the site, including the Upper and Lower Ponds, Western Area, Drainage Channels (Channels A and B), and south of Building 886 (ICF, 1997). Additional sampling was also performed to characterize dioxin and polychlorinated biphenyls (PCBs) concentrations in sediment in offsite drainage channels (Channel D) (McLaren/Hart, 1995b).
1995	DTSC directed that additional interim measures (IM) be implemented to mitigate contamination migration (DTSC, 1995) (Attachment D-1). Tarps were placed over the excavated areas, and weirs were installed to collect channel sediment. A diversion ditch was also cut around the excavation areas to prevent surface water flow over the excavations.
1995-1996	Additional soil and rock samples were independently collected by ICF and analyzed by Oak Ridge Institute of Science and Education (ORISE). Results were below proposed acceptable limits for radioactive contamination in soil, and indicated that the area was acceptable for release for use without restriction (Rockwell, 1996).
1997-2003	An interim groundwater remediation system using ion exchange resin was installed at FSDF to treat VOC and perchlorate-impacted groundwater (H&A, 2006a). The system was shut off temporarily due to the 2000 IM activities, and pumping activities resumed in 2002. The system was shut down in 2003 to facilitate aquifer testing and support the ongoing CFOU characterization program.

1998	Department of Health Services concurred with the release of the FSDF site for unrestricted use based on a final gamma radiation survey and sampling results (Department of Health Services [DHS], 1998) (Attachment D-1).
1999	The IM Work Plan was prepared for the Upper Pond, the Western Area, and Channels A, B, and C. The work plan outlined the proposed excavation areas and provided detailed plans for excavation, backfilling, confirmation sampling, and monitoring. Cleanup goals for dioxins/furans and PCBs were developed based on a human health risk assessment using previous sampling data. The cleanup levels established were 600 micrograms per kilogram [$\mu\text{g}/\text{kg}$] for PCBs and 13.1 nanograms per kilogram [ng/kg] toxic equivalency quotient (TEQ) for dioxins (IT, 1999). DTSC approved the FSDF Interim Measures Work Plan (IMWP) in December 1999 (DTSC, 1999).
2000 - 2001	The IM Work Plan removal action was implemented, and soil within the Upper and Lower Ponds and the upper portion of Channel B was excavated to bedrock. Based on additional sampling data evaluation, in addition to dioxins and PCBs, cleanup levels were established for mercury (0.3 milligrams per kilogram [mg/kg]) and perchlorate (any detection) (IT, 2002). Soils were also removed from the Western Area and the Southern Metal Anomaly Area (see Figure D.2-4). Drainage sediments and over-bank deposits were removed from Channels A, B, and C. Removed soils were disposed offsite at a Class I Landfill operated by Safety Kleen in Buttonwillow, California in 2001 (IT, 2002). The Upper and Lower Pond excavation and upper Channel B were backfilled to depths reaching approximately 13 feet below ground surface (bgs) with clean soil from the DTSC-approved Area IV Soil Borrow Area (IT, 2002; DTSC, 2000). The backfill was compacted, and infiltration monitoring system installed, and the area re-vegetated. A total of 14,928 tons (approximately 12,000 cubic yards) of soil, debris, bedrock, and construction materials were disposed of offsite during the 2000 FSDF IM.

2000	A geophysical electromagnetic (EM) survey was conducted in the FSDF Pistol Range. Survey results indicated that metallic debris in an area approximately 15 feet by 8 feet within the FSDF Pistol Range, believed to be remnants of lead shot or from target practice activities (Attachment D-2).
2000 – 2007	Piezometers, lysimeters, and probes were installed in the backfill of the FSDF to monitor post-construction soil moisture and groundwater conditions (Shaw, 2006). Monitoring began in December 2000 and is ongoing.

Site Inventories

Inventories of buildings, tanks, transformers, and chemicals used at the FSDF RFI Site were compiled during preparation of this RFI 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 D.2-1. The inventories are included as the following tables:

- Building inventory – Table D.2-1
- Fuel and solvent storage tank inventory – Table D.2-2
- Transformer inventory – Table D.2-3
- Documented chemical use – Table D.2-4

D.2.3 FSDF RFI Site Chemical Use Areas

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

- 1a to 1d – Former Disposal Area (Former Lower and Upper Ponds, Former Western Debris Area, and Former Concrete Pool) (SWMU 7.3)
- 2 – Former Steam Lance
- 3– Southern Investigation Area (including the Southern Metal Anomaly area)

- 4 – Former Drum Debris Area
- 5 – Former FSDF Pistol Range

The site characterization information is described relative to these chemical use areas in Section D.3. In addition to known areas of chemical use, samples were collected to assess conditions in the drainages down-slope of all of these chemical use areas. Information regarding the drainage evaluation is also provided in Section D.3.

D.2.4 Site Conditions

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

General Conditions and Topography

The FSDF RFI site is located within the western portion of Area IV. The site is currently inactive and vacant, with no remaining structures. Surface topography in the central portion of the site slopes gently to the north-northeast and becomes steeper north of the site. The gently-sloping area is bounded by northeast-trending bedrock outcrops to the east and west (Figures D.2-1 and D.2-2A).

Current surface elevations at the FSDF RFI Site range from a low of approximately 1,800 feet above mean sea level (msl) in the northern portion of the site to a high of approximately 1,870 feet msl in the southern and southwestern portions of the site. Topography for the site is shown in three geologic cross sections: one oriented northwest - to southeast on the northern portion of the site (FSDF Cross Section A-A'; Figure D.2-3A), one oriented northwest to southeast on the southern portion of the site (FSDF Cross Section B-B'; Figure D.2-3B), and one oriented southwest to northeast (FSDF Cross Section C-C'; Figure D.2-3B). Locations of the cross-sections are shown on Figure D.2-2D.

The three large cleanup actions conducted at the FSDF have altered the surface topography through extensive excavation, backfilling, and grading. The first removal action was the excavation of 20 cubic yards of soil from the Lower Pond in 1980. There is no record of backfill activities for this small excavation. The second removal action took place from 1992 to 1993, and involved excavation of the entire area of the Lower Pond, a portion of the Upper Pond, and removal of the concrete pool and associated structures. During this removal

action, soil was excavated down to bedrock, and a total of approximately 12,000 cubic yards of soil were excavated. In addition, in order to control water infiltration, a diversion ditch was cut around the excavation areas, and the area was covered with a tarp in 1995. The third removal action occurred as an IM in 2000, was the largest excavation of the three, and completely encompassed the previous two excavation areas. During the 2000 IM, the Lower and Upper Ponds, the Western Debris Area, the B886 Concrete Pool Area, and portions of Channels A and B were excavated down to bedrock (IT, 2002). The areal extent of the excavation is shown on Figure D.2-2A.

Following the removal and backfill activities, the site was regraded to prevent the accumulation of surface water in the former excavation area. The surface was graded so that the majority of surface water north of H Street would drain by sheet flow to the north and into Channel B, although the western portion of the former excavation would drain toward Channel A (IT, 2002). Surface water south of H Street was routed into a ditch that drains toward the east, then into a culvert that crosses under H Street, and finally toward the north down Channel B (IT, 2002). The surface water drainages are shown on Figure D.2-1 and discussed in more detail below. Soil disturbance areas, including the former excavation area and the constructed surface water discharge ditch, are shown in Figure D.2-4. Since the current topography of FSDF does not represent the general conditions that existed during site operations and the subsequent period in which the majority of contaminated soil was still in-place, figures show the topography prior to the 2000 IM to facilitate the interpretation of characterization. A map of the current topography is provided in Attachment D-4.

Geology

The FSDF RFI site is located north of the Burro Flats Fault, in proximity of the Upper Burro Flats members of the Upper Chatsworth formation to the north of the fault (Dibblee, 1992; MWH, 2002). A series of deformation bands is also present west and east of the FSDF RFI Site. These deformation bands generally strike northeast-southwest and have been interpreted to comprise the western extent of the North Fault zone (MWH, 2002).

Beds of the Upper Burro Flats member generally strike N70°E and dip 25°NW. The Upper Burro Flats member is predominantly composed of medium-grained sandstone with minor interbeds of siltstone and shale. Figure 2-5 of the Group 8 RFI Report (Volume I) shows the geologic units represented within the RFI site. The locations of the Burro Flats Fault and the

deformation bands are shown on Plate E-1 in Appendix E. Additional geologic information is also presented in Appendix E.

Soils

Throughout most of the FSDF RFI Site, soils are generally thin, typically ranging from less than 2 feet to about 13 feet thick. The maximum depth of backfill in the FSDF former pond excavation area is approximately 13 feet below current grade, near the Former Concrete Pool Area, based on topographic surveys performed following the excavation. Backfill depths within the Former Ponds range up to 11 feet bgs. A map depicting the distribution of alluvial soils and fill within the Group 8 Reporting Area is provided as Figure 2-4 in the Group 8 RFI Report (Volume I). Soils within the excavation areas consist of DTSC-approved soils from an onsite borrow area. Fill soils are primarily comprised of fine-grained silty sands, clayey sandy silts, silty clays, and lean clay. Soils in the undisturbed areas of the site consist of weathered Chatsworth formation materials, which are primarily fine-grained silty sands and clayey silts. Soil boring logs are included as Attachment D-2 to this appendix.

Groundwater

The groundwater system and monitoring network in RFI Group 8 is discussed in detail in Appendix E. Figure D.2-1 shows well locations in and around the FSDF RFI Site.

At the Building FSDF RFI Site, five piezometers (PZ-097, PZ-098, PZ-099, PZ-100, and PZ-101) and two shallow wells (RS-54 and RS-18) were installed to monitor groundwater conditions in alluvium and weathered bedrock (i.e., NSGW), while 13 wells and/or coreholes (RD-21, RD-22, RD-23, RD-33{A,B,C}, RD-54{A,B,C}, RD-57, RD-64, RD-65, and Corehole C-8) were installed to monitor groundwater conditions in the unweathered bedrock (i.e., CFOU Groundwater). In 2006, PZ-099 was abandoned to install erosion control measures. Construction details for these wells/piezometers are shown in Figure E-4 (Appendix E), and their locations are shown in Figure D.2-1.

NSGW is perched above CFOU groundwater in the FSDF RFI Site area. A conceptual cross-section of near-surface and Chatsworth formation groundwater occurrence is shown in Figure E-4. NSGW is encountered at an average depth as shallow as 7.6 feet bgs (1795.2 feet msl) at RS-18 to 21.3 feet bgs (1825.4 feet msl) at RS-54. The NSGW in the FSDF area is laterally discontinuous and has limited areal extent, and a steep topographic slope to the

north where shallow groundwater has not been observed in piezometers. The occurrence of NSGW in the FSDF area is shown in plan view of Figure E-7 of Appendix E.

CFOU groundwater at the FSDF RFI Site is encountered at average depths ranging from 100.9 feet bgs (1766.1 feet msl) at RD-21 to 305.0 feet bgs (1548.4 feet msl) in RD-22. Depths to CFOU groundwater are quite variable at this site due to a combination of physical features which primarily include deformation bands and finer-grained units. The influence of these physical features on groundwater occurrence are discussed further in Appendix E.

Groundwater extractions were initiated in April 1997 at wells RD-21 and RS-54, and continued with few interruptions until mid-2000 when pumping activities were terminated to allow implementation of the 2000 FSDF IM. Pumping activities resumed in March 2001, and was shut off periodically from 2003 to 2007 to facilitate aquifer testing and support the ongoing CFOU characterization program. Water levels in FSDF Chatsworth formation wells were not significantly affected by pumping activities at either of these locations. This observation is consistent with the results of the RD-54B pump test, which showed that RD-21 does not communicate hydraulically with other wells located at the FSDF RFI Site (Appendix E). In addition, groundwater extracted from NSGW well RS-54 does not directly influence water level measurements in FSDF Chatsworth formation wells since it is screened within a perched groundwater unit.

NSGW flow at the FSDF RFI Site is toward the north, with an estimated gradient of 0.11 ft/ft (MWH, 2003b). Chatsworth formation groundwater flow is to the northwest with an estimated horizontal gradient of 0.1 ft/ft based on recent groundwater elevations. A more detailed description of groundwater occurrence and flow is provided in Appendix E.

Several offsite wells (OS-3, OS-4, OS-5, OS-5A, and RD-59 {A,B,C}) are used to monitor groundwater conditions down-gradient of the FSDF RFI Site. Groundwater elevations measured in these wells are significantly lower than those measured within the FSDF RFI Site, which may be due to the presence of a series of deformation bands that are located to the northwest of the FSDF and strikes from northeast to southwest. Artesian conditions are observed in several of these wells and are responsible for the presence of a number of springs that have been identified nearby.

Surface Water

Surface water flow at the FSDF RFI Site is shown on Figure 2-7B of the Group 8 RFI Report (Volume I). Surface water exists intermittently at the FSDF site as the result of seasonal precipitation events. Historically, the Upper and Lower Ponds were basins filled with water and were used to treat residual sodium from the 1960s to 1976. In 1976, the ponds were drained, but water occasionally accumulated there following precipitation at the site (Ebasco, 1991). In 1995, the ponds were covered with tarps and diversion ditches were created to prevent contaminant migration from the pond excavation. Prior to these diversion ditches being installed, surface water discharge from the FSDF area would drain toward the northeast (now called Channel B). After the diversion ditches were installed, the area northwest of the Lower Pond began to drain more directly to the north (now called Channel A) (Rockwell, 1995). In 2001, as part of the 2000 IM, the pond area was backfilled and re-graded to a gentle slope to the north-northeast, with most surface water discharge directed toward Channel B, and a smaller western portion toward Channel A (IT, 2002).

Channel A and Channel B are the primary drainages that convey site runoff from the central portion of the site. As described above, Channel A begins northwest of the former Lower Pond, flows north, and converges with an unnamed drainage that collects surface water from the western edge of the FSDF RFI Site. From this point, Channel A drains to the northeast. Channel B begins northeast of the former Lower Pond, and drains northeast, also receiving runoff from the FSDF Pistol Range area. Channel B converges with an unnamed tributary drainage from northwest of the FSDF Pistol Range area. Channels A and B converge approximately 350 feet northeast of the site, forming Channel C. Surface water in Channel C flows northeast and joins a major north-south trending drainage leading from the Building 56 Landfill RFI Site and forms Channel D. Except within the former FSDF area and the lower reaches of Channel D, Channels A through D are typically very steep drainages with abundant rock outcrops and few bank deposits. Channel D drains north and joins the Meier Canyon drainage, which flows into the Arroyo Simi in Simi Valley.

As described above, storm water runoff occurs as sheet flow in the area north of H Street (i.e., the area of the former Ponds, the Western Debris Area, the Building 886 Concrete Pool Area, and the Steam Lance), and the majority of this sheet flow drains into Channel B. A small bowl-shaped area north of the former Lower Pond in the northwestern portion of the site, drains into Channel A. Surface water south of H Street currently flows into the drainage ditch that was installed after the 2000 IM. Surface water in the ditch south of H Street flows

northeast into a culvert beneath the road, then flows north along the road and into Channel B. Prior to the 2000 IM, surface water runoff south of H Street moved as sheet flow to the north, joining the sheet flow runoff occurring north of H Street.

Surface water runoff at the site is regularly monitored as part of the National Pollutant Discharge Elimination System (NPDES) monitoring program under the oversight of the RWQCB. There are two monitoring locations associated with the FSDF RFI Site: Outfall 005 near the start of Channel A, and Outfall 006 north of the FSDF Pistol Range in Channel B. (Figure D.2-2). Consistent with best management practices (BMPs), structural erosion control measures consisting of dual-media filters were installed at the outfalls. The areas were graded for the construction of the BMPs. Erosion controls, including fiber rolls, straw bales, and a plastic tarps, also have been installed at the former FSDF Pistol Range (MWH, 2006a). Soil disturbance associated with erosion control areas are depicted on Figure D.2-4.

Seeps and Springs

There are three springs (S19, S20, S21) located to the north of the FSDF RFI Site on property owned by the Brandeis-Bardin Institute (BBI). Spring S21 is located near the SSFL boundary and emerges from colluvium at the base of a road cut. Due to its proximity and down-gradient location relative to the Group 8 Reporting Area, S21 is considered to be the most representative of groundwater originating at the FSDF RFI Site. Spring S19 and S20 are located to the northeast of spring S21, but S20 has not been sampled. Groundwater emerging at these springs is described further in Appendix E.

Biology

In June 2007, a post-fire reconnaissance-level vegetation mapping was conducted at the Group 8 RFI Sites and is included as Attachment F6 of Appendix F. Biological conditions at the FSDF RFI Site, including vegetation types and sensitive species, are also shown on Figure 2-13 of the Group 8 RFI Report (Volume I). The FSDF RFI site is comprised of non-native grasslands, coast live oak woodland, chaparral, revegetated areas, and disturbed or developed areas. Following the 2000 IM, the backfilled portion of the site was revegetated with 30 live oak trees, native scrub, and perennial grasses (IT, 2002). Areas of rock outcrop and chaparral are present north of the site, coast live oak woodland and disturbed or developed areas are present to the east, coast live oak woodland is present west of the site, and non-native grasslands are present south of the site. Chaparral is present along the FSDF drainage. Sensitive species identified at or in the vicinity of the site include the Santa Susana

tarplant, Plummer's mariposa lily, southern California black walnut, valley oak, Braunton's milk vetch, mule deer, and San Diego black tailed jackrabbit.

During the September/October 2005 Topanga Fire, vegetation in the northwestern portion of the FSDF RFI Site and in the down-gradient channels were burned, and significant ash was deposited, especially in drainages (MWH, 2006b). Generally, 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. Currently, the plant community in these burned areas is in a transitional state, and 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. Recent vegetation surveys were conducted at the FSDF RFI Site in support of risk assessment. Findings from this survey are presented in Attachment F6 of Appendix F.

D.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 FSDF 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 8 RFI Report, Section 5, Contaminant Transport and Fate - Potential migration via surface water flow
- Group 8 RFI Report Appendix E, Groundwater Characterization - Potential migration from soil to groundwater, and groundwater migration
- Group 8 RFI Report Appendix F, Risk Assessment - Potential volatile organic compound (VOC) migration from groundwater to soil, soil to indoor air

D.3.1 Sampling Objectives

Soil and sediment samples were collected to characterize the extent of potential chemical impacts at the FSDF RFI Site. As described in Section 1, extensive historical documents (Boeing, 2007c) 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 RFI Work Plans (Ogden, 1996 and 2000b) or as directed by DTSC direction during the RFI field program. Additional sampling was also performed to achieve the 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 to require 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 C.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 1995b) and the *Shallow Zone Groundwater Investigation Work Plan* (Ogden, 2000b).

D.3.2 Sampling Scope

A total of 289 soil matrix samples and 9 soil vapor samples were collected between June 1995 and June 2007 to assess potential impact associated with the chemical use areas at the FSDF RFI Site, not including samples from areas that have since been excavated. Thirty-seven additional bedrock samples were also taken in 2000 at the bottom of the excavation. These results were not available electronically and are not shown on the Figures D.3-1A through D.3-5B, nor included in the data tables provided in Attachment D-3, but the results are described in this section. Copies of the data table and map presenting locations of the 37 bedrock samples from the FSDF IM Implementation Report (IT, 2002) are included as Attachment D-5. Depths of samples collected before the 2000 IM have been adjusted to reflect the excavation and grading changes at the site. Sample depths represented on tables and figures in this Site Report for pre-2000 IM samples are estimated and adjusted to reflect current topographic conditions.

RFI 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. Some locations were sampled only by DTSC following the completion of the 2000 IM excavation. Sampling schedules are presented in Tables D.3-1A through D.3-1D.

Both Chatsworth formation groundwater and NSGW have been sampled and analyzed according to agency-approved work plans (GRC, 1995a and 1995b; Ogden, 2000b). Seven wells and piezometers (RS-18, RS-54, PZ-97, PZ-98, PZ-99 (abandoned), PZ-100, and PZ-101) were used to characterize NSGW, and 12 Chatsworth formation wells (RD-21, RD-22, RD-23, RD-33A, RD-33B, RD-33C, RD-54A, RD-54B, RD-54C, RD-57, RD-64, and RD-65) were used to characterize CFOU groundwater specifically at the FSDF RFI Site. As described in the risk assessment, groundwater monitoring data from the most impacted well within the Group 8 Reporting Area were used to characterize the potential direct exposure route for human receptors. RFI site groundwater monitoring data were used for potential indirect groundwater exposures at that site. Groundwater characterization data for the FSDF RFI Site are presented with the entire Group 8 groundwater data set in Appendix E.

Based on a 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 FSDF cleanup actions. Overall data quality is described in the RFI Program Report (MWH, 2004). Site-specific data quality summaries for the FSDF 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 up to 5 to 10 percent of the surficial media analyses performed for the RFI. The ECL data quality audits included 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 Program Report (MWH, 2004). In these reports, the ECL deemed the sample results acceptable or qualified as estimated data points.

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

- Soil vapor
- Soil matrix (including soil and pond/drainage sediment)
- Groundwater
- Surface water

D.3.3 Key Decision Points

DTSC has been an integral part of the decision-making process during the SSFL RFI program. The FSDF was considered an accelerated cleanup site for the RFI since there had been numerous cleanup actions performed and preliminary risk assessment completed (Ogden, 1996). Additional RFI sampling was requested by DTSC during a comprehensive SSFL RFI site review in 2000 (conducted about the same time as the FSDF IM). DTSC was onsite during much of the FSDF IM during 2000 and selected confirmation sampling locations and collected split samples. As described above, DTSC also collected additional discretionary soil and bedrock samples following the completion of the 2000 IM excavation. DTSC input to the site characterization continued after the IM was complete. At that time, DTSC requested additional soil sampling based on review of historical operations, sampling results, and physical inspection. Evaluation of shallow groundwater conditions was also requested by DTSC and was included in the Shallow Groundwater Work Plan (Ogden, 2000b). Additional site assessment has recently been performed to address revised, DTSC-approved requirements for risk assessment (MWH, 2005) and evaluate new potential chemical use areas. Sampling of new chemical use areas and recent step-out sampling followed DTSC-approved work plan protocols for the RFI.

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. Programmatic decision points (those common to all RFI sites) are described and included in the RFI Program Report (MWH, 2004).

- 1) Areas where further assessment in the CMS is recommended were not characterized beyond the need for the CMS.
- 2) FSDF IM confirmation samples and other previous in-place sample data were used for site characterization purposes. Additional representative sampling for metals, semivolatile organic compounds (SVOCs), and perchlorate was conducted along the

southern perimeter of the Former Disposal Area (Chemical Use Area 1) and in down-gradient discharge areas (Channels A and B) to collect sufficient data for risk assessment based on current RFI comparison levels and potential chemical use at the site.

- 3) Due to exceedances of dioxins, copper, lead, and mercury at NPDES Outfall 006, representative samples from Channel B, including the FSDF Pistol Range area were collected for metals and dioxins.
- 4) Terphenyls, glycols, fluoride have been documented as used or stored within Area IV RFI sites with potential disposal at the FSDF. Additional representative samples were collected in areas outside of the excavation areas to assess current site conditions for these chemicals. Glycols were analyzed as a tentatively identified compound (TIC), using analytical method 8270.
- 5) Sodium was included in the site characterization as a potential indicator of contaminant migration of other analytes.
- 6) For characterization purposes, a screening level of 6 µg/L has been used to evaluate perchlorate in soil based on DTSC-approved IM levels at another SSFL sites (e.g., Happy Valley Interim Measure). For the RFI, perchlorate samples are typically collected as water leachates to allow lower laboratory reporting limits. The method uses 1:1 extraction method, so that µg/L is considered equivalent to µg/kg (MWH, 2003c).
- 7) Surface vapor flux samples were collected near RS-54 as part of the vapor validation study (MWH, 2007).
- 8) Carbon tetrachloride, ethanolamine, ammonia, tetrahydrofuran, and hydrazine were detected at significant levels using a field air monitoring instrument (Miran 1B detector) during trenching activities in 1987. Carbon tetrachloride was also detected in soil samples taken during the same field event and in waste characterization samples from the excavated soil from the 1992 Pond Closure excavation (GRC, 1990; DOE, 2000), but this compound was not detected in any soil samples taken after the 1992 Pond Closure excavation (McLaren Hart 1993; ICF, 1997) or in the 2000 IM. Carbon tetrachloride was not detected in any of the 96 post-excavation samples taken throughout the site (Chemical Use Areas 1, 3, and 4, and Channels A, B, and C). Furthermore, the excavation of the former pond area was inclusive of all soil down to bedrock. Therefore, additional VOC sampling was not warranted because the soil impacted by carbon tetrachloride and other VOCs had been removed. This rationale was also applied for the other four chemicals listed above, so additional sampling was not performed to address these field measurements.

D.3.4 Soil Matrix and Soil Vapor Findings

All soil sampling results and characterization findings are summarized in Table D.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 and that no further sampling is warranted.
3. For areas recommended for CMS evaluation, indicate that soil volumes are estimable within a factor of ten for comparison of remedial alternatives.

Goals 2 and 3 are achieved through an iterative evaluation process that takes into account the risk assessment results and CMS recommendations as well as the soil analytical data. For example, if detected concentrations are sufficiently high to indicate that further evaluation in the CMS will be necessary, the data 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, the types of historical site operations and chemical uses, and analytical detection limits.

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

D.3.4.1 Soil Data Presentation

Relevant site information, sampling rationale, analytical results, and evaluation of results are presented in Table D.3-2A. This table refers to chemical results that are shown by chemical group category on Figures D.3-1 through D.3-5B. Table D.3-2A presents the following site characterization information by each Chemical Use Area (Figure D.2-1) for each relevant chemical group within the 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 level (RBSLs¹). The screening levels are also displayed on Figures D.3-1 through D.3-5B.

- Determination if characterization of chemical gradients is sufficient 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.
- Determination if nature and extent of chemicals is defined sufficiently to estimate soil volumes (within a factor of 10) for areas that require further consideration in the CMS (if needed).

D.3.4.2 Soil Data Summary

As detailed in Table D.3-2A, eight individual confirmed and potential chemical use areas were investigated at the FSDF RFI Site. A summary of the chemicals detected above screening criteria is provided below by chemical analytical group. Soil sampling results that represent excavated soil are described first, followed by data for current in-place soil.

VOCs

- VOCs were detected in two areas at the site, within the backfill at the Lower Pond (Chemical Use Area 1a), and near the excavation in the Southern Investigation Area (Chemical Use Area 3).
 - A number of VOCs were detected in pre-excavation samples collected from the Former Disposal Area, including 1,1,1-TCA (up to 1,840 µg/kg), TCE (up to 740,000 µg/kg), PCE (up to 1,200,000 µg/kg), and toluene (up to 800,000 µg/kg). This soil was later removed during the 1992 Pond Closure excavation and the 2000 IM.
 - Eight VOCs, including TCE, were detected in two post-IM soil vapor samples and one soil matrix sample collected from the backfilled area at the Lower Pond. Concentrations of TCE and 1,1-dichloroethene (1,1-DCE) were detected above the RBSLs. TCE was detected up to 10 µg/kg in soil, and 12.3 µg/L in vapor. Concentrations were higher in deeper samples than in shallow samples.
 - Six VOCs were detected in the Southern Investigation Area. Concentrations of tetrachloroethene (PCE) and benzene were detected above RBSLs. PCE was detected in soil vapor samples up to 3.4 µg/L; additional samples collected two years later near the original sample

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 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. See Appendix F.

locations were non detect for PCE. Benzene was detected up to 1 µg/kg in two samples from this area in 1995; similarly, soil vapor samples collected at this location 12 years later were non detect for benzene.

- VOCs detected in channel sediment samples collected prior to the 2000 IM were limited and at low concentrations. Soil/sediment represented by these samples was removed in the 2000 IM. P-cymene was detected at 62 µg/kg, and is believed to be naturally-occurring related to the presence of poison oak in the drainage (there is no RBSL for p-cymene). Two other VOCs (methylene chloride and m,p-xylene) were detected at 16 µg/kg and 1 µg/kg (estimated), respectively. Methylene chloride is a common laboratory contaminant. Only the highest concentration of methylene chloride was above RBSLs.

SVOCs

- SVOCs (up to 1,300 µg/kg, phenanthrene) were detected in waste characterization samples taken from the Former Disposal Area. These data are representative of soil that was removed in the 1992 Pond Closure excavation or the 2000 IM.
- Two phthalates (di-n-butyl phthalate and bis(2-ethylhexyl)phthalate) were detected at low concentrations in samples from the southern boundary of the Former Disposal Area (Chemical Use Area 1) excavation. Phthalate concentrations ranged up to 540 µg/kg, less than RBSLs.
- Polynuclear hydrocarbons (PAHs) were detected in two site samples at concentrations less than RBSLs. At the Southern Investigation Area (Chemical Use Area 3) concentrations ranged up to 30 µg/kg (pyrene). At the former Drum Debris Area (Chemical Use Area 4) concentrations ranged up to 6.4 µg/kg (chrysene).
- SVOCs detected in channel sediments collected prior to the 2000 IM were limited and at low concentrations. Four SVOCs (benzoic acid, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, and p-Cresol) were each detected once in either of two samples from Channels A and C. Concentrations ranged up to 240 µg/kg (bis(2-ethylhexyl)phthalate) and were all below RBSLs.

TPH

- TPH (up to 2,600 mg/kg, oil and grease) was detected in pre-excavation samples from the Former Disposal Area. These results represent soil that was removed in the 1992 Pond Closure excavation or the 2000 IM.
- High boiling petroleum hydrocarbons (equivalent to kerosene, diesel, and lubricant-range TPH) were detected at concentrations up to 75 mg/kg in three samples collected south of the Former Disposal Area (Chemical Use Area 1) excavation perimeter. None of the detected concentrations for TPH exceeded RBSLs.

- High boiling petroleum hydrocarbons were detected at low concentrations in pre-excavation channel sediment samples. This soil was removed in the 2000 IM. Concentrations ranged up to 9.3 mg/kg, less than RBSLs.

PCBs / Terphenyls

- PCBs were detected at concentrations up to 27,000 µg/kg (Aroclor 1254) in samples from the Former Disposal Area. These soils were removed in the 1992 Pond Closure excavation or the 2000 IM.
- PCBs were detected in a total of 64 samples from the Former Disposal Area (Chemical Use Area 1), the Southern Investigation Area (Chemical Use Area 3), and the downgradient discharge Channels A through D. Most detections occurred in small localized areas within channel bank deposits. Thirty-three of the detected concentrations were above ecological RBSLs but below residential, industrial, or recreational RBSLs and the IM cleanup level. PCBs that have been detected in remaining soils at the site are localized, and concentrations are generally low. Of the 175 samples collected, six contained concentrations above 300 µg/kg (up to 520 µg/kg). These areas are further described below:
 - In the Western Debris Area, PCBs were detected in one bedrock sample at 190 µg/kg, above ecological RBSLs (this result, BR-5-2-17, is not shown on Figure D.3-3B, but is approximately 35 feet north of sample PC-4).
 - South of the Former Disposal Area, Aroclor 1254 was detected at concentrations exceeding RBSLs in two samples, ranging up to 360 µg/kg.
 - In the Southern Investigation Area, Aroclor 1254 was detected at concentrations exceeding RBSLs in two samples (on opposite ends of the area) and one duplicate sample, ranging up to 290 µg/kg.
 - In Channel A, Aroclor 1254 or Aroclor 1260 was detected at concentrations exceeding RBSLs in 19 samples. Aroclor 1254 was detected up to 520 µg/kg, and Aroclor 1260 up to 330 µg/kg. PCB concentrations decreased away from and downgradient of these samples.
 - In Channel B, Aroclor 1254 was detected at concentrations exceeding RBSLs in one sample, at 110 µg/kg.
 - In Channel C, Aroclor 1260 was detected at concentrations exceeding RBSLs in six samples, ranging up to 250 µg/kg.
 - In Channel D, Aroclor 1254 was detected in six samples at concentrations up to 91 µg/kg. Only the highest concentration was above the ecological RBSL.
- Terphenyls were detected at concentrations up to 880 mg/kg in pre-excavation soil samples from the Former Disposal Area. This soil was removed in the 1992 Pond Closure excavation or the 2000 IM.
- Terphenyls were not detected in any samples in soils remaining on-site.

Dioxins

- Dioxins were detected in Channel B soil/sediment samples at concentrations up to 423 ng/kg. This soil was removed during the 2000 IM.
- Dioxin TEQs were above background (0.87 ng/kg TEQ) in 30 samples collected at the site, including 14 bedrock samples taken at the bottom of the 2000 IM excavation (Chemical Use Area 1), two soil samples south of the Former Disposal Area (Chemical Use Area 1), five in the Southern Investigation Area (Chemical Use Area 3), two in Channel A, and eight in Channel B. Dioxin TEQs ranged up to 10.7 ng/kg, with six samples exceeding the ecological RBSLs. Two results (one of which is the bedrock sample mentioned above) also exceeded the Residential RBSL (the result for the bedrock sample, BR-4-2-10, is not shown on Figure D.3-3B, but was collected approximately 25 feet north of sample PC-7).

Metals / Inorganic Compounds

- Eight metals (cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc) were detected above background in pre-excavation samples from the Former Disposal Area. This soil was removed during the 1992 excavation or 2000 IM.
- At the Former Disposal Area (Chemical Use Area 1) and in the downgradient discharge Channels A and B, two metals, mercury and sodium, were detected above background.
 - Mercury was detected above background in one bedrock sample and 14 soil samples collected from the Former Disposal Area, Channels A and B, and the FSDF Pistol Range Area upstream of Outfall 006. All concentrations were below RBSLs.
 - Sodium was detected above background in the drainage east of FSDF and in the FSDF Pistol Range area upstream of Outfall 006 (there is no RBSL established for sodium).
- Arsenic was also detected above background in five samples from Channel D, near and slightly beyond the SSFL property boundary. These arsenic concentrations are considered to be naturally occurring for the following reasons:
 - Arsenic concentrations in samples from all of the drainages upstream of these samples (Channels A, B, and C, the B009 drainage, the B056 drainage, and other minor tributaries) are within background ranges (25 samples, including three duplicate or split samples).
 - Higher concentrations of arsenic are often associated with shales, which are present at the SSFL and in the site vicinity.
 - The highest arsenic concentrations were detected in samples from an isolated area above and adjacent to a shale outcrop near the property boundary, away from any SSFL facility operations.

- At the Southern Investigation Area (Chemical Use Area 3), aluminum, mercury and sodium were detected above background.
 - Aluminum was detected above background in two samples from one location (FSBS0072), at concentrations up to 26,900 mg/kg. These samples were collected near the eastern end of the diversion channel downstream of the ESADA RFI Site. Eight samples collected in and around the storage areas at ESADA contained aluminum at concentrations above background (up to 31,100 mg/kg). There are no discernable patterns or concentration gradients in the aluminum concentrations detected above background, except that these occurrences are associated with higher concentrations of clay in the soil. As described above and in Table D.3-2A, the clay-rich Santa Susana Formation is present to the south, and soil derived from this material likely contains higher naturally-occurring aluminum concentrations.
 - Sodium was detected above background at two locations, at concentrations up to 360 mg/kg.
 - Mercury was detected above background at one location (10546220), on the western edge of the Southern Investigation Area, at 0.17 mg/kg, less than RBSLs. Concentrations decrease to below background in all directions and at depth.
- At the FSDF Pistol Range (Chemical Use Area 5), lead was detected above background and RBSLs, at a concentration of 420 mg/kg, in one sample collected beneath the former target area of the FSDF Pistol Range. Concentrations decrease to within background in all directions and at depth. Mercury (up to 0.35 mg/kg) and sodium (up to 150 mg/kg) were also detected above background in this location (as described above in the Former Disposal Areas).
- At the Drum Debris Area in the channel west of FSDF (Chemical Use Area 4), mercury was detected in three samples above background and RBSLs, at concentrations up to 6.1 mg/kg. Two of these samples have concentrations are above the ecological RBSL, and all are less than the Residential RBSL. Mercury decreases to below background in the sample farthest downstream, just upstream of the confluence with Channel A.
- Fluoride was not detected above background in onsite soils..

Perchlorate

- South of the Former Disposal Area (Chemical Use Area 1), perchlorate was detected in five samples north of the road in the southeastern portion of the RFI site, at concentrations up to 2,600 µg/L, with only one of these samples exceeding the perchlorate screening level of 6 µg/L. Perchlorate was also detected in samples from some locations in Channels A and B, at concentrations ranging from 0.056 to 6.0 µg/L, less than the screening level.

The potential contribution of the Topanga Fire to the concentrations of dioxins and metals in soil have been considered in the characterization of the nature and extent of chemicals at FSDF. This evaluation was done to determine if any elevated concentrations of six metals (barium, boron, copper, lead, thallium, and zinc) or 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 (from depths up to 6 inches bgs) collected after the fire were considered in this evaluation. For the FSDF RFI Site, there were three post-fire samples analyzed for dioxins and two post-fire soil samples analyzed for the seven metals. While ash deposition could have contributed to metals concentrations, the two post-fire surficial soil samples analyzed for metals did not contain concentrations suggestive of fire-related impacts. Of the three surficial soil samples analyzed for dioxins, only one sample had an elevated TEQ suggestive of fire-related impacts (FSBS0092).

D.3.5 Groundwater Findings

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

D.3.5.1 Groundwater Data Presentation

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

- Summarize soil impacts as they potentially relate to groundwater impacts.
- Summarize 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 D.3-2A, Table D.3-2B describes groundwater data by chemical group (metals, VOCs, SVOCs, etc.). Table D.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 E of this Group 8 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 the following:

- Laboratory analytical results
- Hydrographs
- Time-series plots
- Cumulative distribution 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 E.

D.3.5.2 Groundwater Data Summary

Groundwater conditions at the FSDF RFI Site are characterized by seven wells and piezometers (RS-18, RS-54, PZ-097, PZ-098, PZ-099 (abandoned), PZ-100, and PZ-101) to characterize the NSGW and 13 Chatsworth formation wells and/or coreholes (RD-21, RD-22, RD-23, RD-33A, RD-33B, RD-33C, RD-54A, RD-54B, RD-54C, RD-57, RD-64, RD-65, and Corehole C-8) to characterize CFOU groundwater. Groundwater findings from these wells are presented on Table D.3-2B. In 2006, PZ-099 was abandoned so that erosion control measures could be installed.

As described in Appendix E, VOCs, SVOCs (both PAHs and phthalates), TPH, metals, inorganic compounds, and perchlorate were detected in groundwater samples. The primary detections in groundwater above regulatory screening levels include TCE and TCE breakdown products (TCE historically ranged up to 4500 µg/L in RS-54, and perchlorate ranged up to 56 µg/L in RD-54A). Other chemicals detected in groundwater above regulatory levels or GWCCs include SVOCs, TPH, and metals.

Based on the site operations, which included the potential and known disposal of numerous chemicals and burning operations of waste organic compounds, and the sampling results of the removed and in-place soil at the site, these detections are considered likely or possibly site-related. VOCs, TPH, and perchlorate, detections in groundwater are considered likely to be related to site operations at FSDF. PAHs and PCBs, which were either detected once or were not analyzed, are also considered possibly site-related. Significant transport of these large organic molecules is unlikely, but it is possible that these compounds exist in groundwater as a result of site activities. Additional groundwater samples for PAHs and PCBs are being collected to assess groundwater conditions for these chemicals, and results will be reported to DTSC when available.

In contrast with the chemicals described above, metals are often found naturally within groundwater. Of the 22 metals detected in groundwater, seven metals (cadmium, cobalt, copper, manganese, molybdenum, nickel, and selenium) are considered likely or possibly site-related because they were (1) detected in recent groundwater samples at concentrations above GWCCs and (2) either detected in soil above background levels or not analyzed in soil. The remaining metals in groundwater were not considered to be site-related because they were detected either below GWCCs, or they were detected above GWCCs only in historical samples while numerous, more recent results have been below GWCCs. Dioxins were not detected in groundwater.

Bedrock porewater in Corehole C-8 was analyzed for VOCs, and results showed that the majority of the TCE mass (>99.9 percent) was present in the vadose zone, which had a thickness of about 180 feet. TCE was the most prevalent of the VOCs detected in porewater, at concentrations ranging up to about 70,000 µg/L. Below 150 feet bgs, TCE porewater concentrations were less than about 1,000 µg/L. Other VOCs detected in porewater included PCE, cis-1,2-dichloroethene (cis-DCE), and 1,1-dichloroethene (1,1-DCE), but at concentrations much lower than TCE (University of Waterloo [UW], 2007). Additional information is provided in Appendix E.

D.3.6 Surface Water Findings

Surface water exists intermittently at the FSDF site primarily as the result of seasonal precipitation events. Both RFI and NPDES surface water sampling has occurred at the site. For the RFI, four surface water samples were collected within Channels A, B, and C and samples were analyzed for perchlorate and mercury (Table D.3-1D). Perchlorate and

mercury were not detected in any of four surface water samples. Results of RFI surface water sampling are presented in Table D.3-2C, and are summarized in relation to soil and soil vapor results in Table D.3-2A. A data quality assessment is summarized on Table D.3-3C.

NPDES data have been collected from Outfalls 005 and 006 since 1992 and analyzed for constituents specified in the NPDES permit. NPDES sampling results that exceeded permit limits are provided on Table D.3-2C and listed below. Prior to the 2000 IM, several mercury exceedances occurred that were likely related to elevated soil concentrations at the FSDF, prompting inclusion of this chemical in the 2000 IM. Following the 2000 IM, however, most exceedances are considered as sporadic detections related to background soil conditions or those caused by naturally-occurring metals or dioxins in ash deposited at the site following regional fires at or very near the SSFL (Boeing, 2004; 2005; 2006; 2007a). Continued evaluation of the NPDES exceedances is ongoing.

The following chemicals were detected multiple times above NPDES permit limits at Outfalls 005 and 006 (Boeing, 1999; 2000; 2001; 2002; 2003; 2004; 2005; 2006; 2007a):

- Antimony (3 times)
- Chloride (3 times)
- Copper (5 times)
- Mercury (10 times, 4 post-IM)
- Thallium (1 time)
- pH (2 times)
- Nitrate (13 times)
- Oil and Grease (1 time)
- Dioxins (9 times)
- Total Dissolved Solids (2 times)

D.4 RISK ASSESSMENT FINDINGS SUMMARY

The following sections summarize the findings of the HRA and ERA performed for the FSDF RFI Site within the Group 8 RFI Reporting Area. Details regarding how the HRA and ERA were conducted are presented in the SRAM (MWH, 2005) and in Attachment F4 of Appendix F of this Group 8 RFI Report.

D.4.1 Key Decision Points

Site-specific key decision points for the HRA and ERA are listed below and described more fully in Appendix F and Attachment F4 of Appendix F. 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, 2004). Site-specific key decision points include the following:

1. While both direct (drinking water) and indirect (vapor) exposures were evaluated in the risk assessment (Appendix F), only indirect exposures are presented here because there is no current or planned future use of groundwater for drinking water.
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 FSDF RFI Site (RS-54) for both indirect and 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 EPCs were based on maximum concentrations (either detected concentrations or the detection limit if sufficient evidence that the chemical is present) unless there were sufficient data to calculate a statistical upper-bound estimate of the concentration.
3. Large-home range receptors were assumed to live only in source areas within the FSDF 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 the SSFL will be presented later in a Site-Wide Large-Home Range Report.
4. Arsenic was evaluated in the risk assessment. However, it is not listed as a risk driver or included in the risk estimate totals because all detected concentrations are

considered naturally occurring. Arsenic concentrations above the background comparison value were detected in only one location adjacent to a shale outcrop near the property boundary (in Channel D).

5. Aluminum was detected above its maximum background comparison level in one sample in the Southern Investigation Area (Chemical Use Area 3). This result was included in the risk assessment performed for the ESADA RFI Site (Appendix C), because the sample did not reflect the majority of the FSDF site soil aluminum concentrations but was within 35 feet of ESADA area samples that contained similar aluminum concentrations.

D.4.2 Human Health Risk Assessment Findings

The receptors included in the human health risk assessment are the current worker and potential trespasser and the future resident, worker, and recreator. Since the current potential trespasser and the 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 D.4-1
- Human Health Risk Estimates – Tables D.4-2
- Human Health Risk Assessment Uncertainty Analysis – Table D.4-3
- Generalized Conceptual Site Model of HRA (CSM) Exposures – Figure D.4-1

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

Exposure to Surficial Media Plus Indirect Groundwater Exposure

The Reasonable Maximum Exposure (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. The risk assessment results are summarized as follows:

- Estimated cancer risks for all receptors ranged up to 3×10^{-5} , and HIs ranged up to 4 (Future Adult Resident). The chemicals contributing to these potential risks were TCE, benzene, and PCE in soil and 1,1-dichloroethane (1,1-DCA), 1,1-DCE, and TCE in groundwater.
- Estimated blood lead levels associated with soil exposures were less than 10 µg/dl for all receptors even at the 99th percentile.

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

D.4.3 Ecological Risk Assessment Findings

The ecological receptors representing the FSDF RFI Site are the deer mouse, the thrush, the hawk, the bobcat, and the mule deer. Supporting information for the ERA is presented in the following tables and figure:

- Chemicals of Potential Ecological Concern (CPEC) – Table D.4-4
- Risk Estimates for Ecological Receptors – Table D.4-5
- Ecological Risk Assessment Uncertainty Analysis – Table D.4-6
- Graphical ECM for Ecological Exposures – Figure D.4-2

A summary of the ERA findings is presented below, including Hazard Quotient (HQ) and Hazard Index (HI) information. HQs are hazard estimates for single CPECs, while HIs are cumulative hazard estimates for all CPECs. For comparison purposes, HQ or HI values less than 1 represent conditions that would not cause unacceptable ecological impacts. HQ or HI values greater than 1 typically require additional evaluation, and may be deemed acceptable or unacceptable by risk managers.

- Estimated HIs for all receptors ranged from 4 to greater than 1,000 at the FSDF RFI Site. The thrush has an estimated HI in excess of 1,000, the hawk has an estimated HI in excess of 100, and the deer mouse, mule deer, and bobcat have estimated HIs of 48, 16 and 4, respectively. These HIs are primarily associated with lead and perchlorate.

- The deer mouse burrow air inhalation pathway does not contribute significantly to the deer mouse risks, compared to the risks from other non-volatile constituents.

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

D.5 FSDF RFI SITE ACTION RECOMMENDATIONS

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

D.5.1 RFI Reporting Requirements

As described in regulatory guidance documents for the SSFL RCRA Corrective Action Program (see Section 1.2.3 of Volume I), the purposes of the RFI are 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 completeness of the investigation, and (3) indicate if additional work is needed.

The FSDF RFI Site Report accomplishes these requirements by:

- 1) Presenting detailed 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 D.3-2A and D.3.3-2B). Section D.3 summarizes the overall characterization of contamination nature and extent, potential source areas, and an assessment of investigation completeness.
- 2) Evaluating groundwater migration pathways in Appendix E of the Group 8 RFI Site Report and other potential transport pathways in Appendix F of the Group 8 RFI Site Report.
- 3) Identifying potential receptors and estimating potential risks at the FSDF RFI Site (Section D.4 and Appendix F).
- 4) Identifying FSDF RFI Site areas requiring further work (this Section).

D.5.2 Basis for Site Action Recommendations

In summary, site action recommendations included in the FSDF RFI Site Report identify areas for the following:

- Further evaluation in the CMS (CMS Areas)
- No further action (NFA Areas)
- Interim corrective measures to stabilize source areas and control 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 contaminants, based on chemical data and transport and fate evaluation. Risk assessments evaluate 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 8 Reporting Area. Samples were also collected in areas where the existing 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 8 Reporting Area are based on an integrated evaluation of characterization and risk assessment results. 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 made in this 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.

CMS and NFA Site Action Evaluation Process

CMS or NFA site action recommendations are based on a 4-step process. This process, which is presented in detail in Section 7.1 of the Group 8 RFI Report, 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 are greater than 1 (noncancer and ecological risks), the RFI site’s risks are reviewed on a chemical-by-chemical basis to identify risk-drivers and significant risk contributors to the cumulative, total risk for each potential receptor.
- **Site Action Evaluation Step 3.** Characterization findings from the entire RFI site are evaluated to 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.
- **Site Action Evaluation Step 4.** The fourth step identifies any uncertainties in the RFI site characterization and risk assessments that may affect the 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.

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

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 RBSLs. 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.

Two additional aspects of RFI reporting will serve to confirm and/or finalize the areas recommended in Group RFI 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.

Source Area Stabilization Site Action Evaluation Process

Chemical data collected during the RFI are evaluated to determine the potential for 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 the following:

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

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

D.5.3 FSDF RFI Site Recommendations

The FSDF RFI Site action recommendations are listed in Table D.5-1 and presented on Figure D.5-1. Table D.5-1 lists CMS and NFA recommendations and identifies chemical risk drivers and contributors for each appropriate receptor. A summary of the FSDF RFI Site CMS Areas is presented in Table D.5-2. 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 will be prepared as needed.

A recommendation for further evaluation of arsenic concentrations in the channel below the FSDF RFI Site during the CMS was not made because these concentrations are considered naturally occurring, related to shale bedrock outcrops. A recommendation for further evaluation of VOCs in the soil backfill in the former pond area during the CMS was not made since these impacts are the result of transport of contaminants from shallow groundwater in this area. CMS recommendations for groundwater, including potential actions in this area, will be made after groundwater characterization activities are completed and reported in the Site-Wide Groundwater RFI Report.

FSDF RFI Site areas recommended for evaluation in the CMS are summarized below. The following three CMS Areas were identified:

- **FSDF-1:** South of Former Disposal Area. The chemical risk driver is perchlorate.
- **FSDF-2:** Former Drum Debris Area. The chemical risk driver is mercury. Given this area's location in the drainage west of FSDF, it is recommended for stabilization measures.
- **FSDF-3:** Former FSDF Pistol Range. The chemical risk driver is lead. Continued covering of this area by a plastic tarp is recommended as a stabilization measure.

D.6 REFERENCES

- The Boeing Company (Boeing). 1999. 1998 NPDES Annual Report - SSFL. March 31.
- Boeing. 2000. 1998 NPDES Annual Report SSFL. March 21.
- Boeing. 2001. 2000 NPDES Annual Report - SSFL. March 30.
- Boeing. 2002. 2001 NPDES Annual Report - SSFL. March 28.
- Boeing. 2003. 2002 NPDES Annual Report, The Boeing Company, Santa Susana Field Laboratory, Ventura County California. March 28.
- Boeing. 2004. 2003 NPDES Annual Reports. March 30.
- Boeing. 2005. Santa Susana Field Laboratory, Discharge Monitoring Report, NPDES Permit CA0001309, Annual Report 2004. March 1.
- Boeing. 2006. Santa Susana Field Laboratory, Discharge Monitoring Report, NPDES Permit CA0001309, Annual Report 2005. March 1.
- Boeing. 2007a. Santa Susana Field Laboratory, Discharge Monitoring Report, NPDES Permit CA0001309, Annual Report 2006. March 1.
- Boeing. 2007b. First Quarter 2007 NPDES Discharge Monitoring Report. May 15.
- Boeing. 2007c. Group 8 Historical Documents, Santa Susana Field Laboratory, Ventura County, California. September.
- Department of Toxic Substances Control (DTSC). 1992. Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities. October.
- DTSC. 1995. Letter from A. Sorsher, DTSC, to R. Ueshiro, Rockwell, regarding, Interim Measures for Former Sodium Disposal Facility, Santa Susana Field Laboratory, Area IV, EPA ID CAD 000 629 972. December 1.
- DTSC. 1999. Letter from D. Oudiz, DTSC, to D. Dassler, Rockwell, regarding, Technical Review of Draft Final Interim Measures Workplan for Soil Cleanup at the Former Sodium Disposal Facility, Santa Susana Field Laboratory, Simi Hills, California CAD 000629972. July 15.
- DTSC. 2000. Letter from G. Abrams, DTSC, to D. Chung, Boeing, regarding Proposed Borrow Area Sampling Results, July 1999, Santa Susana Field Laboratory. September 29.

- Department of Health Services (DHS). 1998. Letter from G. Wong, DHS, to P. Rutherford regarding: Radiological Release of the Former Sodium Disposal Facility. May 15.
- Dibblee, Thomas, W. 1992. Geologic Map of the Calabasas Quadrangle, Los Angeles and Ventura County, California.
- DTSC. 1995. Hazardous Waste Facility Post-Closure Permit. May.
- Ebasco, Environmental (Ebasco). 1991. Closure Plan, Former Sodium Disposal Facility (FSDF), Santa Susana Field Laboratory (SSFL). July.
- Groundwater Resources Consultants, Inc. (GRC), 1989. Investigation of Soil and Shallow Groundwater Conditions, Santa Susana Field Laboratory, Rockwell International Corp., Rocketdyne Division, Ventura County, California. May.
- GRC. 1990. Hydrogeologic Assessment Report (HAR), Lower Pond, B886 FSDF. June 12.
- GRC. 1995a. Sampling and Analysis Plan, Hazardous Waste Facility Post-Closure Permit PC-94/95-3-02, Area IV. Santa Susana Field Laboratory, Rockwell International Corporation, Rocketdyne Division. June 5.
- GRC. 1995b. Sampling and Analysis Plan, Hazardous Waste Facility Post-Closure Permit PC-94/95-3-03, Areas I and III. Santa Susana Field Laboratory, Rockwell International Corporation, Rocketdyne Division. June 5.
- GRC. 1995c. Well Compendium, Rockwell International Corporation, Rocketdyne Division, Santa Susana Field Laboratory, Ventura County, California, 8640M-89C. September 20.
- Haley & Aldrich, Inc. (H&A). 2006a. Report on Annual Groundwater Monitoring, 2005. Santa Susana Field Laboratory, Ventura County, California. February.
- H&A. 2006b. First Quarter 2006 Groundwater Monitoring Report, Santa Susana Field Laboratory, Ventura County, California. May.
- H&A. 2006c. Second Quarter 2006 Groundwater Monitoring Report, Santa Susana Field Laboratory, Ventura County, California. August.
- H&A. 2006d. Third Quarter 2006 Groundwater Monitoring Report, Santa Susana Field Laboratory, Ventura County, California. November.
- ICF Kaiser Engineers (ICF). 1993. Current Conditions Report and Draft RFI Work Plan, Area IV, Santa Susana Field Laboratory, Ventura County, California. September.
- ICF. 1997. Former Sodium Disposal Facility, Santa Susana Field Laboratory, Characterization Report. August 15.
- IT Corporation (IT). 1999. Interim Measures Workplan for Soil Cleanup at the Former Sodium Disposal Facility, Santa Susana Field Laboratory. July 9.

- IT. 2002. Draft Interim Measure Implementation Report, Former Sodium Disposal Facility, Santa Susana Field Laboratory. September 13.
- McLaren/Hart Environmental Engineering Corporation (McLaren/Hart). 1993. Multi-Media Sampling Report for the Brandeis-Bardin Institute and the Santa Monica Mountains Conservancy. March 10.
- McLaren/Hart. 1995a. Additional Soil and Water Sampling, The Brandeis-Bardin Institute and Santa Monica Mountains Conservancy. January 19.
- McLaren/Hart. 1995b. Draft Former Sodium Disposal Facility Off-Site Drainage Characterization Report. October 4.
- Montgomery Watson, 2000a. Technical Memorandum, Conceptual Site Model, Movement of TCE in the Chatsworth Formation. Santa Susana Field Laboratory, Volumes I, II, and III. April.
- MWH. 2002. Plates Depicting the Geologic Structure and Stratigraphy in the Northwest Portion of the SSFL. October.
- MWH. 2003a. Report of Results, Phase I of Northeast Investigation Area Groundwater Characterization. Santa Susana Field Laboratory, Ventura County. September.
- MWH. 2003b. Near-surface Groundwater Characterization Report. Santa Susana Field Laboratory, Ventura County. November.
- MWH. 2003c. Perchlorate Source Evaluation and Technical Report. Santa Susana Field Laboratory, Ventura County. February.
- MWH. 2004. RCRA Facility Investigation Program Report. Santa Susana Field Laboratory, Ventura County. July.
- MWH. 2005. Standardized Risk Assessment Methodology (SRAM) Work Plan, Revision 2. Santa Susana Field Laboratory, Ventura County. September.
- MWH. 2006a. Storm Water Pollution Prevention Plan for Santa Susana Field Laboratory. June.
- MWH. 2006b. Group 6 Northeastern Portion of Area IV, RCRA Facility Investigation, Santa Susana Field Laboratory, Ventura County. September. Appendix D, Soil Background Report Addendum.
- MWH. 2006c. Personal Communication between Diana Buchanan, MWH, and K. Robinson, Boeing, regarding: Steam Lance Fuel Usage. December 8.
- MWH. 2007. Vapor Migration Modeling Study and VOC Surface Flux and Ambient Air Monitoring at the Former Liquid Oxygen Plant Site. Santa Susana Field Laboratory, Ventura County. July.

- Ogden Environmental and Energy Services Co., Inc. (Ogden), 1996. RFI Work Plan Addendum, Santa Susana Field Laboratory, Ventura County, California, September.
- Ogden. 2000a. RCRA Facility Investigation Work Plan Addendum Amendment. Santa Susana Field Laboratory, Ventura County, California. June.
- Ogden. 2000b. Shallow Groundwater Investigation Work Plan, Final. Santa Susana Field Laboratory, Ventura County, California. December.
- Regional Water Quality Control Board (RWQCB). 1990. Letter from J.E. Ross, RWQCB, to S.R. Lafflam, Rockwell, regarding, TPCA Determination, Lower Pond of the Sodium Burn Pit, Santa Susana Field Laboratory (File No. 200.003). April 6.
- RWQCB. 1991. Letter from R.P. Ghirelli, RWQCB, to S.R. Lafflam, Rockwell, regarding, Cleanup and Abatement Order, 91-061.
- RWQCB. 1992a. Letter from J.E. Ross, RWQCB, to S.R. Lafflam, Rockwell, regarding, Former Sodium Disposal Facility B/886, Santa Susana Field Laboratory – Closure Plan Approval (File No 200.003). February 11.
- RWQCB. 1992b. Letter from J.E. Ross, RWQCB, to S.R. Lafflam, Rockwell, regarding, Rockwell International Corporation, Rocketdyne Division – Closure of Surface Impoundment in Area IV, Former Sodium Disposal Facility B/886 Lower Pond, Under the Toxic Pit Cleanup Act (TPCA) Program. December 29.
- Rockwell 1987. CERCLA Program Phase II – Site Characterization. GEN-ZR-0002. May 29.
- Rockwell. 1988. Radiological Survey of the Sodium Disposal Facility – Building T886. GEN-ZR-0004. June 3.
- Rockwell. 1992a. Internal correspondence from P.H. Horton to D.C. Gibbs, regarding: Highlights, Week Ending July 24, 1992. July 27.
- Rockwell. 1992b. Baseline Radiological Survey of the Sodium Disposal Facility (T886). N704SRR990034. August.
- Rockwell. 1993. Internal correspondence from M.C. Shoemaker to S.R. Lafflam, regarding: Environmental Protection Weekly Activity Report. May 13.
- Rockwell. 1994. Post-Remediation Ambient Gamma Radiological Survey of the Former Sodium Disposal Facility (T886).
- Rockwell. 1995. Letter from M. Sullivan, Rockwell, to Carla Slepak, DTSC, regarding Former Sodium Disposal Facility Interim Measures. December 20.
- Rockwell. 1996. Post-Remediation Soil Sampling and Analysis for the Former Sodium Disposal Facility. March 25.

Sapere Consulting, Inc. (Sapere). 2005. Historical Site Assessment of Area IV, Santa Susana Field Laboratory, Ventura County, CA. May.

Science Applications International Corporation (SAIC), 1991. Interim RCRA Facility Assessment Report for Rockwell International Corporation, Rocketdyne Division, Santa Susana Field Laboratory, Ventura County, California. Prepared for USEPA Region IX, San Francisco California. July 10.

SAIC, 1994. Final RCRA Facility Assessment Report for Rockwell International Corporation, Rocketdyne Division, Santa Susana Field Laboratory, Ventura County, California. Prepared for USEPA Region IX, San Francisco California. May.

Shaw Environmental, Inc. (Shaw). 2006. Annual Operation and Maintenance and Infiltration Monitoring Report, July 2005 through June 2006, Former Sodium Disposal Facility Interim Measures, Santa Susana Field Laboratory. August.

University of Waterloo (UW). 2007. Rock Core VOC Results for Corehole C8, Source Zone Characterization at the Santa Susana Field Laboratory, Addendum Report No. 1. July.

United States Department of Energy (DOE). 1989. Environmental Survey Preliminary Report; DOE Activities at Santa Susana Field Laboratory. February. Office of Environment, Safety, and Health Office of Environmental Audits.

United States Department of Energy (DOE). 2000. Draft Docket for the Release of Building 4886 as part of the Energy Technology Engineering Center Closure. CD-ETEC-4886. March.

United States Environmental Protection Agency (USEPA). 1992. Guidance for Data Usability in Risk Assessment (Part A), Final. Office of Emergency and Remedial Response.

USEPA. 1993. National Oil and Hazardous Substances Pollution Contingency Plan.

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.

Facility Drawing References:

Atomics International (AI) Drawing, 1958. Target Range Modification #885, Burro Flats, Santa Susana. Drawing No. 303-885-C1. Drawn Date May 5, 1958, Approved Date June 10, 1958.

AI Drawing, 1962. Firing Range Backstop – S.S. Drawing No. 303-885-C2. September.

AI Drawing, 1966. Location of Impact Test Facility S.S., Site Location Plan. Drawing No. 303-730-C1. Sheet No. 1 of 1. Drawn Date April, 1966, Approved Date May 2, 1966.

AI Drawing, 1966. Isotope Impact Test Building 730 S.S., Foundation Plan and Details. Drawing No. 303-730-S1. Sheet No. 1 of 1. Drawn Date January 14, 1966, Approved Date January 23, 1966.

Azimuth Boundary Services (Azimuth) Drawing, 1991. Topographic Survey. Drawing No. M000-80599-C5. April 5.

Azimuth Drawing, 1991. Topographic Survey. Drawing No. M000-80599-C6. April 8.

Rockwell Drawing, 1992a. Area IV, ETEC, Sodium Disposal Facility Closure Final Grading Plan. Drawing No. M000-80599-C1. February 4.

Rockwell Drawing, 1992b. Area IV, ETEC, Sodium Disposal Facility Closure Existing Topography and Demolition. Drawing No. M000-80599-C2. February 4.

Rockwell Drawing, 1992c. Area IV, ETEC, Sodium Disposal Facility Closure Excavation Plan. Drawing No. M000-80599-C2. February 4.

Rockwell Drawing 1992d. Former Sodium Disposal Facility Area 886 Site Remediation Layout. Drawing No. M000-80599-C4 (886-CX-0002). April 2.

Rockwell Drawing 1992e. Area IV, ETEC, Sodium Disposal Facility Closure Excavation. Drawing No. M000-80599-C2. August 17.

Rockwell Drawing, 1992f. Area IV, ETEC, Sodium Disposal Facility Closure Final Grading Plan. Drawing No. M000-80599-C3. September 1.

TABLES

TABLE D.2-1
FSDf RFI SITE BUILDING INVENTORY
 (Page 1 of 1)

Building (a)	Chemical Use Area Location	Current Use	Former Use	Operational Status Existing/Removed	DTSC Site Visit Date
Building 609	East of 5	None	Storage Building	Removed	March 2001
Building 604	Adjacent to 1b	None	Fire Equipment Storage	Removed	(b)
Building 730	East of 2	None	Storage Shed	Built - 1966 Removed - late 1960s	June 2004
Building 885	5	None	FSDf Pistol Range	Removed - 1980s	March 2001
Building 886	2	None	Sodium Disposal Facility	Removed	(b)

Notes:

- (a) Buildings are sometimes identified with the Administrative Area Number followed by the building number (e.g Building 886 vs. Building 4886).
- (b) DTSC was periodically onsite prior to and during 1992 pond closure and 2000 IM activities for site inspections, geologic mapping, and planning.

Sources:

Sapere 2005; Field inspection, aerial photos, facility records, and historical facility drawings (Azimuth, 1991; Azimuth, 1991; AI, 1958; AI, 1962; AI, 1966a; AI, 1966b; Rockwell, 1992a; Rockwell, 1992b; Rockwell, 1992c; Rockwell 1992d; Rockwell 1992e; Rockwell, 1992f; Boeing 2007b)

TABLE D.2-2
FSDF RFI SITE TANK INVENTORY
(Page 1 of 1)

Tank Designator^(a)	Chem Use Area Number	Location	Contents	Tank Size (gallons)	Operational Status Existing / Removed
--------------------------------------	---------------------------------	-----------------	-----------------	--------------------------------	--

Aboveground Tanks - other

Stormwater Tank 1 ^(b)	North of 1	Outfall 005	Rainwater	20,000	Existing
----------------------------------	------------	-------------	-----------	--------	----------

Underground Tanks

None

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.

^(b) Baker tanks were placed onsite periodically to hold water rainwater that had accumulated on top of tarps (e.g. the tarp that covered the excavation during 1992-1993 rainy season or the tarp that was placed over the excavated area to prevent surface water infiltration in the mid-1990s).

Sources:

Field inspection, aerial photographs (USEPA, 1997) and facility records (Boeing, 2007b).

TABLE D.2-3
FSDF RFI SITE TRANSFORMER INVENTORY
 (Page 1 of 1)

SSFL Identification Number	Chem Use Area Location	Description	Location	Status	Oil Sampled for PCBs ^(a) (Date/ Results)	Soil Sampled (Date/ Results)	Visual Site Inspection (Date/ Findings)
----------------------------------	---------------------------	-------------	----------	--------	---	---------------------------------	---

None.

Notes:

^(a) PCB = polychlorinated biphenyl

Sources:

Field inspection, aerial photographs (USEPA, 1997) and facility records (Boeing, 2007b)

TABLE D.2-4
FSDf RFI SITE DOCUMENTED CHEMICAL USE

Chemicals Used	Reference
Na; NaK	Rockwell 1987; GRC 1990; Ebasco 1991; ICF 1997; IT 1999
Terphenyls ^(a)	Rockwell 1987; GRC 1990; Ebasco 1991; Boeing 1999
Kerosene	Rockwell 1987; GRC 1990; Ebasco 1991
Scrap metal	Rockwell 1987; GRC 1990; Ebasco 1991; ICF 1997; IT 1999
PCBs	GRC 1990; Ebasco 1991
Solvents	GRC 1990; IT 2002
Hydrocarbons	IT 1999
Asbestos ^(b)	Rockwell 1993

Notes:

^(a) Boeing 1999 indicates that Santo-wax, a mixture of terphenyls, was disposed of at the site.

^(b) The use of asbestos has not been documented; however, a small amount of asbestos was reportedly removed from the excavation in 1993.

Acronyms:

Na = Sodium

NaK = Sodium-Potassium mixture

PCB = Polychlorinated biphenyl

TABLE D.3-1A
FSDF RFI SITE SAMPLING SUMMARY

Sample Type (1,5)	Total Number of Samples (2)	Total QC Samples (3)	Total Agency Samples (4)	Total Validated Samples
Soil Vapor Samples (Table D.3-1B)	10	2	0	12
Soil Matrix Samples (Table D.3-1C)	547	47	12	295
Surface Water Samples (Table D.3-1D)	8	4	3	5

Notes:

1. Detailed sample and analytical program information is contained in Tables D.3-1B , D.3-1C and D.3-1D as indicated above.

2. Total samples = total primary site investigation samples, including historical samples and composite samples.

3. Quality Control (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 = Department of Toxic Substance Control (DTSC) or United States Environmental Protection Agency (USEPA) split samples.

5. All groundwater data presented in Appendix E of the Group 8 RFI Report.

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

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Sample Method	Depth (feet bgs)	Sample Type	Sample Analyses (Validated Y/N) ^a	Rationale ^(b)	Consultant ^(c)	Reference Document ^(d)
							VOC			
FSSV0004	FSSV0004S02	FSSV0004S02	03/05/07	Active	8	Primary Sample	Y	DGA	MWH	This report
FSSV0005	FSSV0005S01	FSSV0005S01	03/08/07	Active	5	Primary Sample	Y	DGA	MWH	This report
FSSV0005	FSSV0005S02	FSSV0005S02	03/05/07	Active	10	Primary Sample	Y	DGA	MWH	This report
FSSV0006	FSSV0006D01	FSSV0006D01	03/05/07	Active	4	Field Duplicate	Y	DGA	MWH	This report
FSSV0006	FSSV0006S01	FSSV0006S01	03/05/07	Active	4	Primary Sample	Y	DGA	MWH	This report
FSSV01	RW351	FSSV01S01	04/23/01	Active	15	Primary Sample	Y	WP	AMEC	MWH, 2004
FSSV02	RW352	FSSV02S01	04/23/01	Active	10	Primary Sample	Y	WP	AMEC	MWH, 2004
FSSV03	MV641	FSSV03S01	07/27/06	Active	4	Primary Sample	Y	VV	MWH	MWH, 2007
FSSV03	MV642	FSSV03S02	07/27/06	Active	7	Primary Sample	Y	VV	MWH	MWH, 2007
FSSV03	MV643	FSSV03D01	07/27/06	Active	7	Field Duplicate	Y	VV	MWH	MWH, 2007
FSVF01	MV587	FSVF01S01	07/18/06	Vapor Flux	0	Primary Sample	Y	VV	MWH	MWH, 2007
FSVF01	MV618	FSVF01S02	07/21/06	Vapor Flux	0	Primary Sample	Y	VV	MWH	MWH, 2007
Total Primary Samples:						Validated:	12			
Total QC (Duplicate) Samples:						Not Validated	0			
Number of FSDF RFI Site Soil Vapor Samples:										

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 2007 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.

STEP - Indicates stepout samples were collected as a part of the RFI program (prior to Data Gaps Analysis) to delineate concentrations above comparison levels or anomalous conditions.

VV - Vapor validation study sample.

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

(d) **Reference Document** indicates where data are published; "This report" includes the RFI site appendix and the Group 8 RFI Report (See References, Section D.6).

Laboratory Analytical Methods Represented (EPA Method No.)

VOC - 8260B, TO-15, TO-15 SIM

VOC - Volatile Organic Compound

TABLE D.3-1C
FSDF RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 1 of 11)

TABLE D.3-1C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs) (g,h,i)	Sample Type	Sample Analyses (Validated Yes/No)									Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)
								Dioxins	Inorganics	Metals	PCBs	Perchlorate	SVOCs	Terphenyls	TPH	VOCs				
110500	12124016	110500P	6/28/1995	Removed	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
110500	15000007	110500	6/28/1995	Removed	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
120380	12124017	120380P	6/28/1995	Removed	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
120380	15000008	120380	6/28/1995	Removed	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
125502	15000009	125502	6/28/1995	Removed	G	0	Field Duplicate	N									N	DC	McLaren/Hart	McLaren Hart 1995b
130240	12124018	130240P	6/28/1995	Removed	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
130240	15000010	130240	6/28/1995	Removed	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
210040	12124020	210040P	6/28/1995	Removed	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
210040	15000011	210040	6/28/1995	Removed	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
210660	12124002	210660P	6/28/1995	Removed	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
210660	15000012	210660	6/28/1995	Removed	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
210810	12124003	210810P	6/28/1995	Removed	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
210810	15000013	210810	6/28/1995	Removed	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
310700	12124004	310700P	6/28/1995	Removed	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
310700	15000014	310700	6/28/1995	Removed	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
311560	12124005	311560P	6/28/1995	Removed	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
311560	15000016	311560	6/28/1995	Removed	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
312850	12124006	312850P	6/28/1995	Removed	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
312850	15000017	312850	6/28/1995	Removed	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
321750	12124008	321750P	6/28/1995	Removed	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
321750	15000018	321750	6/28/1995	Removed	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
322680	12124009	322680P	6/28/1995	Removed	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
322680	15000019	322680	6/28/1995	Removed	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
326502	15000020	326502	6/28/1995	Removed	G	0	Field Duplicate	N									N	DC	McLaren/Hart	McLaren Hart 1995b
413580	12124011	413580P	6/28/1995	In Place	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
413580	15000002	413580	6/28/1995	In Place	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
414502	15000001	414502	6/28/1995	In Place	G	0	Field Duplicate	N									N	DC	McLaren/Hart	McLaren Hart 1995b
416380	12124012	416380P	6/28/1995	In Place	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
416380	15000003	416380	6/28/1995	In Place	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
424760	12124014	424760P	6/28/1995	In Place	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
424760	15000004	424760	6/28/1995	In Place	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
428480	12124015	428480P	6/28/1995	In Place	G	0	Primary Sample				N						N	DC	McLaren/Hart	McLaren Hart 1995b
428480	15000006	428480	6/28/1995	In Place	G	0	Primary Sample	N									N	DC	McLaren/Hart	McLaren Hart 1995b
10130331	10130331SMM0	10130331SMM0	7/17/1995	Removed	HA	4.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
10130331	10130331SC0C0	10130331SC0C0	7/17/1995	Removed	HA	4.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
10130331	10130331SVL0	10130331SVL0	7/17/1995	Removed	HA	4.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
10130331	10130331SOC0	10130331SOC0	7/17/1995	Removed	HA	4.5	Primary Sample	N			N		N		N	N	N	WP	ICF Kaiser	ICF 1997
10130331	10130331SVL0	10130331SVL0	7/17/1995	Removed	HA	4.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
10146220	10146220SMM0	10146220SMM0	7/17/1995	In Place	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
10146220	10146220SOC0	10146220SOC0	7/17/1995	In Place	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
10146220	10146220SVL0	10146220SVL0	7/17/1995	In Place	HA	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
10230331	10230331SMM0	10230331SMM0	7/18/1995	Removed	HA	4.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
10230331	10230331SOC0	10230331SOC0	7/18/1995	Removed	HA	5	Primary Sample	N			N		N		N	N	N	WP	ICF Kaiser	ICF 1997
10230331	10230331SVL0	10230331SVL0	7/18/1995	Removed	HA	5.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
10230331	10230331SOC0	10230331SOC0	7/18/1995	Removed	HA	5	Primary Sample	N			N		N		N	N	N	WP	ICF Kaiser	ICF 1997
10230331	10230331SVL0	10230331SVL0	7/18/1995	Removed	HA	5.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
10246220	10246220SMM0	10246220SMM0	7/18/1995	In Place	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
10246220	10246220SOC0	10246220SOC0	7/18/1995	In Place	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
10246220	10246220SVL0	10246220SVL0	7/18/1995	In Place	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
10330331	10330331SMM0	10330331SMM0	7/18/1995	In Place	HA	4.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
10330331	10330331SOC0	10330331SOC0	7/18/1995	In Place	HA	5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
10330331	10330331SVL0	10330331SVL0	7/18/1995	In Place	HA	5.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
10346220	10346220SMM0	10346220SMM0	7/18/1995	In Place	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
10346220	10346220SOC0	10346220SOC0	7/18/1995	In Place	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
10346220	10346220SVL0	10346220SVL0	7/18/1995	In Place	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
10430331	10430331SMM0	10430331SMM0	7/18/1995	In Place	HA	5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
10430331	10430331SOC0	10430331SOC0	7/18/1995	In Place	HA	5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
10430331	10430331SVL0	10430331SVL0	7/18/1995	In Place	HA	5.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
10446220	10446220SMM0	10446220SMM0	7/18/1995	In Place	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997

TABLE D.3-1C
FSDF RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 2 of 11)

TABLE D.3-1C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs) (g,h,i)	Sample Type	Sample Analyses (Validated Yes/No)									Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)
								Dioxins	Inorganics	Metals	PCBs	Perchlorate	SVOCs	Terphenyls	TPH	VOCs				
10446220	10446220SOC0	10446220SOC0	7/18/1995	In Place	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
10446220	10446220SVL0	10446220SVL0	7/18/1995	In Place	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
10530331	10530331SMM0	10530331SMM0	7/18/1995	In Place	HA	5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
10530331	10530331SOC0	10530331SOC0	7/18/1995	In Place	HA	4.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
10530331	10530331SVL0	10530331SVL0	7/18/1995	In Place	HA	4.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
10546220	10546220SMM0	10546220SMM0	7/18/1995	In Place	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
10546220	10546220SMM2	10546220SMM2	7/18/1995	In Place	HA	0.5	Field Duplicate			N							N	WP	ICF Kaiser	ICF 1997
10546220	10546220SOC0	10546220SOC0	7/18/1995	In Place	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
10546220	10546220SOC2	10546220SOC2	7/18/1995	In Place	HA	1	Field Duplicate	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
10546220	10546220SVL0	10546220SVL0	7/18/1995	In Place	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
10546220	10546220SVL2	10546220SVL2	7/18/1995	In Place	HA	1	Field Duplicate									N	N	WP	ICF Kaiser	ICF 1997
20130331	20130331SMM0	20130331SMM0	7/24/1995	In Place	HA	5.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
20130331	20130331SOC0	20130331SOC0	7/24/1995	In Place	HA	5.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
20130331	20130331SVL0	20130331SVL0	7/24/1995	In Place	HA	5.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
20146220	20146220SMM0	20146220SMM0	7/24/1995	In Place	HA	1.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
20146220	20146220SOC0	20146220SOC0	7/24/1995	In Place	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
20146220	20146220SVL0	20146220SVL0	7/24/1995	In Place	HA	1.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
20230331	20230331SVL0	20230331SVL0	7/24/1995	Removed	HA	5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
20230331	20230331SOC0	20230331SOC0	7/24/1995	Removed	HA	5.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
20230331	20230331SMM0	20230331SMM0	7/24/1995	Removed	HA	5.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
20246220	20246220SMM0	20246220SMM0	7/24/1995	In Place	HA	1.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
20246220	20246220SOC0	20246220SOC0	7/24/1995	In Place	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
20246220	20246220SVL0	20246220SVL0	7/24/1995	In Place	HA	1.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
20330281	20330281SMM0	20330281SMM0	7/24/1995	Removed	HA	4.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
20330281	20330281SOC0	20330281SOC0	7/24/1995	Removed	HA	5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
20330281	20330281SVL0	20330281SVL0	7/24/1995	Removed	HA	5.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
20346310	20346310SMM0	20346310SMM0	7/24/1995	In Place	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
20346310	20346310SOC0	20346310SOC0	7/24/1995	In Place	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
20346310	20346310SVL0	20346310SVL0	7/24/1995	In Place	HA	1.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
20446370	20446370SMM0	20446370SMM0	7/24/1995	In Place	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
20446370	20446370SOC0	20446370SOC0	7/24/1995	In Place	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
20446370	20446370SVL0	20446370SVL0	7/24/1995	In Place	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
20530491	20530491SVL0	20530491SVL0	7/24/1995	Removed	HA	4.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
20530491	20530491SOC0	20530491SOC0	7/24/1995	Removed	HA	5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
20530491	20530491SMM0	20530491SMM0	7/24/1995	Removed	HA	5.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
20546500	20546500SMM0	20546500SMM0	7/24/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
20546500	20546500SOC0	20546500SOC0	7/24/1995	Removed	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
20546500	20546500SVL0	20546500SVL0	7/24/1995	Removed	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
20630331	20630331SMM0	20630331SMM0	7/24/1995	Removed	HA	5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
20630331	20630331SOC0	20630331SOC0	7/24/1995	Removed	HA	5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
20630331	20630331SVL0	20630331SVL0	7/24/1995	Removed	HA	5.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
20646220	20646220SOC0	20646220SOC0	7/21/1995	Removed	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
20646220	20646220SVL0	20646220SVL0	7/21/1995	Removed	HA	1.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
20646220	20646220SMM0	20646220SMM0	7/21/1995	Removed	HA	1	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
20730331	20730331SMM0	20730331SMM0	7/20/1995	Removed	HA	4.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
20746220	20746220SMM0	20746220SMM0	7/21/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
20846220	20746220SVL0	20746220SVL0	7/21/1995	Removed	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
20946220	20746220SOC0	20746220SOC0	7/21/1995	Removed	HA	1.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21030331	21030331SVL0	21030331SVL0	7/19/1995	Removed	HA	4.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21030331	21030331SMM0	21030331SMM0	7/19/1995	Removed	HA	4.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21030331	21030331SOC0	21030331SOC1	7/19/1995	Removed	HA	5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21046220	21046220SOC0	21046220SOC0	7/19/1995	Removed	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21046220	21046220SMMO	21046220SMMO	7/19/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21046220	21046220SVLO	21046220SVLO	7/19/1995	Removed	HA	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21120331	21120331SMM0	21120331SMM0	7/19/1995	Removed	HA	4.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21120331	21120331SVL0	21120331SVL0	7/19/1995	Removed	HA	5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21120331	21120331SOC0	21120331SOC0	7/19/1995	Removed	HA	5.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21136220	21136220SMM0	21136220SMM0	7/18/1995	In Place	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21136220	21136220SOC0	21136220SOC0	7/18/1995	In Place	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997

TABLE D.3-1C
FSDF RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 3 of 11)

TABLE D.3-1C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs) (g,h,i)	Sample Type	Sample Analyses (Validated Yes/No)									Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)
								Dioxins	Inorganics	Metals	PCBs	Perchlorate	SVOCs	Terphenyls	TPH	VOCs				
21136220	21136220SVL0	21136220SVL0	7/18/1995	In Place	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21230331	21230331SMM0	21230331SMM0	7/21/1995	In Place	HA	5.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21230331	21230331SOC0	21230331SOC0	7/21/1995	In Place	HA	5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21230331	21230331SVL0	21230331SVL0	7/21/1995	In Place	HA	5.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21246220	21246220SMM0	21246220SMM0	7/21/1995	Removed	HA	1	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21246220	21246220SMM5	21246220SMM5	7/21/1995	Removed	HA	1.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21246220	21246220SOC0	21246220SOC0	7/21/1995	Removed	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21246220	21246220SOC5	21246220SOC5	7/21/1995	Removed	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21246220	21246220SVL5	21246220SVL5	7/21/1995	Removed	HA	1.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21246220	21246220SVL0	21246220SVL0	7/21/1995	Removed	HA	1.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21346220	21346220SOC0	21346220SOC0	7/21/1995	Removed	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21346220	21346220SMM0	21346220SMM0	7/21/1995	Removed	HA	1	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21346220	21346220SVL0	21346220SVL0	7/21/1995	Removed	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21404240	2140420SOC0	2140420SOC0	7/25/1995	Removed	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21404240	21404240SVL0	21404240SVL0	7/25/1995	Removed	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21404240	21004240SMM0	21004240SMM0	7/25/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21431330	21431330SOC0	21431330SOC0	7/24/1995	Removed	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21431330	21431330SVL0	21431330SVL0	7/24/1995	Removed	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21431330	21431330SMM0	21431330SMM0	7/24/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21446220	21446220SMM0	21446220SMM0	7/24/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21446220	21446220SOC0	21446220SOC0	7/24/1995	Removed	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21446220	21446220SVL0	21446220SVL0	7/24/1995	Removed	HA	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21513070	21513070SVL0	21513070SVL0	7/25/1995	Removed	HA	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21513070	21513070SMM0	21513070SMM0	7/25/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21516170	21516170SOC0	21516170SOC0	7/25/1995	Removed	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21546220	21546220SVL0	21546220SVL0	7/19/1995	Removed	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21646220	21646220SOC0	21646220SOC0	7/19/1995	Removed	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21646220	21646220SMM0	21646220SMM0	7/19/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21720331	21720331SMM0	21720331SMM0	7/19/1995	Removed	HA	4.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21720331	21720331SVL0	21720331SVL0	7/19/1995	Removed	HA	4.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21720331	21720331SOC0	21720331SOC0	7/19/1995	Removed	HA	5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21736220	21736220SMM0	21736220SMM0	7/19/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21736220	21736220SOC0	21736220SOC0	7/19/1995	Removed	HA	0.5	Primary Sample	N		N			N		N		N	WP	ICF Kaiser	ICF 1997
21736220	21736220SVL0	21736220SVL0	7/19/1995	Removed	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21846220	21846220SOC0	21846220SOC0	7/21/1995	Removed	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21846220	21846220SVL0	21846220SVL0	7/21/1995	Removed	HA	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21846220	21846220SMM0	21846220SMM0	7/21/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
21946220	21946220SOC0	21946220SOC0	7/21/1995	Removed	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
21946220	21946220SVL0	21946220SULO	7/21/1995	Removed	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
21946220	21946220SMM0	21946220SMM0	7/21/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
22046220	22046220SVL0	22046220SVL0	7/24/1995	Removed	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
22046220	22046220SMM0	22046220SMM0	7/24/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
22046220	2204622080C0	2204622080C0	7/24/1995	Removed	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
22130331	22130331SMM0	22130331SMM0	7/20/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
22130331	22130331SOC0	22130331SOC0	7/20/1995	Removed	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
22130331	22130331SVL0	22130331SVL0	7/20/1995	Removed	HA	1.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
22146220	22146220SOC0	22146220SOC0	7/19/1995	Removed	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
22146220	22146220SMM0	22146220SMM0	7/19/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
22146220	22146220SVL0	22146220SVL0	7/19/1995	Removed	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
22236220	22236220SOC0	22236220SOC0	7/18/1995	Removed	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
22236220	22236220SMM0	22236220SMM0	7/18/1995	Removed	HA	1	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
22236220	22236220SVL0	22236220SVL0	7/18/1995	Removed	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
22236220	22236220SOC2	22236220SOC2	7/18/1995	Removed	HA	0.5	Field Duplicate	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
22236220	22236220SVL2	22236220SVL2	7/18/1995	Removed	HA	1	Field Duplicate									N	N	WP	ICF Kaiser	ICF 1997
22236220	22236220SMM2	22236220SMM2	7/18/1995	Removed	HA	0.5	Field Duplicate			N							N	WP	ICF Kaiser	ICF 1997
30302480	30302480BOM0	30302480BOM0	7/26/1995	Removed	BR	10	Primary Sample			N	N		N		N		N	WP	ICF Kaiser	ICF 1997
30520210	30520210BOM0	30520210BOM0	7/26/1995	Removed	BR	0	Primary Sample			N	N		N		N		N	WP	ICF Kaiser	ICF 1997
30538110	30538110BOM0	30538110BOM0	7/26/1995	Removed	BR	3	Primary Sample			N	N		N		N		N	WP	ICF Kaiser	ICF 1997
30543090	30543090BOM0	30543090BOM0	7/31/1995	Removed	BR	3	Primary Sample			N	N		N		N		N	WP	ICF Kaiser	ICF 1997

TABLE D.3-1C
FSDF RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 4 of 11)

TABLE D.3-1C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs) (g,h,i)	Sample Type	Sample Analyses (Validated Yes/No)									Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)
								Dioxins	Inorganics	Metals	PCBs	Perchlorate	SVOCs	Terphenyls	TPH	VOCs				
30716110	30716110BOM0	30716110BOM0	7/26/1995	Removed	BR	8.5	Primary Sample			N	N		N		N		N	WP	ICF Kaiser	ICF 1997
30724500	30724500BOM0	30724500BOM0	7/26/1995	Removed	BR	10	Primary Sample			N	N		N		N		N	WP	ICF Kaiser	ICF 1997
30733360	30733360BOM0	30733360BOM0	7/31/1995	Removed	BR	10	Primary Sample			N	N		N		N		N	WP	ICF Kaiser	ICF 1997
30770330	30770330BOM0	30770330BOM0	7/26/1995	Removed	BR	4	Primary Sample			N	N		N		N		N	WP	ICF Kaiser	ICF 1997
30921670	30921670SMM0	30921670SMM0	7/25/1995	Removed	HA	0.5	Primary Sample			N	N		N		N		N	WP	ICF Kaiser	ICF 1997
30921670	30921670SOC0	30921670SOC0	7/25/1995	Removed	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
30921670	30921670SVL0	30921670SVL0	7/25/1995	Removed	HA	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
31001360	31001360BOM0	31001360BOM0	7/26/1995	Removed	BR	11	Primary Sample			N	N		N		N		N	WP	ICF Kaiser	ICF 1997
31019530	31019530BOM0	31019530BOM0	7/26/1995	Removed	BR	3.5	Primary Sample			N	N		N		N		N	WP	ICF Kaiser	ICF 1997
31236290	31236290SOC0	31236290SOC0	7/25/1995	Removed	HA	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
31236290	31236290SVL0	31236290SVL0	7/25/1995	Removed	HA	1	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
31236290	31236290SMM0	31236290SMM0	7/25/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
40414080	40414080SMM0	40414080SMM0	7/27/1995	Removed	G	0.5	Primary Sample			N	N		N		N		N	WP	ICF Kaiser	ICF 1997
40414080	40414080SMOC0	40414080SMOC0	7/27/1995	Removed	G	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
40414080	40414080SSVL0	40414080SSVL0	7/27/1995	Removed	G	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
40518080	40518080SMM0	40518080SMM0	7/27/1995	Removed	G	0.5	Primary Sample			N	N		N		N		N	WP	ICF Kaiser	ICF 1997
40518080	40518080SOC0	40518080SOC0	7/27/1995	Removed	G	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
40518080	40518080SVL0	40518080SVL0	7/27/1995	Removed	G	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
41047580	41047580SMM0	41047580SMM0	7/27/1995	Removed	G	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
41047580	41047580SOC0	41047580SOC0	7/27/1995	Removed	G	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
41047580	41047580SVL0	41047580SVL0	7/27/1995	Removed	G	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
41049080	41049080SMM0	41049080SMM0	7/27/1995	Removed	G	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
41049080	41049080SOC0	41049080SOC0	7/27/1995	Removed	G	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
41049080	41049080SVL0	41049080SVL0	7/27/1995	Removed	G	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
41206390	41206390SMM0	41206390SMM0	7/25/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
41206390	41206390SOC0	41206390SOC0	7/25/1995	Removed	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
41206390	41206390SVL0	41206390SVL0	7/25/1995	Removed	HA	1.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
41206390	41206390SMM2	41206390SMM2	7/25/1995	Removed	HA	0.5	Field Duplicate			N							N	WP	ICF Kaiser	ICF 1997
41206390	41206390SOC2	41206390SOC2	7/25/1995	Removed	HA	1	Field Duplicate	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
41206390	41206390SVL2	41206390SVL2	7/25/1995	Removed	HA	1.5	Field Duplicate									N	N	WP	ICF Kaiser	ICF 1997
41414090	41414090SMM0	41414090SMM0	7/26/1995	Removed	G	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
41414090	41414090SOC0	41414090SOC0	7/26/1995	Removed	G	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
41414090	41414090SVL0	41414090SVL0	7/26/1995	Removed	G	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
41830090	41830090SMM0	41830090SMM0	7/26/1995	Removed	G	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
41830090	41830090SOC0	41830090SOC0	7/26/1995	Removed	G	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
41830090	41830090SVL0	41830090SVL0	7/26/1995	Removed	G	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
42455090	42455090SMM0	42455090SMM0	7/26/1995	Removed	G	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
42455090	42455090SOC0	42455090SOC0	7/26/1995	Removed	G	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
42455090	42455090SVL0	42455090SVL0	7/26/1995	Removed	G	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
42559090	42559090SMM0	42559090SMM0	7/27/1995	Removed	G	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
42559090	42559090SOC0	42559090SOC0	7/27/1995	Removed	G	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
42559090	42559090SVL0	42559090SVL0	7/27/1995	Removed	G	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
42570590	42570590SMM0	42570590SMM0	7/27/1995	Removed	G	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
42570590	42570590SOC0	42570590SOC0	7/27/1995	Removed	G	0.5	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
42570590	42570590SVL0	42570590SVL0	7/27/1995	Removed	G	0.5	Primary Sample									N	N	WP	ICF Kaiser	ICF 1997
100BE	CAC-100BE	CAC-100BE	9/15/2000	In Place	G	0	Primary Sample	Y		Y							Y	WP	IT Corp	IT 2002
100BE	SCAC-100BE	CAC-100BE	9/15/2000	In Place	G	0	Split Sample	N		N							N	WP	DTSC	IT 2002
101BE	CAC-101BE	CAC-101BE	9/15/2000	In Place	G	0	Primary Sample			Y							Y	WP	IT Corp	IT 2002
101BED	CAC-101BED	CAC-101BED	9/15/2000	In Place	G	0	Field Duplicate			Y							Y	WP	IT Corp	IT 2002
102SW	CBC-102SW	CBC-102SW	9/15/2000	In Place	G	1	Primary Sample			Y							Y	WP	IT Corp	IT 2002
10B	CAC-10B	CAC-10B	6/6/2000	Removed	G	0	Primary Sample				N						N	WP	IT Corp	IT 2002
11ST	CAC-11SB	CAC-11SB	6/6/2000	In Place	G	1.7	Primary Sample				Y						Y	WP	IT Corp	IT 2002
11ST	CAC-11ST	CAC-11ST	6/6/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
12ST	CAC-12SB	CAC-12SB	6/6/2000	In Place	G	0.7	Primary Sample				Y						Y	WP	IT Corp	IT 2002
12ST	CAC-12ST	CAC-12ST	6/6/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
13R	CAC-13R	CAC-13R	6/6/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
14B	CAC-14B	CAC-14B	6/6/2000	Removed	G	0	Primary Sample				N						N	WP	IT Corp	IT 2002
15B	CAC-15B	CAC-15B	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
15R	CAC-15R	CAC-15R	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002

TABLE D.3-1C
FSDF RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 5 of 11)

TABLE D.3-1C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs) (g,h,i)	Sample Type	Sample Analyses (Validated Yes/No)								Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)	
								Dioxins	Inorganics	Metals	PCBs	Perchlorate	SVOCs	Terphenyls	TPH					VOCs
16R	CAC-16R	CAC-16R	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
17R	CAC-17R	CAC-17R	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
18B	CCC-18B	CCC-18B	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
19R	CCC-19R	CCC-19R	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
1S	CAC-1S	CAC-1S	6/6/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
20B	CCC-20B	CCC-20B	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
218BS210	218BS210SMM0	218BS210SMM0	7/20/1995	Removed	HA	0.5	Primary Sample			N							N	WP	ICF Kaiser	ICF 1997
218BS210	218BS210SOC0	218BS210SOC0	7/20/1995	Removed	HA	1	Primary Sample	N			N		N		N		N	WP	ICF Kaiser	ICF 1997
218BS210	218BS210SVL0	218BS210SVL0	7/20/1995	Removed	HA	1	Primary Sample								N		N	WP	ICF Kaiser	ICF 1997
21B	CCC-21B	CCC-21B	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
22B	CCC-22B	CCC-22B	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
23S	CCC-23B	CCC-23B	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
24B	CCC-24B	CCC-24B	6/8/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
25B	CCC-25B	CCC-25B	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
26B	CAC-26B	CAC-26B	6/7/2000	Removed	G	0	Primary Sample				N						N	WP	IT Corp	IT 2002
27B	CAC-27B	CAC-27B	6/7/2000	Removed	G	0	Primary Sample				N						N	WP	IT Corp	IT 2002
28B	CAC-28B	CAC-28B	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
29B	CAC-29B	CAC-29B	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
2R	CAC-2R	CAC-2R	6/6/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
30B	CAC-30B	CAC-30B	6/7/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
31SW	CAC-31SW	CAC-31SW	6/7/2000	In Place	G	0	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
32SW	CAC-32SW	CAC-32SW	6/7/2000	In Place	G	0	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
33B	CAC-33B	CAC-33B	6/27/2000	Removed	G	0	Primary Sample				N						N	WP	IT Corp	IT 2002
34B	CAC-34B	CAC-34B	6/27/2000	Removed	G	0	Primary Sample				N						N	WP	IT Corp	IT 2002
34B	CAC-34D	CAC-34D	6/27/2000	Removed	G	0	Field Duplicate				N						N	WP	IT Corp	IT 2002
35B	CAC-35B	CAC-35B	6/27/2000	Removed	G	0	Primary Sample				N						N	WP	IT Corp	IT 2002
35B	CAC-35D	CAC-35D	6/27/2000	Removed	G	0	Field Duplicate				N						N	WP	IT Corp	IT 2002
36B	CAC-36B	CAC-36B	6/27/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
37B	CAC-37B	CAC-37B	6/27/2000	Removed	G	0	Primary Sample										N	WP	IT Corp	IT 2002
38B	CAC-38B	CAC-38B	6/27/2000	Removed	G	0	Primary Sample				N						N	WP	IT Corp	IT 2002
39B	CAC-39B	CAC-39B	6/27/2000	Removed	G	0	Primary Sample				N						N	WP	IT Corp	IT 2002
3SB	CAC-3SB	CAC-3SB	6/6/2000	In Place	G	1.3	Primary Sample				Y						Y	WP	IT Corp	IT 2002
3ST	CAC-3ST	CAC-3ST	6/6/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
40B	CAC-40B	CAC-40B	6/27/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
40B	CAC-40B DUP	CAC-40B DUP	6/27/2000	In Place	G	0	Field Duplicate				Y						Y	WP	IT Corp	IT 2002
44B	CAC-44B	CAC-44B	6/27/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
45B	CBC-45B	CBC-45B	6/27/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
46B	CBC-46B	CBC-46B	6/27/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
47B	CBC-47B	CBC-47B	6/27/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
48S	CBC-48S	CBC-48S	7/10/2000	Removed	G	2	Primary Sample										N	WP	IT Corp	IT 2002
49S	CBC-49S	CBC-49S	7/10/2000	Removed	G	2	Primary Sample	N		N	N	N					N	WP	IT Corp	IT 2002
4SB	CAC-4SB	CAC-4SB	6/6/2000	In Place	G	2.7	Primary Sample				Y						Y	WP	IT Corp	IT 2002
4ST	CAC-4ST	CAC-4ST	6/6/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
50S	CBC-50S	CBC-50S	7/10/2000	In Place	G	1	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
51SW	CBC-51SW	CBC-51SW	8/28/2000	Removed	G	2	Primary Sample										N	WP	IT Corp	IT 2002
52SW	CBC-52SW	CBC-52SW	7/10/2000	Removed	G	2	Primary Sample	N		N	N	N					N	WP	IT Corp	IT 2002
53S	CBC-53S	CBC-53S	7/6/2000	Removed	G	2	Primary Sample										N	WP	IT Corp	IT 2002
54SW	CBC-54SW	CBC-54SW	7/10/2000	Removed	G	2	Primary Sample										N	WP	IT Corp	IT 2002
55S	CBC-55S	CBC-55S	7/6/2000	In Place	G	1.5	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
56SW	CBC-56SW	CBC-56SW	7/10/2000	In Place	G	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
57SW	CBC-57SW	CBC-57SW	7/10/2000	In Place	G	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
58SW	CBC-58SW	CBC-58SW	7/6/2000	Removed	G	2	Primary Sample										N	WP	IT Corp	IT 2002
59B	CAC-59B	CAC-59B	7/11/2000	In Place	G	0.25	Primary Sample				Y						Y	WP	IT Corp	IT 2002
5S	CAC-5S	CAC-5S	6/6/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
60B	CAC-60B	CAC-60B	7/11/2000	Removed	G	0.25	Primary Sample				N						N	WP	IT Corp	IT 2002
61B	CAC-61B	CAC-61B	7/11/2000	Removed	G	0.25	Primary Sample				N						N	WP	IT Corp	IT 2002
62B	CAC-62B	CAC-62B	7/11/2000	Removed	G	0.25	Primary Sample				N						N	WP	IT Corp	IT 2002
62B	CAC-62B	CAC-62B	7/11/2000	Removed	G	0.5	Primary Sample				N						N	WP	IT Corp	IT 2002
62B	CAC-62B	CAC-62B	7/21/2000	Removed	G	0.75	Primary Sample				N						N	WP	IT Corp	IT 2002

TABLE D.3-1C
FSDF RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 6 of 11)

TABLE D.3-1C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs) (g,h,i)	Sample Type	Sample Analyses (Validated Yes/No)								Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)	
								Dioxins	Inorganics	Metals	PCBs	Perchlorate	SVOCs	Terphenyls	TPH					VOCs
63B	CAC-63B	CAC-63B	7/11/2000	In Place	G	0.25	Primary Sample				Y						Y	WP	IT Corp	IT 2002
63B	CAC-63BRE	CAC-63BRE	7/11/2000	In Place	G	0.5	Primary Sample				Y						Y	WP	IT Corp	IT 2002
64B	CAC-64B	CAC-63B	7/21/2000	In Place	G	0.75	Primary Sample				Y						Y	WP	IT Corp	IT 2002
64B	CAC-64B	CAC-63B	7/21/2000	In Place	G	0.75	Primary Sample				Y						Y	WP	IT Corp	IT 2002
64B	CAC-64B	CAC-64B	7/11/2000	In Place	G	0.75	Primary Sample				Y						Y	WP	IT Corp	IT 2002
65B	CAC-65B	CAC-65B	7/11/2000	In Place	G	0.25	Primary Sample				Y						Y	WP	IT Corp	IT 2002
66B	CAC-66B	CAC-66B	7/21/2000	In Place	G	0.25	Primary Sample				Y						Y	WP	IT Corp	IT 2002
66B	CAC-66BC	CAC-66BC	8/28/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
66B	CAC-66D	CAC-66D	7/21/2000	In Place	G	0.25	Field Duplicate				Y						Y	WP	IT Corp	IT 2002
67B	CAC-67B	CAC-67B	7/11/2000	In Place	G	0.25	Primary Sample				Y						Y	WP	IT Corp	IT 2002
68B	CAC-68B	CAC-68B	7/11/2000	In Place	G	0.25	Primary Sample				Y						Y	WP	IT Corp	IT 2002
69B	CAC-69B	CAC-69B	7/21/2000	In Place	G	0.25	Primary Sample				Y						Y	WP	IT Corp	IT 2002
69B	CAC-69BC	CAC-69BC	7/21/2000	In Place	G	0.5	Primary Sample				Y						Y	WP	IT Corp	IT 2002
69B	CAC-69B	CAC-69B	7/21/2000	In Place	G	0.75	Primary Sample				Y						Y	WP	IT Corp	IT 2002
69B	CAC-69BC	CAC-69BC	8/28/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
6SB	CAC-6SB	CAC-6SB	6/6/2000	In Place	G	1.2	Primary Sample				Y						Y	WP	IT Corp	IT 2002
6ST	CAC-6ST	CAC-6ST	6/6/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
70B	CAC-70B	CAC-70B	7/21/2000	In Place	G	0.25	Primary Sample				Y						Y	WP	IT Corp	IT 2002
71B	CAC-71B	CAC-71B	8/11/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
72B	CAC-72B	CAC-72B	8/11/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
72B	CAC-72D	CAC-72D	8/11/2000	In Place	G	0	Field Duplicate				Y						Y	WP	IT Corp	IT 2002
73B	CAC-73B	CAC-73B	8/11/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
74B	CAC-74B	CAC-74B	8/11/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
75B	CAC-75B	CAC-75B	8/11/2000	Removed	G	0	Primary Sample				N						N	WP	IT Corp	IT 2002
76B	CAC-76B	CAC-76B	8/11/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
77B	CAC-77B	CAC-77B	8/11/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
78B	CAC-78B	CAC-78B	8/11/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
79B	CAC-79B	CAC-79B	8/25/2000	Removed	G	0	Primary Sample				N						N	WP	IT Corp	IT 2002
79SW	CBC-79SW	CBC-79SW	8/17/2000	Removed	G	2	Primary Sample				N						N	WP	IT Corp	IT 2002
79SW	CBC-79SWD	CBC-79SWD	8/17/2000	Removed	G	2	Field Duplicate				N						N	WP	IT Corp	IT 2002
7SB	CAC-7SB	CAC-7SB	6/6/2000	In Place	G	1.8	Primary Sample				Y						Y	WP	IT Corp	IT 2002
7ST	CAC-7ST	CAC-7ST	6/6/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
80B	CAC-80B	CAC-80B	8/25/2000	Removed	G	0	Primary Sample				N						N	WP	IT Corp	IT 2002
80S	CBC-80S	CBC-80S	8/17/2000	Removed	G	3.5	Primary Sample	N		N	N	N					N	WP	IT Corp	IT 2002
81B	CAC-81B	CAC-81B	8/25/2000	In Place	G	0	Primary Sample				Y		N				Y	WP	IT Corp	IT 2002
82B	CAC-82B	CAC-82B	8/25/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
83B	CAC-83B	CAC-83B	8/25/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
84B	CAC-84B	CAC-84B	8/25/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
85B	CAC-85B	CAC-85B	8/25/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
86B	CAC-86B	CAC-86B	8/25/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
86B	CAC-86D	CAC-86D	8/25/2000	In Place	G	0	Field Duplicate				Y						Y	WP	IT Corp	IT 2002
87B	CAC-87B	CAC-87B	8/25/2000	Removed	G	0	Primary Sample				N						N	WP	IT Corp	IT 2002
88B	CAC-88B	CAC-88B	8/25/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
89BE	CAC-89BE	CAC-89BE	8/25/2000	Removed	G	0	Primary Sample	N			N	N					N	WP	IT Corp	IT 2002
89BW	CAC-89BW	CAC-89BW	8/25/2000	In Place	G	0	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
8B	CAC-8B	CAC-8B	6/6/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
90BE	CAC-90BE	CAC-90BE	8/25/2000	Removed	G	0	Primary Sample	N		N	N	N					N	WP	IT Corp	IT 2002
90BW	CAC-90BW	CAC-90BW	8/25/2000	Removed	G	0	Primary Sample	N			N	N					N	WP	IT Corp	IT 2002
91S	CBC-91S	CBC-91S	8/28/2000	In Place	G	0	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
92S	CBC-92S	CBC-92S	8/28/2000	In Place	G	3.5	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
93S	CBC-93S	CBC-93S	8/28/2000	In Place	G	3	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
94SW	CBC-94SW	CBC-94SW	8/28/2000	In Place	G	2.5	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
95B	CAC-95B	CAC-95B	9/1/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
96SW	CBC-96SW	CBC-96SW	9/1/2000	In Place	G	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
97SW	CBC-97SW	CBC-97SW	9/1/2000	In Place	G	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
97SW	CBC-97SWD	CBC-97SWD	9/1/2000	In Place	G	2	Field Duplicate	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
98S	CBC-98S	CBC-98S	9/1/2000	In Place	G	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
99SW	CBC-99SW	CBC-99SW	9/1/2000	In Place	G	2.5	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
9R	CAC-9R	CAC-9R	6/6/2000	In Place	G	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002

TABLE D.3-1C
FSDF RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 7 of 11)

TABLE D.3-1C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs) (g,h,i)	Sample Type	Sample Analyses (Validated Yes/No)								Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)	
								Dioxins	Inorganics	Metals	PCBs	Perchlorate	SVOCs	Terphenyls	TPH					VOCs
BB-18-001	BB18001	BB18001	4/21/1992	Removed	G	0	Primary Sample			N			N			N	N	DC	McLaren/Hart	McLaren Hart 1993
BB-18-001	BB18001-USEPA	BB18001-USEPA	4/21/1992	Removed	G	0	Split Sample			N			N			N	N	DC	McLaren/Hart	McLaren Hart 1993
BB-18-001A	BB18001A	BB18001A	4/21/1992	Removed	G	0	Primary Sample			N			N			N	N	DC	McLaren/Hart	McLaren Hart 1993
BB-18-001B	BB18001B	BB18001B	4/21/1992	Removed	G	0	Primary Sample			N			N			N	N	DC	McLaren/Hart	McLaren Hart 1993
BB-18-002	BB18002	BB18002	4/21/1992	Removed	G	0	Primary Sample			N			N			N	N	DC	McLaren/Hart	McLaren Hart 1993
BB-18-002A	BB18002A	BB18002A	4/21/1992	Removed	G	0	Primary Sample			N			N			N	N	DC	McLaren/Hart	McLaren Hart 1993
BB-18-002B	BB18002B	BB18002B	4/21/1992	Removed	G	0	Primary Sample			N			N			N	N	DC	McLaren/Hart	McLaren Hart 1993
BB-18-003	BB18003	BB18003	4/21/1992	Removed	G	0	Primary Sample			N			N			N	N	DC	McLaren/Hart	McLaren Hart 1993
BB-18-003	BB18003-DUP	BB18003-DUP	4/21/1992	Removed	G	0	Field Duplicate									N	N	DC	McLaren/Hart	McLaren Hart 1993
BB-18-003A	BB18003A	BB18003A	4/21/1992	Removed	G	0	Primary Sample			N			N			N	N	DC	McLaren/Hart	McLaren Hart 1993
BB-18-003B	BB18003B	BB18003B	4/21/1992	Removed	G	0	Primary Sample			N			N			N	N	DC	McLaren/Hart	McLaren Hart 1993
BB-18-004	BB18004	BB18004	3/10/1994	Removed	G	0	Primary Sample			N								DC	McLaren/Hart	McLaren Hart 1995a
BB-18-005	BB18005	BB18005	3/10/1994	Removed	G	0	Primary Sample			N								DC	McLaren/Hart	McLaren Hart 1995a
BB-18-005A	BB18005A	BB18005A	3/10/1994	Removed	G	0	Primary Sample			N								DC	McLaren/Hart	McLaren Hart 1995a
BB-18-005B	BB18005B	BB18005B	3/10/1994	Removed	G	0	Primary Sample			N								DC	McLaren/Hart	McLaren Hart 1995a
BB-18-005C	BB18005C	BB18005C	3/10/1994	Removed	G	0	Primary Sample			N								DC	McLaren/Hart	McLaren Hart 1995a
BB-18-006A	BB18006A	BB18006A	3/10/1994	Removed	G	0	Primary Sample			N								DC	McLaren/Hart	McLaren Hart 1995a
BB-18-006B	BB18006B	BB18006B	3/10/1994	Removed	G	0	Primary Sample			N								DC	McLaren/Hart	McLaren Hart 1995a
BBBS0001	BBBS0001S01	BBBS0001S01	4/5/2007	In Place	HA	0.5	Primary Sample		Y	Y						Y	DGA	MWH	This report	
BBBS0002	BBBS0002S01	BBBS0002S01	4/5/2007	In Place	HA	0.5	Primary Sample		Y	Y						Y	DGA	MWH	This report	
BBBS0003	BBBS0003S01	BBBS0003S01	4/5/2007	In Place	HA	0.25	Primary Sample		Y	Y						Y	DGA	MWH	This report	
BBBS0004	BBBS0004S01	BBBS0004S01	4/5/2007	In Place	HA	0.5	Primary Sample		Y	Y						Y	DGA	MWH	This report	
BBBS0005	BBBS0005S01	BBBS0005S01	4/5/2007	In Place	HA	0.25	Primary Sample		Y	Y						Y	DGA	MWH	This report	
BBBS0006	BBBS0006S01	BBBS0006S01	4/5/2007	In Place	HA	0.5	Primary Sample		Y	Y						Y	DGA	MWH	This report	
BR-10-2-18	BR-10-2-19	BR-10-2-20	9/27/2000	In Place	BR	6	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-11-2-19	BR-11-2-20	BR-11-2-21	9/27/2000	In Place	BR	8.5	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-1-2-07	BR-1-2-07	BR-1-2-07	9/27/2000	In Place	BR	12	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-1-2-07	BR-1-2-07D	BR-1-2-07D	9/27/2000	In Place	BR	12	Field Duplicate	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-12-2-20	BR-12-2-21	BR-12-2-22	9/27/2000	In Place	BR	11	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-13-2-21	BR-13-2-22	BR-13-2-23	9/27/2000	In Place	BR	9	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-14-2-22	BR-14-2-23	BR-14-2-24	9/27/2000	In Place	BR	8	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-15-2-23	BR-15-2-24	BR-15-2-25	9/27/2000	In Place	BR	6.5	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-16-3-08	BR-16-3-08	BR-16-3-08	9/27/2000	In Place	BR	8	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-17-3-07	BR-17-3-08	BR-17-3-09	9/27/2000	In Place	BR	9.5	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-18-3-06	BR-18-3-07	BR-18-3-08	9/27/2000	In Place	BR	8	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-19-3-09	BR-19-3-10	BR-19-3-11	9/27/2000	In Place	BR	4	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-20-3-10	BR-20-3-11	BR-20-3-12	9/27/2000	In Place	BR	6	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-21-3-12	BR-21-3-13	BR-21-3-14	9/27/2000	In Place	BR	8	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-2-2-08	BR-2-2-09	BR-2-2-10	9/27/2000	In Place	BR	7	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-22-3-18	BR-22-3-19	BR-22-3-20	9/28/2000	In Place	BR	2	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-23-3-17	BR-23-3-18	BR-23-3-19	9/28/2000	In Place	BR	2	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-23-3-17	BR-23-3-17D	BR-23-3-17D	9/28/2000	In Place	BR	8	Field Duplicate	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-24-3-13	BR-24-3-14	BR-24-3-15	9/28/2000	In Place	BR	7	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-25-3-11	BR-25-3-12	BR-25-3-13	9/28/2000	In Place	BR	3	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-26-4-21	BR-26-4-22	BR-26-4-23	9/28/2000	In Place	BR	1.5	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-27-4-19	BR-27-4-20	BR-27-4-21	9/28/2000	In Place	BR	4	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-28-4-18	BR-28-4-19	BR-28-4-20	9/28/2000	In Place	BR	1	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-29-4-17	BR-29-4-18	BR-29-4-19	9/28/2000	In Place	BR	0	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-30-4-16	BR-30-4-17	BR-30-4-18	9/28/2000	In Place	BR	1.5	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-31-4-15	BR-31-4-16	BR-31-4-17	9/28/2000	In Place	BR	4	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-3-2-09	BR-3-2-10	BR-3-2-11	9/27/2000	In Place	BR	10	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-32-2-07	BR-32-2-08	BR-32-2-09	9/28/2000	In Place	BR	2.5	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-33-4-13	BR-33-4-14	BR-33-4-15	9/28/2000	In Place	BR	4	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-34-4-12	BR-34-4-13	BR-34-4-14	9/28/2000	In Place	BR	3.5	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-35-SOIL	BR-35-SOIL	BR-35-SOIL	9/28/2000	In Place	BR	6.5	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-4-2-10	BR-4-2-11	BR-4-2-12	9/27/2000	In Place	BR	10	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-5-2-17	BR-5-2-18	BR-5-2-19	9/27/2000	In Place	BR	10	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-6-2-16	BR-6-2-17	BR-6-2-18	9/27/2000	In Place	BR	7	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
BR-6-3-08	BR-6-3-09	BR-6-3-10	9/27/2000	In Place	BR	7	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	

TABLE D.3-1C
FSDF RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 8 of 11)

TABLE D.3-1C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs) (g,h,i)	Sample Type	Sample Analyses (Validated Yes/No)								Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)	
								Dioxins	Inorganics	Metals	PCBs	Perchlorate	SVOCs	Terphenyls	TPH					VOCs
BR-7-2-15	BR-7-2-16	BR-7-2-17	9/27/2000	In Place	BR	9	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
BR-8-2-14	BR-8-2-15	BR-8-2-16	9/27/2000	In Place	BR	9	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
BR-9-2-13	BR-9-2-14	BR-9-2-15	9/27/2000	In Place	BR	7.5	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
Brandeis-1	Brandeis-1	Brandeis-1	11/9/2000	In Place	BR	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
Brandeis-1	Brandeis-1D	Brandeis-1D	11/9/2000	In Place	BR	0	Field Duplicate				Y						Y	WP	IT Corp	IT 2002
Brandeis-2	Brandeis-2	Brandeis-2	11/9/2000	In Place	BR	0	Primary Sample				Y						Y	WP	IT Corp	IT 2002
DTSC-A	SDTSC-A	DTSC-A	9/27/2000	In Place	G	0	Primary Sample	N		N	N	N					N	WP	DTSC	IT 2002
DTSC-B	SDTSC-B	DTSC-B	9/27/2000	In Place	G	0	Primary Sample	N		N	N	N					N	WP	DTSC	IT 2002
DTSC-C	SDTSC-C	DTSC-C	9/27/2000	In Place	G	0	Primary Sample	N		N	N	N					N	WP	DTSC	IT 2002
DTSC-D	SDTSC-D	DTSC-D	10/3/2000	In Place	BR	11	Primary Sample			N							N	WP	DTSC	IT 2002
DTSC-E	SDTSC-E	DTSC-E	10/3/2000	In Place	BR	8.5	Primary Sample			N							N	WP	DTSC	IT 2002
DTSC-F	SDTSC-F	DTSC-F	10/3/2000	In Place	BR	11	Primary Sample			N							N	WP	DTSC	IT 2002
DTSC-G	SDTSC-G	DTSC-G	10/3/2000	In Place	BR	12	Primary Sample			N							N	WP	DTSC	IT 2002
FSBS0002	FSBS0002S01	FSBS0002S01	2/22/2007	In Place	HA	1	Primary Sample	Y									Y	DGA	MWH	This report
FSBS0003	FSBS0003S01	FSBS0003S01	2/22/2007	In Place	GP	0.5	Primary Sample		Y	Y	Y						Y	DGA	MWH	This report
FSBS0003	FSBS0003S02	FSBS0003S02	2/22/2007	In Place	GP	5.5	Primary Sample		Y	Y							Y	DGA	MWH	This report
FSBS0004	FSBS0004S01	FSBS0004S01	2/12/2007	In Place	HA	1	Primary Sample		Y	Y	Y						Y	DGA	MWH	This report
FSBS0005	FSBS0005S01	FSBS0005S01	2/12/2007	In Place	Trowel	0.5	Primary Sample		Y	Y	Y	Y					Y	DGA	MWH	This report
FSBS0005	FSBS0005S02	FSBS0005S02	2/22/2007	In Place	HA	4	Primary Sample		Y								Y	DGA	MWH	This report
FSBS0006	FSBS0006S01	FSBS0006S01	2/12/2007	In Place	Trowel	0.5	Primary Sample		Y	Y	Y	Y					Y	DGA	MWH	This report
FSBS0006	FSBS0006S02	FSBS0006S02	2/22/2007	In Place	HA	2.5	Primary Sample		Y								Y	DGA	MWH	This report
FSBS0007	FSBS0007AS01	FSBS0007AS01	5/17/2007	In Place	HA	0.5	Primary Sample		Y	Y			Y	Y	Y		Y	DGA	MWH	This report
FSBS0007	FSBS0007S01	FSBS0007S01	2/12/2007	In Place	Trowel	0.5	Primary Sample		Y	Y	Y	Y					Y	DGA	MWH	This report
FSBS0008	FSBS0008S01	FSBS0008S01	2/22/2007	In Place	GP	0.5	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0008	FSBS0008S02	FSBS0008S02	2/22/2007	In Place	GP	5	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0009	FSBS0009S01	FSBS0009S01	2/22/2007	In Place	GP	0.5	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0009	FSBS0009S01SP	FSBS0009S01SP	2/22/2007	In Place	GP	0.5	Split Sample					Y					Y	DGA	MWH	This report
FSBS0009	FSBS0009S02	FSBS0009S02	2/22/2007	In Place	GP	4	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0010	FSBS0010S01	FSBS0010S01	2/22/2007	In Place	HA	0.5	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0011	FSBS0011D01	FSBS0011D01	2/16/2007	In Place	HA	0.5	Field Duplicate		Y	Y	Y	Y	Y		Y	Y	Y	DGA	MWH	This report
FSBS0011	FSBS0011S01	FSBS0011S01	2/16/2007	In Place	HA	0.5	Primary Sample		Y	Y	Y	Y	Y		Y	Y	Y	DGA	MWH	This report
FSBS0012	FSBS0012S01	FSBS0012S01	2/16/2007	In Place	HA	0.25	Primary Sample		Y	Y	Y	Y	Y		Y	Y	Y	DGA	MWH	This report
FSBS0013	FSBS0013S01	FSBS0013S01	2/16/2007	In Place	HA	0.5	Primary Sample		Y	Y							Y	DGA	MWH	This report
FSBS0014	FSBS0014S01	FSBS0014S01	2/13/2007	In Place	HA	0.5	Primary Sample		Y	Y							Y	DGA	MWH	This report
FSBS0014	FSBS0014S02	FSBS0014S02	2/13/2007	In Place	HA	5.5	Primary Sample		Y								Y	DGA	MWH	This report
FSBS0015	FSBS0015S01	FSBS0015S01	2/14/2007	In Place	HA	0.5	Primary Sample		Y	Y							Y	DGA	MWH	This report
FSBS0017	FSBS0017S01	FSBS0017S01	2/13/2007	In Place	HA	0.5	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0018	FSBS0018S01	FSBS0018S01	2/13/2007	In Place	Trowel	1	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0018	FSBS0018S01SP	FSBS0018S01SP	2/13/2007	In Place	HA	1	Split Sample					Y					Y	DGA	MWH	This report
FSBS0021	FSBS0021AS01	FSBS0021AS01	4/2/2007	In Place	Trowel	0.5	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0022	FSBS0022S01	FSBS0022S01	2/14/2007	In Place	HA	0.5	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0022	FSBS0022S02	FSBS0022S02	2/14/2007	In Place	HA	4	Primary Sample			Y							Y	DGA	MWH	This report
FSBS0023	FSBS0023S01	FSBS0023S01	2/14/2007	In Place	HA	0.5	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0024	FSBS0024S01	FSBS0024S01	2/14/2007	In Place	HA	0.5	Primary Sample			Y							Y	DGA	MWH	This report
FSBS0026	FSBS0026AD01	FSBS0026AD01	4/2/2007	In Place	Trowel	0.5	Field Duplicate					Y					Y	DGA	MWH	This report
FSBS0026	FSBS0026AS01	FSBS0026AS01	4/2/2007	In Place	Trowel	0.5	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0027	FSBS0027S01	FSBS0027S01	2/14/2007	In Place	HA	0.75	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0028	FSBS0028S01	FSBS0028S01	2/14/2007	In Place	HA	1	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0031	FSBS0031AS01	FSBS0031AS01	4/3/2007	In Place	Trowel	0.5	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0031	FSBS0031S01	FSBS0031S01	2/15/2007	In Place	HA	0.5	Primary Sample			Y							Y	DGA	MWH	This report
FSBS0032	FSBS0032S01	FSBS0032S01	2/15/2007	In Place	HA	0.5	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0033	FSBS0033S01	FSBS0033S01	2/15/2007	In Place	HA	1	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0034	FSBS0034S01	FSBS0034S01	2/15/2007	In Place	HA	0.5	Primary Sample			Y							Y	DGA	MWH	This report
FSBS0036	FSBS0036AS01	FSBS0036AS01	6/7/2007	In Place	HA	0.5	Primary Sample			Y							Y	DGA	MWH	This report
FSBS0036	FSBS0036S01	FSBS0036S01	2/15/2007	In Place	HA	0.5	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0036	FSBS0036S01SP	FSBS0036S01SP	2/15/2007	In Place	HA	0.5	Split Sample					Y					Y	DGA	MWH	This report
FSBS0041	FSBS0041S01	FSBS0041S01	2/15/2007	In Place	HA	0.5	Primary Sample			Y							Y	DGA	MWH	This report
FSBS0051	FSBS0051S01	FSBS0051S01	2/15/2007	In Place	HA	0.5	Primary Sample					Y					Y	DGA	MWH	This report
FSBS0052	FSBS0052S01	FSBS0052S01	2/15/2007	In Place	HA	0.5	Primary Sample					Y					Y	DGA	MWH	This report

TABLE D.3-1C
FSDF RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 9 of 11)

TABLE D.3-1C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs) (g,h,i)	Sample Type	Sample Analyses (Validated Yes/No)								Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)	
								Dioxins	Inorganics	Metals	PCBs	Perchlorate	SVOCs	Terphenyls	TPH					VOCs
FSBS0053	FSBS0053S01	FSBS0053S01	2/15/2007	In Place	HA	1	Primary Sample			Y						Y	DGA	MWH	This report	
FSBS0054	FSBS0054S01	FSBS0054S01	2/15/2007	In Place	HA	1	Primary Sample					Y				Y	DGA	MWH	This report	
FSBS0061	FSBS0061S01	FSBS0061S01	2/14/2007	In Place	HA	0.5	Primary Sample					Y				Y	DGA	MWH	This report	
FSBS0062	FSBS0062S01	FSBS0062S01	2/15/2007	In Place	HA	0.5	Primary Sample					Y				Y	DGA	MWH	This report	
FSBS0063	FSBS0063S01	FSBS0063S01	2/14/2007	In Place	HA	0.5	Primary Sample		Y							Y	DGA	MWH	This report	
FSBS0064	FSBS0064S01	FSBS0064S01	2/13/2007	In Place	HA	1	Primary Sample					Y				Y	DGA	MWH	This report	
FSBS0064	FSBS0064S02	FSBS0064S02	2/13/2007	In Place	HA	4.5	Primary Sample			Y						Y	DGA	MWH	This report	
FSBS0064	FSBS0064S03	FSBS0064S03	2/13/2007	In Place	HA	7.5	Primary Sample			Y						Y	DGA	MWH	This report	
FSBS0065	FSBS0065S01	FSBS0065S01	2/13/2007	In Place	HA	1	Primary Sample					Y				Y	DGA	MWH	This report	
FSBS0066	FSBS0066D01	FSBS0066D01	2/13/2007	In Place	HA	1	Field Duplicate	Y	Y	Y	Y	Y				Y	DGA	MWH	This report	
FSBS0066	FSBS0066S01	FSBS0066S01	2/13/2007	In Place	HA	1	Primary Sample	Y	Y	Y	Y	Y				Y	DGA	MWH	This report	
FSBS0066	FSBS0066S02	FSBS0066S02	2/13/2007	In Place	HA	5	Primary Sample	Y	Y							Y	DGA	MWH	This report	
FSBS0067	FSBS0067S01	FSBS0067S01	2/13/2007	In Place	HA	1	Primary Sample	Y	Y	Y	Y	Y				Y	DGA	MWH	This report	
FSBS0067	FSBS0067S01SP	FSBS0067S01SP	2/13/2007	In Place	HA	1	Split Sample		Y	Y	Y					Y	DGA	MWH	This report	
FSBS0067	FSBS0067S02	FSBS0067S02	2/13/2007	In Place	HA	3	Primary Sample		Y							Y	DGA	MWH	This report	
FSBS0068	FSBS0068S01	FSBS0068S01	2/13/2007	In Place	Trowel	0.5	Primary Sample	Y	Y							Y	DGA	MWH	This report	
FSBS0069	FSBS0069S01	FSBS0069S01	2/12/2007	In Place	Trowel	1	Primary Sample	Y	Y	Y	Y	Y				Y	DGA	MWH	This report	
FSBS0070	FSBS0070S01	FSBS0070S01	2/12/2007	In Place	HA	1	Primary Sample	Y	Y	Y	Y	Y				Y	DGA	MWH	This report	
FSBS0070	FSBS0070S02	FSBS0070S02	2/12/2007	In Place	HA	5	Primary Sample		Y							Y	DGA	MWH	This report	
FSBS0071	FSBS0071S01	FSBS0071S01	2/12/2007	In Place	Trowel	0.5	Primary Sample		Y							Y	DGA	MWH	This report	
FSBS0072	FSBS0072D01	FSBS0072D01	4/2/2007	In Place	HA	0.5	Field Duplicate		Y	Y						Y	DGA	MWH	This report	
FSBS0072	FSBS0072S01	FSBS0072S01	4/2/2007	In Place	HA	0.5	Primary Sample		Y	Y						Y	DGA	MWH	This report	
FSBS0079	FSBS0079S01	FSBS0079S01	4/2/2007	In Place	HA	1	Primary Sample	Y								Y	DGA	MWH	This report	
FSBS0080	FSBS0080S01	FSBS0080S01	4/2/2007	In Place	HA	0.5	Primary Sample		Y	Y						Y	DGA	MWH	This report	
FSBS0081	FSBS0081S01	FSBS0081S01	4/2/2007	In Place	HA	0.5	Primary Sample		Y	Y						Y	DGA	MWH	This report	
FSBS0084	FSBS0084S01	FSBS0084S01	5/17/2007	In Place	GP	0.5	Primary Sample		Y	Y			Y	Y		Y	DGA	MWH	This report	
FSBS0084	FSBS0084S01SP	FSBS0084S01SP	5/17/2007	In Place	GP	0.5	Split Sample		Y	Y						Y	DGA	MWH	This report	
FSBS0084	FSBS0084S02	FSBS0084S02	5/17/2007	In Place	GP	4.5	Primary Sample		Y	Y			Y	Y		Y	DGA	MWH	This report	
FSBS0085	FSBS0085D01	FSBS0085D01	5/17/2007	In Place	GP	0.5	Field Duplicate		Y	Y			Y	Y		Y	DGA	MWH	This report	
FSBS0085	FSBS0085S01	FSBS0085S01	5/17/2007	In Place	GP	0.5	Primary Sample		Y	Y			Y	Y		Y	DGA	MWH	This report	
FSBS0085	FSBS0085S02	FSBS0085S02	5/17/2007	In Place	GP	3.5	Primary Sample		Y	Y			Y	Y		Y	DGA	MWH	This report	
FSBS0086	FSBS0086S01	FSBS0086S01	5/17/2007	In Place	GP	0.5	Primary Sample		Y	Y		Y		Y		Y	DGA	MWH	This report	
FSBS0086	FSBS0086S01SP	FSBS0086S01SP	5/17/2007	In Place	GP	0.5	Split Sample		Y	Y						Y	DGA	MWH	This report	
FSBS0086	FSBS0086S02	FSBS0086S02	5/17/2007	In Place	GP	7	Primary Sample		Y	Y		Y	Y	Y		Y	DGA	MWH	This report	
FSBS0087	FSBS0087D01	FSBS0087D01	5/17/2007	In Place	GP	0.5	Field Duplicate		Y				Y	Y	Y	Y	Y	DGA	MWH	This report
FSBS0087	FSBS0087S01	FSBS0087S01	5/17/2007	In Place	GP	0.5	Primary Sample		Y				Y	Y	Y	Y	Y	DGA	MWH	This report
FSBS0087	FSBS0087S02	FSBS0087S02	5/17/2007	In Place	GP	7.5	Primary Sample		Y				Y	Y	Y	Y	Y	DGA	MWH	This report
FSBS0088	FSBS0088S01	FSBS0088S01	5/30/2007	In Place	HA	0.5	Primary Sample			Y						Y	DGA	MWH	This report	
FSBS0089	FSBS0089S01	FSBS0089S01	5/30/2007	In Place	HA	0.5	Primary Sample			Y						Y	DGA	MWH	This report	
FSBS0089	FSBS0089S02	FSBS0089S02	5/30/2007	In Place	HA	7	Primary Sample			Y						Y	DGA	MWH	This report	
FSBS0090	FSBS0090S01	FSBS0090S01	6/5/2007	In Place	Trowel	0.5	Primary Sample					Y				Y	DGA	MWH	This report	
FSBS0091	FSBS0091S01	FSBS0091S01	6/5/2007	In Place	HA	0.5	Primary Sample					Y				Y	DGA	MWH	This report	
FSBS0091	FSBS0091S02	FSBS0091S02	6/5/2007	In Place	HA	5	Primary Sample					Y				Y	DGA	MWH	This report	
FSBS0092	FSBS0092D01	FSBS0092D01	5/17/2007	In Place	HA	0.5	Field Duplicate	Y	Y	Y	Y			Y		Y	DGA	MWH	This report	
FSBS0092	FSBS0092S01	FSBS0092S01	5/17/2007	In Place	HA	0.5	Primary Sample	Y	Y	Y	Y			Y		Y	DGA	MWH	This report	
FSBS0092	FSBS0092S02	FSBS0092S02	5/17/2007	In Place	HA	2.5	Primary Sample	Y	Y	Y	Y			Y		Y	DGA	MWH	This report	
FSBS0093	FSBS0093S01	FSBS0093S01	5/17/2007	In Place	HA	0.5	Primary Sample	Y	Y	Y	Y			Y		Y	DGA	MWH	This report	
FSBS0093	FSBS0093S01SP	FSBS0093S01SP	5/17/2007	In Place	HA	0.5	Split Sample	Y	Y	Y	Y					Y	DGA	MWH	This report	
FSBS0094	FSBS0094S01	FSBS0094S01	5/16/2007	In Place	GP	0.5	Primary Sample		Y				Y	Y	Y	Y	Y	DGA	MWH	This report
FSBS0094	FSBS0094S02	FSBS0094S02	5/16/2007	In Place	GP	11.5	Primary Sample		Y				Y	Y	Y	Y	Y	DGA	MWH	This report
FSBS0095	FSBS0095S01	FSBS0095S01	6/7/2007	In Place	Trowel	0.25	Primary Sample			Y						Y	DGA	MWH	This report	
FSBS0096	FSBS0096S01	FSBS0096S01	6/7/2007	In Place	Trowel	0.25	Primary Sample			Y						Y	DGA	MWH	This report	
FSBS01	MJ842	FSBS01S01	7/27/2006	In Place	HA	5	Primary Sample								Y	Y	VV	MWH	MWH, 2004	
FSBS01	MJ843	FSBS01S02	7/27/2006	In Place	HA	8	Primary Sample								Y	Y	VV	MWH	MWH, 2004	
PC-1	PC-1	PC-1	6/28/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
PC-10	PC-10	PC-10	6/28/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
PC-11	PC-11	PC-11	6/28/2000	In Place	T	2	Primary Sample					Y				Y	WP	IT Corp	IT 2002	
PC-12	PC-12	PC-12	6/28/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y				Y	WP	IT Corp	IT 2002	
PC-13	PC-13B	PC-13B	6/28/2000	In Place	T	6	Primary Sample					Y				Y	WP	IT Corp	IT 2002	

TABLE D.3-1C
FSDF RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 10 of 11)

TABLE D.3-1C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs) (g,h,i)	Sample Type	Sample Analyses (Validated Yes/No)									Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)
								Dioxins	Inorganics	Metals	PCBs	Perchlorate	SVOCs	Terphenyls	TPH	VOCs				
PC-13	PC-13T	PC-13T	6/28/2000	In Place	T	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PC-14	PC-14B	PC-14B	6/28/2000	In Place	T	6	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-14	PC-14T	PC-14T	6/28/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-15	PC-15B	PC-15B	6/28/2000	In Place	T	6	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PC-15	PC-15T	PC-15T	6/28/2000	In Place	T	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PC-16	PC-16B	PC-16B	6/28/2000	In Place	T	6	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-16	PC-16BD	PC-16BD	6/28/2000	In Place	T	6	Field Duplicate	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-16	PC-16T	PC-16T	6/28/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-16	SPC-16B	PC-16B	6/28/2000	In Place	T	6	Split Sample	N		N	N	N					N	WP	DTSC	IT 2002
PC-17	PC-17B	PC-17B	6/28/2000	In Place	T	6	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PC-17	PC-17T	PC-17T	6/28/2000	In Place	T	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PC-17	SPC-17B	PC-17B	6/28/2000	In Place	T	6	Split Sample					N					N	WP	DTSC	IT 2002
PC-18	PC-18	PC-18	6/28/2000	Removed	T	6	Primary Sample				N	N					N	WP	IT Corp	IT 2002
PC-19	PC-19	PC-19	6/28/2000	In Place	T	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PC-2	PC-2	PC-2	6/28/2000	Removed	T	2	Primary Sample					N	N				N	WP	IT Corp	IT 2002
PC-20	PC-20	PC-20	6/29/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-21	PC-21	PC-21	6/29/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-22	PC-22	PC-22	6/29/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-23	PC-23	PC-23	8/17/2000	In Place	T	2	Primary Sample			Y							Y	WP	IT Corp	IT 2002
PC-24	PC-24	PC-24	8/25/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-25	PC-25	PC-25	8/25/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-26	PC-26	PC-26	8/28/2000	In Place	T	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PC-27	PC-27	PC-27	8/28/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-28	PC-28	PC-28	8/28/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-28	PC-28D	PC-28D	8/28/2000	In Place	T	2	Field Duplicate	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-3	PC-3	PC-3	6/28/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-34	PC-34	PC-34	9/20/2000	Removed	T	2	Primary Sample				N	N					N	WP	IT Corp	IT 2002
PC-37	PC-37	PC-37	9/26/2000	Removed	T	2	Primary Sample				N						N	WP	IT Corp	IT 2002
PC-38	PC-38	PC-38	9/26/2000	Removed	T	6	Primary Sample				N						N	WP	IT Corp	IT 2002
PC-4	PC-4	PC-4	6/28/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-42	PC-42	PC-42	9/28/2000	Removed	T	6	Primary Sample				N						N	WP	IT Corp	IT 2002
PC-43	PC-43	PC-43	9/28/2000	In Place	T	2	Primary Sample	Y			Y						Y	WP	IT Corp	IT 2002
PC-5	PC-5	PC-5	6/28/2000	In Place	T	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PC-6	PC-6	PC-6	6/28/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-7	PC-7	PC-7	6/28/2000	In Place	T	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PC-8	PC-8	PC-8	6/28/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PC-9	PC-9	PC-9	6/28/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PCS-29	PCS-29	PCS-29	9/15/2000	In Place	T	2	Primary Sample	Y		Y	Y	Y	Y				Y	WP	IT Corp	IT 2002
PCS-29	SPCS-29	PCS-29	9/15/2000	In Place	T	2	Split Sample	N		N	N	N	N				N	WP	DTSC	IT 2002
PCS-30	PCS-30	PCS-30	9/15/2000	Removed	T	6	Primary Sample				N	N	N				N	WP	IT Corp	IT 2002
PCS-31	PCS-31	PCS-31	9/15/2000	In Place	T	2	Primary Sample	Y	Y	Y	Y	Y	Y				Y	WP	IT Corp	IT 2002
PCS-31	SPCS-31	PCS-31	9/15/2000	In Place	T	2	Split Sample	N		N	N	N	N				N	WP	DTSC	IT 2002
PCS-32	PCS-32	PCS-32	9/15/2000	Removed	T	6	Primary Sample				N	N	N				N	WP	IT Corp	IT 2002
PCS-33	PCS-33	PCS-33	9/15/2000	Removed	T	6	Primary Sample				N	N	N				N	WP	IT Corp	IT 2002
PCS-34	PCS-34	PCS-34	9/22/2000	In Place	T	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PCS-35	PCS-35	PCS-35	9/15/2000	Removed	T	6	Primary Sample					N					N	WP	IT Corp	IT 2002
PCS-39	PCS-39	PCS-39	9/26/2000	In Place	T	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PCS-40	PCS-40	PCS-40	9/26/2000	In Place	T	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PCS-41	PCS-41	PCS-41	9/26/2000	In Place	T	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PCS-43	PCS-43	PCS-43	9/28/2000	In Place	B	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PCS-44	PCS-44	PCS-44	9/28/2000	In Place	B	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PCS-45	PCS-45	PCS-45	9/28/2000	In Place	B	2	Primary Sample					Y					Y	WP	IT Corp	IT 2002
PCS-46B	PCS-46B	PCS-46B	10/4/2000	In Place	BR	12	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PCS-47B	PCS-47B	PCS-47B	10/4/2000	In Place	BR	12	Primary Sample	Y		Y	Y	Y					Y	WP	IT Corp	IT 2002
PRBS0001	PRBS0001S01	PRBS0001S01	2/21/2007	In Place	HA	1	Primary Sample		Y	Y							Y	DGA	MWH	This report
PRBS0001	PRBS0001S02	PRBS0001S02	2/21/2007	In Place	HA	4	Primary Sample		Y	Y							Y	DGA	MWH	This report
PRBS0002	PRBS0002S01	PRBS0002S01	2/21/2007	In Place	HA	1.5	Primary Sample		Y	Y							Y	DGA	MWH	This report
PRBS0002	PRBS0002S02	PRBS0002S02	2/21/2007	In Place	HA	9	Primary Sample		Y	Y							Y	DGA	MWH	This report
PRBS0003	PRBS0003S01	PRBS0003S01	2/21/2007	In Place	HA	1	Primary Sample		Y	Y							Y	DGA	MWH	This report

TABLE D.3-1C
FSDF RFI SITE SOIL MATRIX SAMPLING AND ANALYTICAL SUMMARY
(Page 11 of 11)

TABLE D.3-1C

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Removed or In Place (f)	Sample Method (a)	Depth (feet bgs) (g,h,i)	Sample Type	Sample Analyses (Validated Yes/No)								Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)
								Dioxins	Inorganics	Metals	PCBs	Perchlorate	SVOCs	Terphenyls	TPH				
PRBS0003	PRBS0003S02	PRBS0003S02	2/21/2007	In Place	HA	6	Primary Sample		Y	Y						Y	DGA	MWH	This report
PRBS0004	PRBS0004S01	PRBS0004S01	2/21/2007	In Place	HA	1	Primary Sample		Y	Y						Y	DGA	MWH	This report
PRBS0005	PRBS0005S01	PRBS0005S01	2/21/2007	In Place	HA	1	Primary Sample		Y	Y						Y	DGA	MWH	This report
PRBS0005	PRBS0005S02	PRBS0005S02	2/21/2007	In Place	HA	3.5	Primary Sample		Y	Y						Y	DGA	MWH	This report
Total Primary Samples: 547							Validated:	95	67	150	176	145	18	17	9	5	295		
Total QC (Duplicate, Split) Samples: 47							Not Validated:	92	0	103	130	20	90	0	74	75	292		
Total Number of FSDF RFI Site Soil Samples: 594																			

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. Trowel = Hand trowel or scoop. G = Grab sample BR = Bedrock sample
HA = Hand Auger sample B = Boring sample T = Trench 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 2007 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.
STEP - Indicates stepout samples were collected as a part of the RFI program (prior to Data Gaps Analysis) to delineate concentrations above comparison levels or anomalous conditions.
DC - Indicates samples collected in 1995 as a part of the FSDF OffSite Drainage Characterization Efforts.
- (d) **Consultant:** Contractor responsible for sampling and reporting for each location.
- (e) **Reference Document:** Document containing published data; "This report" includes the RFI site appendix and the Group 8 RFI Report. Refer to Section D.6 (References) for complete citation.
- (f) **Removed or in-place sample status:** Reported as removed in previous reports or as defined by Boeing following IM. Status as of date of this report.
- (g) **Sample Depths for In-Place samples:** Sample depths estimated to reflect depth from current grade for samples collected prior to or during the 2000 IM.
- (h) **Sample Depths for Removed 1995 samples:** The removed samples from the FSDF Characterization Report (ICF, 1997) have not been adjusted to reflect topography changes resulting from the 2000 IM activities. A sample map showing the topography at the time of this study is included in Attachment D-4, which can be compared to the existing topography as shown in figures.
- (i) **Sample Depths for 2000 IM composite sidewall samples** taken from the sidewalls of the excavation during the 2000 IM samples are conservatively approximated.

Laboratory Analytical Methods Represented (EPA Method No.)

Dioxins - 1613B, 8290
Inorganics - 9045C, 300.0, 9056
Metals - 6010, 6010A, 6010B, 6020, 7060, 7471, 7471A, 7740, 7841
PCB - 1662, 8080, 8082
Perchlorate - 300.0, 314.0, 314.0M, 8321A
SVOCs - 8270, 8270A, 8270C, 8270C SIM
Terphenyls - 8015B
TPH - 8015B, 8015M
VOCs - 8240, 8260, 8260B

Inorganics - pH and Fluoride
PCB - Polychlorinated biphenyls
SVOCs - Semivolatile Organic Compound
TPH - Total Petroleum Hydrocarbons
VOCs - Volatile Organic Compound

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

TABLE D.3-1D

Sample Location Identification	Unique Sample ID	Sample Identification	Date Collected	Sample Method (a)	Depth (feet bgs)	Sample Type	Sample Analyses (Validated Yes/No)		Validated (b)	Rationale (c)	Consultant (d)	Reference Document (e)
							Metals	Perchlorate				
FSSW01	RX050	FSSW01S01	5/8/2000	G	5	Primary Sample		Y	Y	WP	OGDEN	MWH, 2004
FSSW01	RY050	FSSW01S01	5/8/2000	G	5	Split Sample		Y	Y	WP	OGDEN	MWH, 2004
FSSW03	MJ224	FSSW03S01	3/15/2003	G	0	Primary Sample	Y	Y	Y	WP	MWH	MWH, 2004
FSSW03	SSFL-W-175K	FSSW03S01	3/15/2003	G	0	Split Sample		N	N	WP	DTSC	MWH, 2004
FSSW04	MJ121	FSSW04S01	2/14/2003	G	0	Primary Sample	Y	Y	Y	WP	MWH	MWH, 2004
FSSW04	SSFL-W-099K	FSSW04S01	2/14/2003	G	0	Split Sample		N	N	WP	DTSC	MWH, 2004
FSSW05	MJ122	FSSW05S01	2/14/2003	G	0	Primary Sample	Y	Y	Y	WP	MWH	MWH, 2004
FSSW05	SSFL-W-100K	FSSW05S01	2/14/2003	G	0	Split Sample		N	N	WP	DTSC	MWH, 2004
Total Primary Samples:							Validated:	3	5	5		
Total QC (Duplicate, Split) Samples:							Not Validated	0	3	3		
Total Number of FSDf RFI Site Surface Water Samples:												

Sample Location Identification - Boring or trench number

Unique Sample ID - Laboratory reporting code

Sample Identification - RFI site and sample identifier code

(a) Sample Method:

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 2007 as a part of the Data Gaps Analysis to address delineation with stepout samples, elevated detection limit issues, and specific DTSC requests.

WP - Indicates samples collected based on DTSC-approved Work Plan scope.

STEP - Indicates stepout samples were collected as a part of the RFI program (prior to Data Gaps Analysis) to delineate concentrations above comparison levels or anomalous conditions.

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

(e) Reference Document: Document containing published data; "This report" includes the RFI site appendix and the Group 8 RFI Report. Refer to Section D.6 (References) for complete citation.

Laboratory Analytical Methods Represented (EPA Method No.)

Metals - 245.1

Perchlorate - 300.0, 314.0

TABLE D.3-2A (Page 1 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
1a, 1b, 1c, 1d	Former Disposal Area [Former Lower and Upper Ponds, Western Debris Area, and Building 886 (B886) Concrete Pool Area] The facility operated from the early 1960s to 1976. Sodium-contaminated components were placed in the ponds until residual sodium or sodium / potassium (NaK) mixtures reacted with water. The unlined ponds were low-lying areas surrounded by earthen berms. When the ponds became inactive, some equipment was left in place and buried. The Western Debris Area was used mainly for burial and storage. Large metal components and barrels were placed in this area and buried. Components were also placed in the 12 x 42 x 15-foot deep concrete pool for reaction with water. A 12 x 15-foot steel pad and a 6 x 12-foot blast shield were located adjacent to the pool area for protection of workers and features. The Former Disposal Area was also used for the open burning of combustible materials and wastes. All features were removed, and soils from the Lower Pond and portions of the Upper Pond and Western Debris Area were excavated to bedrock during the 1992 pond closure. In 2000, the entire Former Disposal Area and portions of Channels A and B were excavated to bedrock and the uppermost portions of bedrock were removed in the Interim Measure (IM). Area was backfilled with clean soils (from DTSC-approved borrow source at SSFL) and re-graded to slope gently to the northeast. Backfill depths range up to 13 feet. Surface water drains by sheet flow to the northeast and into Channels A and B. Channels A and B converge north of FSDF, becoming Channel C. Channel C converges with the B009 drainage and then the B056 Landfill drainage, at which point it is called Channel D. The channel continues north and drains offsite into the Brandeis-Bardin Institute (BBI) property. Erosion control measures have been installed in Channels A and B (at Outfalls 005 and 006) to control potential contaminant migration.	VOCs: Potential presence of waste organic solvents in unidentified waste materials.	<u>Removed Soil</u> Soil was excavated to bedrock during the 1992 pond closure and 2000 IM. VOCs were analyzed in soil samples collected during previous investigations; soil represented by these samples has since been removed: • 1987 – 1993: Twelve soil samples (GRC, 1990) and waste characterization samples (DOE, 2000) were collected from soil excavated during the 1992 pond closure. • 1993 BBI Channel Sampling: Nine soil/sediment samples were collected in Channels A, B, and C. • 1995: Fifty soil samples were collected on an approximate 50-foot square grid pattern to characterize the Former Disposal Area. Eight additional sediment samples were collected within Channels A and B (ICF 1997)⁸. The results for seven of these samples, which represent soil that is still in-place, are described under In-Place Soil. <u>In Place Soil</u> • 1995 Samples: Seven of the 1995 samples (see above) were located outside of the 2000 IM excavation area are represent soil that is still in-place. • 2006/2007 Vapor Validation Study: Soil and vapor samples were collected within the former Lower Pond from fill soils emplaced over exposed bedrock following the 2000 IM excavation. Data were collected to provide data to validate vapor migration models used in estimating indoor air concentrations for risk assessment: ➤ Two surface vapor flux samples (at FSVF01), ➤ Two soil vapor samples (at FSSV03) from depths of 4 and 7 feet bgs ➤ Two soil matrix samples (at FSBS01) at depths of 5 and 8 feet bgs	Pre-excavation sampling results (maximum concentrations), which represent soil that has been removed, are contained in Table D.3-2D for samples collected from excavated soils. VOC results for in place soil samples and the extent of excavation is shown on Figure D.3-1. <u>Removed Soil</u> Findings for excavated soil samples include: • 1987 – 1993: A number of VOCs were detected, including 1,1,1-TCA (up to 1,840 µg/kg), TCE (up to 740,000 µg/kg), PCE (up to 1,200,000 µg/kg), and toluene (up to 800,000 µg/kg). As noted previously, soils represented by these samples were mostly removed in the 1992 excavation; remaining soil was removed in the 2000 IM. • 1995: VOCs were not detected in soil samples from the Former Disposal Area. One VOC, p-cymene, was detected 62 µg/kg in a single sample within the Channel A. P-cymene is a chemical occurring naturally in plants (e.g., poison oak, which is found along Channel A). Soil / sediment represented by these samples were removed during the 2000 IM. • 1993 BBI Channel Sampling: Two VOCs were detected in the Channels. Methylene chloride was detected at 16 µg/kg in a sample in Channel C, and m,p-Xylene was detected at 1 µg/kg (estimated) in a sample in Channel A. Sediments were removed during the 2000 IM. <u>In Place Soil</u> Based on extensive soil excavation down to bedrock and previous soil sampling results, VOC-impacted soil has been removed: • VOCs detected in 1987-1993 soil samples were removed during the 1992 excavation and were not detected in 1995 samples⁸, with the exception of methylene chloride (see below). • Based on IM cleanup levels established for mercury, PCBs, and dioxins, additional excavation to bedrock was conducted in 2000 within the Former Disposal Area and the upper portions of Channels A and B (IT 2002) as shown on Figure D.3-1. Excavations extended beyond the 1992-1993 limits to include most of the FSDF site. • The southern excavation limit is delimited by seven in-place soil samples located just outside the excavation perimeter (Figure D.3-1). Methylene chloride was detected up to 2 µg/kg (estimated) in five of these samples; however, this compound is a common laboratory contaminant and is below RBSLs. No other VOCs were detected in any of the seven perimeter samples. <u>2006 Vapor Validation Study</u> Eight VOCs, primarily TCE, were detected in the soil vapor and soil matrix samples taken within fill soils in the Lower Pond: • TCE was detected in FSSV03 at 0.21 µg/L (4 feet bgs) and at 12.3 µg/L (7 feet bgs). • In FSBS01, TCE was not detected at 5 feet bgs but was detected at 18 µg/kg at 8 feet bgs. Detected soil vapor TCE was above both Eco and ResRBSLs (1.4 µg/L), and detected soil matrix TCE was above the ResRBSL of 2.2 µg/kg. 1,1-Dichloroethene was detected up to 1.1 µg/L, exceeding the EcoRBSL in two samples. TCE is also detected in near-surface and Chatsworth formation groundwater (e.g., in RS-54) and is likely present in bedrock.	YES Based on extensive excavation and recent sampling at location of highest potential for VOC source. Detected VOCs considered related to bedrock and groundwater impacts.	YES <u>Area Southeast of B886</u> Area recommended for further evaluation during the CMS based on perchlorate concentrations and risk assessment results. VOCs detected at low concentrations in this area (considered laboratory contamination) and do not drive CMS recommendations. <u>Remaining Area</u> Area is not recommended for CMS based on surficial media since VOCs are related to bedrock or groundwater impacts. Groundwater CMS recommendations will be made following completion of characterization and reported in Site-Wide Groundwater Report.

TABLE D.3-2A (Page 2 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
		VOCs (continued)		In summary: - VOCs were not detected during 1995 grid sampling following 1992 pond closure. - All soil within most of chemical use areas 1a through 1d has been excavated to bedrock and backfilled with clean soil. - VOCs detected within the lower pond (2006) were observed at depth within fill soils emplaced over exposed bedrock during the 2000 IM. Based on these observations, the continued presence of VOCs in soil vapor and soil samples is considered related to VOC-impacted bedrock and groundwater underlying fill soils. Therefore, no further characterization of soil or soil vapor VOCs is warranted.		
		SVOCs: Potentially present in burned materials or unidentified wastes; potential storage of glycols, which were known to have been stored within Group 8.	<u>Removed Soil</u> Soil was excavated to bedrock during the 1992 pond closure and 2000 IM. SVOCs were analyzed in soil samples collected during previous investigations; soil represented by these samples has since been removed: 1992 – 1993: Samples were collected for waste characterization from soil excavated during the 1992 pond closure (DOE, 2000). 1993 BBI Channel Sampling: Nine soil/sediment samples were collected in Channels A, B, and C. 1995: Fifty soil samples were collected on an approximate 50-foot square grid pattern to characterize the Former Disposal Area. Eight additional sediment samples were collected within Channels A and B (ICF 1997)⁸. The results for seven of these samples represent soil that is still in-place. <u>In Place Soil</u> 1995 Samples: Seven of the 1995 samples (see above) were located outside of the 2000 IM excavation area are represent soil that is still in-place. 2007 Samples: To assess post IM conditions, shallow and deep samples were collected at three representative locations south of the excavation perimeter and analyzed for SVOCs (Method 8270C) to assess potential presence of glycols possibly stored at the FSDF.	Pre-excavation sampling results (maximum concentrations), which represent soil that has been removed, are contained in Table D.3-2D for samples collected from excavated soils. SVOC results for in place soil samples and the extent of excavation is shown on Figure D.3-2. <u>Removed Soil</u> Findings for excavated soil samples include: 1992-1993: Nine SVOCs (up to 1,300 µg/kg, phenanthrene) were detected in waste characterization samples, which were removed in the 1992 excavation. 1995: Two SVOCs, bis(2-Ethylhexyl)phthalate and chrysene, were detected in soil samples from the Western Debris Area at 1,200 µg/kg and 1,600 µg/kg, respectively. Soil / sediment represented by these samples were removed during the 2000 IM. 1993 BBI Channel Sampling: Four SVOCs were detected in the Channels. Benzoic acid, Bis(2-ethylhexyl)phthalate, and butyl benzyl phthalate were detected in one sample in Channel C (up to 240 µg/kg, Bis(2-ethylhexyl)phthalate) and p-Cresol was detected in one sample in Channel A (at 88 µg/kg). Sediments were removed during the 2000 IM. <u>In Place Soil</u> Based on extensive soil excavation down to bedrock, SVOC-impacted soil has been removed: - As noted above for VOCs, additional excavation to bedrock was conducted in 2000 within the Former Disposal Area and the upper portions of Channels A and B (IT 2002) as shown on Figure D.3-2. Excavations were extended to include most of the FSDF site based on confirmatory sampling results for mercury, PCBs, and dioxins. - The southern excavation limit is delimited by seven in-place soil samples located just outside the excavation perimeter (Figure D.3-2). Phthalates were detected up to 540 µg/kg (bis(2-Ethylhexyl) phthalate) in five of these samples. Detected SVOCs were below RBSLs and no other SVOCs were detected in any of the eight perimeter samples. Glycols were not detected in the three representative 2007 samples. Based on extensive excavation within these chemical use areas and the limited SVOCs detected, no further characterization is warranted.	YES Detected SVOCs were limited. Potential SVOC distribution adequately defined by representative samples from in place soil sample locations.	YES <u>Area Southeast of B886</u> Area recommended for further evaluation during the CMS based on perchlorate concentrations and risk assessment results. SVOCs do not drive CMS recommendation. <u>Remaining Disposal Area & Channels</u> Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE D.3-2A (Page 3 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
		TPH: Potential presence in waste fuels/oils and coolants.	<u>Removed Soil</u> Soil was excavated to bedrock during the 1992 pond closure and 2000 IM. TPH was analyzed in soil samples collected during previous investigations; soil represented by these samples has since been removed: 1987-1993: Twelve soil samples (GRC, 1990) and waste characterization samples (DOE, 2000) were collected from soil excavated during the 1992 pond closure. 1995: Fifty soil samples were collected on an approximate 50-foot square grid pattern to characterize the Former Disposal Area. Eight additional sediment samples were collected within Channels A and B (ICF 1997)⁸. The results for seven of these samples represent soil that is still in-place. <u>In Place Soil</u> Seven of the 1995 samples (see above) were located outside of the 2000 IM excavation area are represent soil that is still in-place.	Pre-excavation sampling results (maximum concentrations), which represent soil that has been removed, are contained in Table D.3-2D for samples collected from excavated soils. TPH results for in place soil samples and the extent of excavation is shown on Figure D.3-2. <u>Removed Soil</u> Findings for excavated soil samples include: 1987-1993: Oil and grease (2,600 mg/kg), TPH as “diesel fuel” (375 mg/kg), and TRPH (760 mg/kg were detected in soil samples from the Lower Pond in 1987 (GRC, 1990). No petroleum hydrocarbons were detected in waste characterization soil samples during the 1992 pond closure (DOE, 2000). Soils represented by these samples were mostly removed in the 1992 excavation; remaining soil was removed in the 2000 IM. 1995: “High boiling petroleum hydrocarbons” were detected at 120 mg/kg within the former Upper Pond, up to 9.3 mg/kg in Channel A, and up to 7.6 mg/kg in Channel B. Soil / sediment represented by these samples were removed during the 2000 IM. <u>In Place Soil</u> Based on extensive soil excavation down to bedrock, TPH impacted soil has been removed: - As noted above for VOCs, additional excavation to bedrock was conducted in 2000 within the Former Disposal Area and the upper portions of Channels A and B (IT 2002) as shown on Figure D.3-2. Excavations were extended to include most of the FSDF site based on confirmatory sampling results for mercury, PCBs, and dioxins. - The southern excavation limit is delimited by seven in-place soil samples located just outside the excavation perimeter (Figure D.3-2). High boiling petroleum hydrocarbons were detected in three of these samples up to 75 mg/kg. All detected hydrocarbons were below RBSLs Based on extensive excavation within these chemical use areas, and the limited TPH detected, no further characterization is warranted.	YES Potential presence of TPH and terphenyls adequately defined by representative samples from in place soil sample locations.	YES <u>Area Southeast of B886</u> Area recommended for further evaluation during the CMS based on perchlorate. TPH was limited and does not drive CMS recommendations. <u>Remaining Disposal Area & Channels</u> Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE D.3-2A (Page 4 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
		PCBs / Terphenyls: Heat transfer agents for organic-cooled experimental nuclear reactor program.	<u>Removed Soil</u> Soil was excavated to bedrock during the 1992 pond closure and 2000 IM. PCBs were analyzed in soil samples collected during previous investigations; soil represented by these samples has since been removed: • 1987 – 1993: Twelve soil samples (GRC, 1990) and waste characterization samples (DOE, 2000) were collected from soil excavated during the 1992 pond closure. Biphenyls, PCBs, Terphenyls, and polychlorinated terphenyls were analyzed. • 1995 Channel Samples: Sixteen sediment samples were collected in Channels A through D. The results for five of these samples (in Channel D) represent soil that is still in-place. • 1995 Samples: Fifty soil samples were collected on an approximate 50-foot grid pattern to characterize the Former Disposal Area. Eight additional sediment samples were collected within Channels A and B (ICF 1997)⁸. The results for seven of these samples represent soil that is still in-place. <u>In Place Soil</u> <u>Disposal Area</u> • 1995 Samples: Seven of the 1995 samples (see above) were located outside of the 2000 IM excavation and represent soil that is still in-place. • 2000 IM verification samples: Collected sidewall samples at the excavation perimeter, excluding most of the west side, which was bounded by bedrock outcrop. Also collected bedrock samples along the bottom of the excavation. Samples include PC-series, DTSC-A, DTSC-C, BR-series⁹. • Terphenyls: Collected eight representative samples south of the excavation perimeter to assess potential presence of terphenyls possibly disposed or stored. <u>Channels A, B, C, and D</u> • 1995 Samples: Five of the 1995 Channel samples were located in Channel D, and represent soil that is still in-place. • 2000 IM verification samples: Sidewall / bank and bottom soil samples were collected in Channels A, C, and Lower B along the excavation perimeter and downstream of the excavated areas. Also collected bedrock samples from the bottom of the Channel B excavation. Samples include CAC-series for Channel A CBC-series for Channel B, CCC-series for Channel C, and DTSC-B.	Pre-excavation sampling results (maximum concentrations), which represent soil that has been removed, are contained in Table D.3-2D for samples collected from excavated soils. PCB results for in place soil samples and the extent of excavation are shown on Figure D.3-3A, D.3-3B, D.3-5A, D.3-5B. <u>Removed Soil</u> • 1987-1993: Aroclor 1254 (up to 12,000 µg/kg) and biphenyls (up to 102,000 µg/kg) were detected in 1987 soil samples (GRC, 1990) and PCBs (up to 2,000 µg/kg) were detected in 1992 pond closure waste characterization samples (Boeing, 1999). The soil represented by these samples was mostly removed during the 1992-1993 excavation; remaining soil was removed in the 2000 IM. • 1995: Aroclor 1254 was detected and up to 27,000 µg/kg in the Western Debris Area, up to 3,800 µg/kg in Channel A, and up to 150 µg/kg in Channel B. Soil / sediment represented by these samples were removed during the 2000 IM. <u>In Place Soil</u> As noted above for VOCs, additional excavation to bedrock was conducted in 2000 within the Former Disposal Area and upper portions of Channels A and B (IT 2002) as shown on Figures D.3-3A and D3-3B. Excavations were extended based on verification sampling results for mercury, PCBs, and dioxins. Based on extensive soil excavation down to bedrock and soil sampling results, the majority of PCB impacted soil has been removed. The following describes sampling results reflecting post-IM conditions. <u>Disposal Area</u> Samples were collected and analyzed for PCBs along or near the excavation perimeter: • Aroclor 1254 was detected up to 360 µg/kg (above the ResRBSL in sample 20446370) in five soil samples along the southern excavation perimeter; two of these samples exceeded one or both the Eco and ResRBSLs. Nearby samples were nondetect for PCBs to the east, west, and south. • PCBs were also detected at 190 µg/kg in a bedrock sample taken at the bottom of the excavation in the Western Debris Area (BR-5-2-17)⁹. • Two samples were analyzed on the western perimeter since this side of the excavation is bounded by a rock outcrop. PCBs were not detected in these samples. • PCBs were not detected in samples collected on the east or north perimeter of the disposal area excavation, with the exception of one sample DTSC-C, which contained 46 µg/kg Aroclor 1260 (below RBSLs). <u>Channel A</u> Aroclor 1254 and 1260 were both detected in Channel A: • Aroclor 1254 was detected in 27 of 58 samples, and above RBSLs in 17 samples; up to 520 µg/kg in bank sample CAC-66D. ➢ Detected mostly in bank samples (21 of 27 samples). ➢ Highest concentration was detected within a cluster of bank samples just downstream from the excavated areas in Channel A. Concentrations in this area range from 120 µg/kg to 520 µg/kg (samples CAC-63B through 67B). ➢ Concentrations upstream of this location in Channel A are below RBSLs or nondetect, and generally decrease downstream with concentrations mostly below 100 µg/kg (maximum 140 µg/kg) in lower Channel A. • Aroclor 1260 was detected in two samples up to 330 mg/kg. Highest concentration is detected just north of the site boundary and decreases downstream to non detect.	YES Potential distribution of PCBs adequately defined by extensive representative and step-out samples from excavated and in-place soil sample locations.	YES <u>Area Southeast of B886</u> Area recommended for further evaluation during the CMS based on perchlorate. PCBs do not drive CMS recommendations. <u>Remaining Disposal Area & Channels</u> Areas not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE D.3-2A (Page 5 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
		PCBs / Terphenyls (continued)	- Collected representative soil samples downstream of the excavation within and near Channel B (FSBS0066, FSBS0067, FSBS0092, and FSBS0093) and from the contributing drainage to the west of the outfall (FSBS0069, FSBS0070). Terphenyls: Collected three representative samples south of the excavation perimeter to assess potential presence of terphenyls possibly disposed or stored.	<u>Channel B</u> Aroclor 1242, 1254, and 1260 were detected in five samples, up to 110 µg/kg (Aroclor 1254 in CBC-92S): - Highest concentration is located just downstream of the Lower Pond west of Channel B and was the only detected concentration above the EcoRBSL. - PCBs were not detected in samples collected along the excavated portion of Channel B. - One sample east of CBC-92S and four samples downstream of the excavated channel contained PCBs below RBSLs (maximum 54 µg/kg Aroclor 1254). <u>Channels C & D</u> Aroclor 1254 was detected in Channel D and 1260 were detected in Channel C: - Aroclor 1260 was detected in six samples in Channel C, up to 250 µg/kg, all were above the Eco RBSL. Concentrations generally decrease downstream. - Aroclor 1254 was detected below RBSLs (up to 91 µg/kg) in five Channel D samples. Only the highest concentration is above the Eco RBSL. Terphenyls were not detected in the Former Disposal Areas or in the Channels. No further characterization is warranted. PCBs are limited in extent and detected at low concentrations surrounding excavated areas. Channel PCB concentrations are higher in localized areas and defined by extensive representative location sampling and step-outs. No further characterization is warranted.		

TABLE D.3-2A (Page 6 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
		Dioxins: Not used at site but can be present in burned materials and ash.	<u>Removed Soil</u> 1995 Samples: Fifty soil samples were collected on an approximate 50-foot grid pattern to characterize the Former Disposal Area. Eight additional sediment samples were collected within Channels A and B (ICF 1997)⁸. The results for seven of these samples represent soil that is still in-place. 1995 Channel Samples: Sixteen sediment samples were collected in Channels A through D. The results for five of these samples represent soil that is still in-place. Pre-Pond Closure Excavation: Samples were not analyzed for dioxins prior to the 1992 Pond Closure, but the ponds were likely the primary dioxin source area at FSDF based on historical burning activities. <u>In Place Soil Disposal Area</u> 1995 Samples: Seven of the 1995 samples (see above) were located outside of the 2000 IM excavation area are represent soil that is still in-place. 2000 IM verification samples: Collected sidewall samples at the excavation perimeter, excluding most of the west side, which was bounded by bedrock outcrop. Also collected bedrock samples along the bottom of the excavation. Samples include PC-series, DTSC-A, DTSC-C, BR-series⁹. <u>Channels A and B</u> 1995 Channel Samples: Five of the 1995 Channel samples were located in Channel D, and represent soil that is still in-place. 2000 IM verification samples: Sidewall / bank and bottom soil samples were collected in Channels A, C, and Lower B along the excavation perimeter and downstream of the excavated areas. Also collected bedrock samples from the bottom of the Channel B excavation. Samples include CAC-series for Channel A and CBC-series for Channel B, and DTSC-B. - Based on PCB permit limit exceedances at Outfall 006, collected representative soil samples downstream of the excavation within and near Channel B (FSBS0066, FSBS0067, FSBS0092, and FSBS0093) and from the contributing drainage to the west of the outfall (FSBS0069, FSBS0070).	Pre-excavation sampling results (maximum concentrations), which represent soil that has been removed, are contained in Table D.3-2D for samples collected from excavated soils. Dioxin results for in place soil samples and the extent of excavation are shown on Figure D.3-3A, D.3-3B, D.3-5A, D.3-5B. <u>Removed Soil</u> Dioxins were detected in Former Disposal Area soil samples (TCDD TEQ up to 12.26 ng/kg), in Channel A (TCDD TEQ up to 1.2 ng/kg), and in Channel BB (TCDD TEQ up to 423 ng/kg) during the 1995 investigation; soil represented by these samples has since been removed in the 2000 IM. <u>In Place Soil</u> As noted above for VOCs, additional excavation to bedrock was conducted in 2000 within the ponds, debris area, B886 and the upper portions of Channels A and B (IT 2002) as shown on Figures D.3-3A and D3-3B. Excavations were extended to include most of the FSDF Disposal Area and upper portions of Channels A and B. Based on extensive soil excavation down to bedrock, historical burning in the ponds and soil sampling results, the majority of dioxin impacted soil has been removed. The following describes sampling results reflecting post-2000 IM conditions. <u>Disposal Area</u> Dioxins were detected above background in two shallow samples on the southern excavation perimeter, with TCDD TEQs of 2.5 ng/kg and 4.0 ng/kg. The highest concentration was above the Eco RBSL. Concentrations are within background range to the east, west, and south. Samples along the west, north and east disposal area excavation perimeter contained dioxins within background range. <u>Channel A</u> Two samples contained dioxins above background, with TCDD TEQs of 1.5 ng/kg (at CAC-89BW) and 1.0 ng/kg (at CAC-32SW) in upstream and downstream samples, respectively. A sample approximately 50 feet downstream contained dioxins within background range. Detected dioxins in Channel A are below RBSLs. <u>Channel B</u> Dioxin TEQs were above background in eight samples in the area upgradient of Outfall 006, three above the TEQ Eco RBSL of 2.8 ng/kg. - TEQs ranged up to 1.8 ng/kg in two samples located within or near the upper portion of Channel B; surrounding samples contained dioxins within background range. - The other six samples are located downstream in the lower portion of Channel B, with TEQs ranging up to 6.7 ng/kg at FSBS0067 (collected 1.5 years after the Topanga fire). Concentrations decrease downstream to 2.6 ng/kg in FSBS0092 and 0.10 ng/kg in FSBS0079. Dioxins are limited in extent and generally detected at low concentrations within excavated areas. Channel B dioxin concentrations are higher in localized areas and defined by representative location sampling along the channel length. No further characterization is warranted.	YES Potential dioxin distribution adequately defined by representative and step-out samples from excavated and in-place soil sample locations.	YES <u>Area Southeast of B886</u> Area recommended for further evaluation during the CMS based on perchlorate. Dioxins do not drive CMS recommendations. <u>Remaining Disposal Area & Channels</u> Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE D.3-2A (Page 7 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
		Metals / Fluoride: Water-reactive metallic sodium and/or sodium-potassium mixtures (NaK). Metals potentially associated with treated components or disposal and burial activities. Potential storage of fluoride, which was known to have been stored within Group 8	<u>Removed Soil</u> Soil was excavated to bedrock during the 1992 pond closure and 2000 IM. Metals were analyzed in soil samples collected during previous investigations; soil represented by these samples has since been removed: • 1987-1993: 23 soil samples (GRC, 1990) and waste characterization samples (DOE, 2000) were collected from soil excavated during the 1992 pond closure. • 1993 & 1995 BBI Channel Sampling: Nine soil/sediment samples were collected in Channels A, B, and C and analyzed for metals in 1993; Seven additional samples were taken in 1995 in Channels A, B, and C and analyzed for mercury. • 1995 Samples: Fifty soil samples were collected on an approximate 50-foot grid pattern to characterize the Former Disposal Area. Eight additional sediment samples were collected within Channels A and B (ICF 1997)⁸. The results for seven of these samples represent soil that is still in-place. <u>In Place Soil Disposal Area</u> • 1995 Samples: Seven of the 1995 samples (see above) were located outside of the 2000 IM excavation and represent soil that is still in-place. • 2000 IM verification samples: Collected sidewall samples at the excavation perimeter, excluding most of the west side, which was bounded by bedrock outcrop. Also collected bedrock samples along the bottom of the excavation. Samples include PC-series, DTSC-A, DTSC-C through DTSC-G, BR-series⁹. • Three additional samples (FSBS0084 through FSBS0086) were collected along the southern excavation perimeter to assess the presence of fluoride potentially stored at FSDF and zirconium due to the discovery of zirconium turnings in the Western Debris Area in 1992. <u>Channels A, B, C, and D</u> • 1995 Channel Samples: Five of the 1995 Channel samples were located in Channel D, and represent soil that is still in-place. • 2000 IM verification samples: Sidewall / bank and bottom soil samples were collected in Channels A, C, and Lower B along the excavation perimeter and downstream of the excavated areas.	Pre-excavation sampling results (maximum concentrations), which represent soil that has been removed, are contained in Table D.3-2D for samples collected from excavated soils. Dioxin results for in place soil samples and the extent of excavation are shown on Figure D.3-4A, D.3-4B, D.3-5A, D.3-5B. <u>Removed Soil</u> Findings for excavated soil samples include: • 1987-1993: Eight metals were detected above background in 1987 Lower Pond soil samples (GRC, 1990) or the 1992 pond closure waste characterization (DOE, 2000): cadmium up to 7.5 mg/kg (background 1 mg/kg), chromium up to 710 mg/kg (background 36.8 mg/kg), copper up to 159 mg/kg (background 20 mg/kg), lead up to 864 mg/kg (background 34 mg/kg), mercury up to 85 mg/kg (background 0.09 mg/kg), nickel up to 240 mg/kg (background 29 mg/kg), silver up to 5 mg/kg (background 0.79 mg/kg), and zinc at 1,100 mg/kg (background 110 mg/kg). Soils represented by these samples were mostly removed during the 1992 excavation; remaining soil was removed in the 2000 IM. • 1995 Samples: Six metals were detected above background ranges in the Former Disposal Area: chromium at 50.6 mg/kg, copper at 187 mg/kg, lead at 232 mg/kg, mercury at 25 mg/kg, and nickel at 50.6 mg/kg (ICF, 1997)⁸. Mercury was detected above background ranges in Channels A and B. Soil represented by these samples has since been removed in the 2000 IM. Remaining (in place) samples are discussed below. • 1993 & 1995 BBI Channel Sampling: Mercury was detected up to 0.4 mg/kg in one sample location Channel C and arsenic was detected up to 24 mg/kg (background 15 mg/kg) in one sample in Channel B. Sediment represented by these samples was removed in the 2000 IM. <u>In Place Soil</u> As noted above for VOCs, additional excavation to bedrock was conducted in 2000 within the ponds, debris area, B886 and the upper portions of Channels A and B (IT 2002) as shown on Figures D.3-4A, D3-4B. Excavations were extended to include most of the FSDF Disposal Area and upper portions of Channels A and B. Based on extensive soil excavation down to bedrock and soil sampling results, metals impacted soil has been removed to near background levels. The following describes sampling results reflecting post-2000 IM conditions. Three metals, mercury, sodium, and arsenic were detected above background in the disposal area and/or channels A and B. • Mercury was detected above background in 16 of 63 samples within the Disposal Area and Channels A and B. ➤ Mercury was detected up to 0.28 mg/kg in soil samples and up to 0.14 mg/kg in bedrock samples within the disposal area excavation and southern perimeter. ➤ Mercury was detected up to 0.2 mg/kg in the upper portion of Channel A, decreasing to background range downstream ➤ Mercury was detected up to 0.35 mg/kg in Channel B near the FSDF Pistol Range, decreasing to just above background (0.10 mg/kg at FSBS0092) farther downstream. ➤ Mercury concentrations in Channels C and D were within background range. ➤ Detected mercury was below RBSLs. ➤ Mercury was not detected in any surface water samples.	YES Potential metals distribution adequately defined by representative and step out samples from excavated and in-place soil sample locations.	YES <u>Area Southeast of B886</u> Area recommended for further evaluation during the CMS based on perchlorate. Metals do not drive CMS recommendations. <u>Remaining Disposal Area & Channels</u> Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE D.3-2A (Page 8 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
			- Also collected bedrock samples from the bottom of the Channel B excavation. Samples include CAC-series for Channel A and CBC-series for Channel B, and DTSC-B. - Based on metals permit limit exceedances at Outfall 006, collected representative soil samples downstream of the excavation within and near Channel B (FSBS0066, FSBS0067, FSBS0069, FSBS0070, FSBS0092, FSBS0093, and PRBS0001 through PRBS0005). - Collected two samples (FSBS0069, FSBS0070) to characterize metals within the drainage originating from the rock outcrop northwest of the pistol range target area that contributes to Outfall 006 and Channel B. - Collected additional samples in drainage east of FSDF to characterize potential impacts from ESADA to Channel B through this channel (FSBS0080, FSBS0088, FSBS0089). - Collected stepout samples for arsenic in Channels A, C, and D to define concentration gradients down the Channels. - Collected four surface water samples for mercury in Channels A, B, and C (FSSW01, FSSW03 through FSSW05).	- Sodium was detected above background in the drainage east of FSDF and the FSDF Pistol Range area in and near Channel B. - Sodium was detected at 301 mg/kg at the drainage head closest to ESADA (FSBS0089). Concentrations decrease farther downstream to below background, upstream of the FSDF pistol range area. - Sodium was detected above background in 8 of 20 samples in the area upgradient of Outfall 006. Highest concentration is near the former target area (PRBS0002), and decrease to the north, south, and east. Rock outcrops limits the extent of the impacted soil to the west. - Arsenic was detected up to 34.9 mg/kg (above background of 15 mg/kg) five Channel D sediment samples near the property boundary. However, these arsenic concentrations are considered to be naturally occurring, since: - Arsenic has not been detected above background range in removed and in-place samples in the Former Disposal Area. - Arsenic was detected above background in only one removed sample in Channel A, and was not detected in any in-place samples in Channels A, B, or C. - Arsenic has not been detected above background range within the B009 or B056 Landfill drainages. - Higher arsenic concentrations are often associated with shale, which is present in the area. Further downstream of these five samples with concentrations above background, three samples contained arsenic within background range. Note: Lead was detected above background and is discussed below under Chemical Use Area 5, FSDF Pistol Range. Fluoride and zirconium were detected within background ranges in all samples. Metals concentrations above background are localized (arsenic and sodium) or scattered throughout the disposal and channel areas at concentrations just above background, and are bounded by samples containing metals within background ranges. No further characterization is warranted.		

TABLE D.3-2A (Page 9 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
		Perchlorate: No documented use; however presence of perchlorate in groundwater suggests the likely disposal of perchlorate within the Former Disposal Area.	<u>2000 IM</u> Collected sidewall samples around the excavation perimeter and in Channels A and B, due to perchlorate detections and soil removal actions for perchlorate in the Southern Investigation Area (see Chemical Use Area 3). Samples include PC-series, CAC-series for Channel A, CBC-series for Channel B. <u>2007</u> Collected additional perchlorate samples in representative locations around the excavation perimeter, in Channels A, B, C and D to address elevated detection limits in 2000 IM verification samples. Collected five shallow and four deep step-out samples (FSBS0086, FSBS0087, FSBS0090, FSBS0091, FSBS0094) to define extent of maximum detected perchlorate in the area southeast of B886.	Perchlorate results are shown on Figure D.3-4A, D3-4B, D3-5A, D3-5B. <u>Disposal Area</u> Perchlorate was detected above RBSLs in six samples in the southeastern portion of FSDF: - Perchlorate was detected at 3,600 µg/L in a shallow leachate sample at FSBS008 and 110 µg/L in the deeper sample (4.5-5’ bgs), above both Eco and ResRBSLs. Depth to bedrock is approximately 7.5 feet. - Three other samples located to the north, northwest and southeast contained perchlorate between 2.8 µg/L and 6 µg/L, above the EcoRBSL. All other samples were nondetect for perchlorate in the Former Disposal Area. <u>Channels A, B, C, and D</u> Perchlorate was also detected between 0.056 to 6.0 µg/L in isolated locations, two in Channel B and one in Channel A, each surrounded by nondetect results. All detected concentrations are above the EcoRBSL, but below the ResRBSL. Extensive samples representing disposal area and channels contained localized detected perchlorate defined by surrounding sample data and step-out samples (at the maximum). No further characterization warranted.	YES <u>Area Southeast of B886</u> Based on sampling and risk assessment results, area is recommended for further evaluation during the CMS. <u>Remaining Disposal Area and Channels</u> Potential perchlorate presence adequately defined by extensive representative samples.	YES <u>Southeast Corner</u> Soil volume is based on surrounding results, perchlorate data at depth, and depth to bedrock. <u>Remaining Disposal Area and Channels</u> Areas not recommended for further evaluation during the CMS based on sampling and risk assessment results.
2	Steam Lance The steam lance was used to clean residual sodium off of components. The steam lance is believed to have been powered by kerosene (MWH, 2006c). Northwestern corner of the steam lance area was excavated down to bedrock in 2000. Surface water flows via sheet flow to northeast and drains into Channel B.	SVOCs: Potential use of kerosene fuel for steam generation.	One shallow soil sample (2064220) was collected at the steam lance in 1995.	Two PAHs were detected between one to two orders of magnitude below current RBSLs. Soil represented by this sample was excavated to bedrock during the 2000 IM. Based on low PAH concentrations and soil excavation during the 2000 IM, no further sampling is warranted.	YES	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.
		TPH: Potential use of kerosene fuel for steam generation.	One shallow soil sample (2064220) was collected at the steam lance in 1995.	TPH was not detected. Soil represented by this sample was excavated to bedrock during the 2000 IM. Based on the lack of detected TPH and soil excavation during the 2000 IM, no further sampling is warranted.	YES	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.
		Metals: Metals potentially associated with kerosene used to generate heat for the steam lance.	One shallow soil sample (2064220) was collected at the steam lance in 1995.	Metals were within background ranges. Soil represented by this sample was excavated to bedrock during the 2000 IM. Based on metals detected within background range and soil excavation during the 2000 IM, no further sampling is warranted.	YES	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE D.3-2A (Page 10 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
3	Southern Investigation Area Scattered metal anomalies were observed in this area in geophysical surveys conducted in 1995 and in 1999 suggesting possible burial of waste materials. During the excavation of three trenches in the area south of the road, three drums were found with a strong kerosene odor (Rockwell, 1992) A 20-foot by 50-foot section to the northeast of the area was excavated for perchlorate during the 2000 IM. Area backfilled with clean soils from DTSC-approved SSFL borrow source. Surface water drains into a diversion drainage that was dug after the 2000 IM to minimize contamination migration. Surface water from the ESADA RFI Site, upgradient of FSDF, also drains northeast into this diversion drainage through the Southern Investigation Area. The drainage flows northeast into a culvert that flows underneath the road intersection in the southeastern corner of the RFI Site. Runoff discharges into another man-made drainage that flows north along the road on the east side of FSDF into Channel B. Historically, surface water migrated via sheet flow across the site to the northeast into Channels A and B.	VOCs: Potential presence in unidentified, buried waste materials.	<u>1995</u> A total of 10 soil samples were collected in 1995 to characterize VOCs (10000000 series sample IDs) at representative locations across the Southern Investigation Area. Note: a small area (approximately 830 cubic yards) was excavated to bedrock to remove perchlorate during the 2000 IM. Soil represented by two of these samples was removed; these samples are not shown on Figure D.3-1. <u>2001 (Post IM)</u> Two soil vapor samples were collected to characterize VOCs in the eastern portion of the Southern Investigation Area, FSSV02 at 10 feet bgs and FSSV01 at 15 feet bgs. <u>2007 (Post-IM)</u> Based on tetrachloroethene (PCE) in FSSV01 and FSSV02, two additional representative samples were collected at FSSV0004 and FSSV0005 to confirm PCE. An additional sample was collected in the western portion of the Southern Investigation Area at FSSV0006.	VOC results for in place samples and the extent of soil excavation are shown on Figure D.3-1. Five compounds were detected in five of the eight 1995 soil samples: • Benzene, methylene chloride, toluene, chlorobenzene and naphthalene were detected at or below 3 µg/kg • Only benzene was detected above the RBSL. • No VOCs were detected in the removed 1995 soil samples⁸. In 2001, PCE was detected in FSSV01 at 3.4 µg/L in FSSV02 at 1.8 µg/L In 2007, VOCs were not detected in any of the three soil vapor samples collected. Based on low VOC concentrations initially detected in soil and lack of detected VOCs in recent representative soil vapor samples, no further characterization is warranted.	YES Potential VOC presence adequately defined by representative sampling locations.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.
		SVOCs: Potential presence in unidentified, buried waste materials.	<u>1995</u> A total of 10 soil samples were collected in 1995 to characterize SVOCs (10000000 series sample IDs) at representative locations across the Southern Investigation Area. Note: as described above for VOCs soil was excavated to bedrock to remove perchlorate during the 2000 IM. Soil represented by two of these samples was removed. <u>2000 IM</u> Sidewall verification samples PCS-29 and PCS-31 were collected at the 2000 IM excavation perimeter. Note: Soil represented by three additional samples analyzed for SVOCs were removed due to perchlorate detections. <u>2007 (Post-IM)</u> Two soil samples were collected at representative locations near the center and eastern portions of the investigation area (FSBS0087 and FSBS0094) for SVOC analysis.	SVOC results for in place samples and the extent of soil excavation are shown on Figure D.3-2. PAHs and phthalates were detected in the investigation area. • Bis(2-Ethylhexyl) phthalate was detected up to 130 µg/kg and di-n-butyl phthalate was detected up to 72 µg/kg in 1995 (pre-IM) and 2007 samples; phthalates were not detected in 2000 IM verification samples PCS-29 and PCS-31. • PAHs were detected in PCS-31 up to 30 µg/kg (pyrene). • All detected SVOCs were below RBSLs. Note: SVOCs were not detected in removed 1995 samples or 2000 IM verification samples. PAHs and phthalates detected at low concentrations below RBSLs in representative samples across the Southern Investigation Area. No further characterization is warranted.	YES. Potential SVOC distribution adequately defined.	YES. Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE D.3-2A (Page 11 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
		TPH / Terphenyls: Potential presence in unidentified, buried waste materials; suspected kerosene discovered in buried drums in 1992.	<u>1995</u> A total of 10 soil samples were collected in 1995 to characterize TPH (10000000 series sample IDs) at representative locations across the Southern Investigation Area. Note: as described above for VOCs soil was excavated to bedrock to remove perchlorate during the 2000 IM. Soil represented by two of these samples was removed; these samples are not shown on Figure D.3-2. <u>2007 (Post-IM)</u> Two soil samples were collected at representative locations near the center and eastern portions of the investigation area (FSBS0087 and FSBS0094) for TPH analysis.	TPH results for in place samples and the extent of soil excavation are shown on Figure D.3-2. TPH not detected in in-place samples collected within the Southern Investigation Area; no further characterization is warranted. Note: “High-boiling petroleum hydrocarbons” were detected at 7.6 mg/kg in one of two samples from removed soils.	YES Potential TPH presence adequately defined.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.
		PCBs: Potential presence in unidentified, buried waste materials.	<u>1995</u> A total of 10 soil samples were collected in 1995 to characterize PCBs (10000000 series sample IDs) at representative locations across the Southern Investigation Area. Note: as described above for VOCs soil was excavated to bedrock to remove perchlorate during the 2000 IM. Soil represented by two of these samples was removed; these samples are not shown on Figure D.3-3B. <u>2000 IM</u> Sidewall verification samples PCS-29 and PCS-31were collected at the 2000 IM excavation perimeter. Bedrock samples were also collected at the excavation bottom (PCS-46B and PCS-47B). Note: Soil represented by three additional samples analyzed for PCBs were removed due to perchlorate detections. <u>2007 (Post-IM)</u> Due to elevated PCBs in 1995 sample 10546220, collected two step-out samples to the west and south (FSBS0003 and FSBS0004, respectively). Collected three samples (FSBS0005, FSBS0006 and FSBS0007) at representative locations in the channel downgradient of the culvert that discharges water from the Southern Investigation Area. The drainage diverts water to flow along the east side of FSDF created during the 2000 IM activities to reduce contaminant migration over the former Disposal Areas.	PCB results are shown on Figure D.3-3B. Aroclor 1254 was detected at 290 µg/kg in one representative 1995 sample the western edge of the Southern Investigation Area and in excavation sidewall sample PCS-29 at 97 µg/kg. Aroclor 1254 was not detected in the other sidewall sample (PCS-31), excavation bedrock samples (PCS-46B and PCS-47B) or in the 2007 step-out samples. Note: Aroclor 1254 was detected at 120 µg/kg in one of the two 1995 samples from removed soils. PCBs were not detected in the removed 2000 IM verification samples. PCBs were not detected in the downstream channel samples. Detected Aroclor 1254 is localized in two samples and bounded by nondetect samples in all directions. No other Aroclors were detected. Further characterization is not warranted.	YES PCBs distribution adequately defined by representative and step-out sample locations.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE D.3-2A (Page 12 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
		Dioxins: Potential presence in unidentified, buried waste materials.	<u>1995</u> A total of 10 soil samples were collected in 1995 to characterize dioxins (10000000 series sample IDs) at representative locations across the Southern Investigation Area. Note: as described above for VOCs soil was excavated to bedrock to remove perchlorate during the 2000 IM. Soil represented by two of these samples was removed; these samples are not shown on Figure D.3-3B. <u>2000 IM</u> Sidewall verification samples PCS-29 and PCS-31 were collected at the 2000 IM excavation perimeter. Bedrock samples were also collected at the excavation bottom (PCS-46B and PCS-47B). Note: Soil represented by three additional samples analyzed for dioxins were removed due to perchlorate detections. <u>Post-IM</u> Due to dioxins detected above background just south of the excavation in a 1995 sample (10146220), collected one step-out sample to the south (FSBS0002).	Dioxin results are shown on Figure D.3-3B. <u>Southern Investigation Area</u> Dioxin TEQs were above background (between 0.88 and 4.7 ng/kg) in five of 13 samples, distributed throughout the area: - Highest concentration in a sample just south of the excavation (10146220); step-out sample and surrounding samples at or below background. - TEQs up to 1.8 ng/kg in other four samples; all others below background. - Maximum detected result above EcoRBSL; all others below RBSLs. Note: Dioxins were detected above background (TEQ of 1.33 ng/kg) in one of two 1995 samples from removed soils. Dioxins were detected above background (TEQ of 1.4 ng/kg) in one of three removed 2000 IM verification samples. Dioxins above background limited and interspersed with values below background; single sample with TEQ over EcoRBSL defined by surrounding samples. No further characterization warranted.	YES Potential distribution of elevated dioxins adequately defined.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE D.3-2A (Page 13 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
		Metals: Potential presence in unidentified, buried waste materials.	<u>1995</u> A total of 10 soil samples were collected in 1995 to characterize metals (10000000 series sample IDs) at representative locations across the Southern Investigation Area. Note: as described above for VOCs soil was excavated to bedrock to remove perchlorate during the 2000 IM. Soil represented by two of these samples was removed; these samples are not shown on Figure D.3-4B. <u>2000 IM</u> Sidewall verification samples PCS-29 and PCS-31 were collected at the 2000 IM excavation perimeter. Bedrock samples were also collected at the excavation bottom (PCS-46B and PCS-47B). <u>Post-IM</u> Due to metals detected above background ranges in previous samples, collected three step-out samples to the west, south, and east (FSBS0003, FSBS0004 and FSBS0072, respectively). Collected a targeted sample for fluoride in the diversion drainage in the Southern Investigation, upstream of the culvert (FSBS0094). Collected three samples (FSBS0005, FSBS0006 and FSBS0007) at representative locations in the channel downgradient of the culvert that discharges water from the Southern Investigation Area. The drainage diverts water to flow along the east side of FSDF created to reduce contaminant migration over the former Disposal Areas.	Metals results are shown on Figure D.3-4B. Aluminum, mercury, and sodium were detected above background concentrations within the Southern Investigation Area. - Aluminum was detected above background in one sample (and duplicate) up to 26,900 mg/kg (FSBS0072), at the eastern end of the Southern Investigation Area. Step out sample FSBS0094 contained aluminum within background range. Aluminum concentrations are considered to be naturally occurring since: - This sample is downgradient of ESADA where aluminum was detected up to 31,100 mg/kg. - ESADA is situated on a hill slope comprised of soils derived from Santa Susana formation rocks. The maximum aluminum concentration in the background dataset was detected within the Santa Susana formation southwest of ESADA. - Aluminum is not correlated with sodium at ESADA (the area of highest sodium contains aluminum within background range), which is associated with a known release of Dowanol PM. - No known source of aluminum is associated with ESADA or SRE where Dowanol PM was used for pipe cleaning. - High aluminum concentrations are common in clay-rich soils. - Mercury was detected above background at 0.17 mg/kg (below RBSLs) at one location (10546220), on the western edge of the Southern Investigation Area. Concentrations decrease to below background in all directions and in deeper samples. - Sodium was detected above background at two locations up to 360 mg/kg. Highest concentration is located in the deeper sample on the western edge of the Southern Investigation Area. Note: Metals were detected within background ranges in two samples from removed soils. Metals were detected within background range in the drainage east of FSDF. Elevated metals were limited among representative sample locations and defined by step out samples. Aluminum is considered naturally occurring. No further characterization is warranted.	YES Potential distribution of metals adequately defined.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.
		Perchlorate: Potential presence in unidentified, buried waste materials.	<u>2000 IM</u> Presence of perchlorate in groundwater triggered the collection of soil samples in the investigation area. Perchlorate was detected in soil and bedrock samples, and the small area in the east was excavated. Collected soil sidewall verification samples at the perimeter of the 2000 IM excavation activities (PCS-29, PCS-31, PCS-34, PCS-39 through PCS-41). Also collected bedrock samples (PCS-46B and PCS-47B). <u>2007</u> Collected two additional step-out samples (FSBS0087 and FSBS0094) to define extent of perchlorate detected in Chemical Use Area 1 (above).	Perchlorate results are shown on Figure D.3-4B. Perchlorate was not detected in verification soil and bedrock samples or step out soil samples. No further characterization warranted. Note: Perchlorate was detected up to 0.75 mg/kg in samples that represent soil that was removed in the 2000 IM.	YES Perchlorate not detected. Potential perchlorate presence adequately assessed.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

TABLE D.3-2A (Page 14 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
4	Former Drum Debris Area Flat area just north of the road and upstream of the channel to the west of FSDF may have been a potential drum storage area. Unidentified drum debris was observed in pictures within the western channel in FSDF. Surface water flows into the channel, which drains to the northeast. The channel converges with Channel A, northwest of FSDF.	VOCs: Potential presence in unidentified drum storage and debris.	Collected two representative soil / sediment samples, one from the potential drum storage area (FSBS0011) and one from the former drum debris area in the channel (FSBS0012), to characterize potential VOCs.	VOC results are shown on Figure D.3-1. No VOCs detected in targeted locations within the potential drum storage area and the drum debris area; no further characterization warranted.	YES Potential VOC presence adequately assessed by targeted locations.	YES Area recommended for further evaluation in the CMS recommended based on mercury. VOCs not detected and do not drive CMS recommendation.
		SVOCs: Potential presence in unidentified drum storage and debris.	Collected two representative soil / sediment samples, one from the potential drum storage area (FSBS0011) and one from the former drum debris area in the channel (FSBS0012), to characterize potential SVOCs.	SVOC Results are shown on Figure D.3-2. PAHs (benzo(a)pyrene and chrysene) were detected (at 6.3 µg/kg and 6.4 µg/kg, respectively), in upstream sample FSBS0011. Phthalates were detected in both samples up to 220 µg/kg (di-n-butyl phthalate in FSBS0011). Detected SVOCs were all below RBSLs. Low concentrations of PAHs detected in targeted samples are likely naturally occurring. Phthalates likely represent laboratory contaminants. No further characterization is warranted.	YES SVOC distribution adequately defined by targeted locations.	YES Area recommended for further evaluation in the CMS recommended based on mercury. SVOCs do not drive CMS recommendation.
		TPH: Potential presence in unidentified drum storage and debris.	Collected two representative soil / sediment samples, one from the potential drum storage area (FSBS0011) and one from the former drum debris area in the channel (FSBS0012), to characterize potential TPH.	TPH results are shown on Figure D.3-2. No hydrocarbons were detected in targeted locations within the potential drum storage area and the drum debris area; no further characterization warranted.	YES Potential TPH presence adequately assessed.	YES Area recommended for further evaluation in the CMS recommended based on mercury. TPH not detected and does not drive CMS recommendation.
		PCBs: Potential presence in unidentified drum storage and debris.	Collected two representative soil / sediment samples, one from the potential drum storage area (FSBS0011) and one from the former drum debris area in the channel (FSBS0012), to characterize potential PCBs.	PCB results are shown on Figure D.3-3B. Aroclor 1254 was detected up to 19 µg/kg (estimated below reporting limit) in both samples targeting the potential drum storage and the drum debris areas. Low uniform results do not suggest higher concentrations elsewhere and are below Eco and Res RBSLs. No further characterization warranted.	YES Potential presence of PCBs adequately assessed by targeted locations.	YES Area recommended for further evaluation in the CMS based on mercury. PCBs do not drive CMS recommendation.
		Metals: Potential presence in unidentified drum storage and debris.	Collected two representative soil / sediment samples, one from the potential drum storage area (FSBS0011) and one from the former drum debris area in the channel (FSBS0012), to characterize metals. Collected two downstream step-out samples, one within the drum debris area (FSBS0013) and one downstream of the former drum debris area (FSBS0014).	Metals results are shown on Figure D.3-4A and D.3-4B. Mercury was detected above the background of 0.09 mg/kg in three samples: - At 2.2 mg/kg in the drum debris area (FSBS0012) - At 6.1 mg/kg in downdrainage step out FSBS0013 - At 0.16 mg/kg in downdrainage step out FSBS0014 Upstream sample FSBS0011 was contained mercury below background. Mercury at FSBS0012 and FSBS0013 is above the EcoRBSL of 0.88 mg/kg. Impacted soil extent is limited by the rock outcrops to the east and west, and depth of bedrock (1 to 7.5 feet bgs).	YES Area recommended for further evaluation in the CMS based on mercury concentrations.	YES Volume delineated based on concentrations gradients, bedrock depth, and rock outcrops.

TABLE D.3-2A (Page 15 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

Map Key	Chemical Use Area Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale ¹ [See Figure D.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels? ¹	Potential concentration gradients sufficiently evaluated for risk assessment? ^{2,3}	Is delineation sufficient to estimate soil volume in CMS? ⁴ [see Figure D.5-1 for CMS areas]
		Perchlorate: Potential presence in unidentified drum storage and debris.	Collected two representative soil / sediment samples, one from the potential drum storage area (FSBS0011) and one from the former drum debris area in the channel (FSBS0012), to characterize potential perchlorate.	Perchlorate results are shown on Figure D.3-4B. No Perchlorate was detected in targeted locations within the potential drum storage area and the drum debris area; no further characterization warranted.	YES Potential perchlorate presence adequately assessed by targeted locations.	YES Area recommended for further evaluation in the CMS recommended based on mercury. Perchlorate not detected and does not drive CMS recommendation.
5	FSDF Pistol Range Area was used as a shooting range for target practice and training for security personnel from the 1950s to the 1970s. Area contained an asphalt pad (Building 885) approximately 20 feet by 30 feet. East of the pad was a storage building. Northwest of the pad was a wooden target area/backstop, 22 feet wide and 8 feet high. The target area was situated against a rock outcrop to the northwest, with fill dirt placed between the backstop and the outcrop. During a geophysical survey performed in 2000, metallic debris was identified as remnants of lead shots from shooting activities. Another geophysical survey was conducted in 2001 to identify the potential extent of lead shot. The target area has been removed, but the asphalt pad is still in place. Surface water drains from the pistol range area by sheet flow into Channel B, which originates in and receives surface water from the FSDF RFI Site. Surface water north of the rock outcrop that borders the area on the northwest side drains to the northeast and joins Channel B. Erosion control measures, including fiber rolls, straw bales, and a plastic tarp, have been implemented at the former FSDF Pistol Range.	Metals: Lead shots from shooting activities.	Screen area for lead and other related metals resulting from shooting activities. Collected three targeted samples at the former target area: - One deep and one shallow sample at PRBS0002, directly beneath the former target area, - One shallow sample at PRBS0003, just outside the target area along bedrock outcrop. - One shallow sample at the former shooting pad (PRBS0005). Collected five additional representative samples downgradient of the main shooting area, including near the storage building (PRBS0001) and near the oak trees to the north of the site (PRBS0004, FSBS0064, FSBS0066, FSBS0067). Collected two targeted samples in the channel north of the rock outcrop that supported the former target area to characterize impacts of shots fired over the rock outcrop (FSBS0069, FSBS0070).	Metals results are shown on Figure D.3-4A. Lead was detected at 420 mg/kg above background of 34 mg/kg in one shallow sample (PRBS002), collected just below the former target. Concentrations decrease to below background in the deeper sample taken at the same location and in all other surrounding sample locations. Rock outcrop behind the target area limits impacts to the northeast. Mercury and sodium results for this area are described in Chemical Use Area 1.	YES Based on sampling and risk assessment results, the area is recommended for further evaluation during the CMS.	YES Soil volume is based on laterally and vertically decreasing concentrations (step-out data) and rock outcrops.

Sources: Rockwell 1979; GRC 1990; Ebasco 1992; ICF 1993; SAIC 1994; ICF 1997; Ogden 1996; Boeing 1999;IT 1999; IT 2001; Sapere 2005; MWH 2007

Notes:

1. Map Key refers to numbered chemical use area as shown on Figures D.3-1A, D.3-2A and D.3-2B.
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 D-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.

TABLE D.3-2A (Page 16 of 16)
DESCRIPTION OF CHEMICAL USE AREAS AT THE FSDF RFI SITE AND SOIL SAMPLING RESULTS SUMMARY

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. Results reported are as indicated within the Draft FSDF Characterization Report text, which did not report concentrations between the detection limit and the method reporting limit.
9. Bedrock samples (BR-series) are not shown on figures. Sample results and map are included in Attachment D-5.

ACRONYMS

B886 = Building 886	mg/kg = milligrams per kilogram	RFI = Resource Conservation and Recovery Act (RCRA)	TPH = Total Petroleum Hydrocarbons
bgs = below ground surface	ng/kg = nanograms per kilogram	Facility Investigation	µg/kg = micrograms per kilogram
CMS = Corrective Measures Study	PAH = Polynuclear Aromatic Hydrocarbon	SVOC = Semivolatile Organic Compounds	
Eco RBSL = Ecological Risk Based Screening Level	PCB = Polychlorinated Biphenyls	TEQ = Total Equivalency Quotient (normalized to 2,3,7,8	
FSDF = Former Sodium Disposal Facility	Res RBSL = Residential Risk Based Screening Level	TCDD)	
VOC = Volatile Organic Compound			

TABLE D.3-2B
FSDF 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 GW? (Above GWCC or Regulatory Criteria?) ³	RFI Site Related?	Groundwater Characterized Sufficiently for Risk Assessment?
VOCs	Solvents were disposed of at the site, primarily at the Lower and Upper Pond, Western Debris Area, and the Southern Investigation Area. Removed Samples: VOCs were detected within soil in the Lower Pond area that was removed during the 1992-1993 pond closure excavation. This included 1,1,1-Trichloroethane up to 1,840 mg/kg, tetrachloroethene (PCE) at 1,200 mg/kg, trichloroethene (TCE) at 740 mg/kg, and toluene at 800 mg/kg. Remaining In-Place Samples: After the 2000 IM, VOCs were detected at lower concentrations in the Lower Pond and the Southern Investigation area. - VOCs were detected up to 12.3 µg/L <TCE> in soil vapor and up to 18 µg/kg <TCE> in soil matrix samples collected within DTSC-approved backfill in the Lower Pond. Since these samples were collected within previously clean backfill and concentrations were highest in deeper samples, VOCs are suspected to be the result of vapor migration from groundwater and direct contact of soil and groundwater. - PCE was also detected up to 3.4 µg/kg in soil vapor samples in the Southern Investigation Area near the soil excavation area.	YES 514 samples have been collected and analyzed for VOCs between 1987 and 2007 in 6 perched piezometers/wells PZ-98, PZ-99, PZ-100, PZ-101, RS-18, RS-54 and 12 Chatsworth formation wells RD-21, RD-22, RD-23, RD-33A, RD-33B, RD-33C, RD-54A, RD-54B, RD-54C, RD-57, RD-64 and RD-65	YES A total of 18 different VOCs were detected in groundwater; 12 were detected above regulatory criteria. TCE was detected in 15 wells and above regulatory criteria in 12 wells (PZ-98, PZ-99, PZ-101, RS-18, RS-54, RD-21, RD-23, RD-33A, RD-54A, RD-54B, RD-64 and RD-6), ranging between 2.4 to 4,500 µg/L. - Concentrations were highest is RS-54. TCE concentrations are generally highest in wells within the FSDF RFI Site, near areas of likely use/disposal of solvents. TCE concentrations in the wells upgradient of these areas and to the west of the site are generally low or nondetect. - Concentrations have generally decreased over time, and TCE has decreased to below regulatory criteria or nondetect in five wells (RD-33A, RD-33B, RD-54B, RD-54C, and RD-57). - Concentrations above regulatory criteria are generally located within the FSDF RFI Site. In wells outside the RFI Site, ranging from roughly 350 feet (RD-22) from the Disposal Area to 550 feet from the Disposal Area (RD-57, RD-33 cluster), TCE concentrations have been nondetect or below regulatory criteria since 2003 or longer.	YES VOCs were historically disposed of at the FSDF and were detected in soil prior to removal actions.	NSGW – YES CFOU- YES
SVOCs	SVOCs (PAHs) are likely found at the site due to burning of waste hydrocarbons and organics in the Disposal Areas. Removed Samples - SVOCs, including PAHs, phenols, and phthalates, were detected in removed soil samples in the Disposal Areas. PAHs were detected up to 13,000 µg/kg (phenanthrene), phenols up to 3,330 µg/kg (phenol, 2-fluorophenol, and 2,4,6-Tribromophenol), phthalates at 2,200 µg/kg (Bis(2-Ethylhexyl)phthalate), and other SVOCs up to 1,670 µg/kg (nitrobenzene). - Benzo(a)pyrene was not detected in removed soil samples. - Bis(2-Ethylhexyl)phthalate was also detected in one removed soil / sediment sample at a low concentration (<240 µg/kg) collected in Channel C. Remaining In-Place Samples (2007): After the 2000 IM, representative samples were analyzed for the presence of SVOCs throughout the site. Two phthalates (Di-n-butyl phthalate and Bis(2-Ethylhexyl)phthalate) were detected at low concentrations (<540 µg/kg), on the southern boundary of the excavation. Seven PAHs were also detected within the southern portions of the site (in the Southern Investigation Area and in the Drum Debris Area) at low concentrations, ranging up to 30 µg/kg (pyrene). Benzo(a)pyrene was also detected in the Drum Debris Area at 6.3 µg/kg.	YES A total of 13 samples have been collected and analyzed for SVOCs between 1989 and 2003 in 4 perched piezometers/wells PZ-98, PZ-99, RS-18, RS-54 and 8 Chatsworth formation wells RD-21, RD-22, RD-23, RD-33A, RD-33B, RD-33C, RD-54A, and RD-57.	YES One PAH and one phthalate were each detected in one groundwater sample. - Bis(2-Ethylhexyl)phthalate was detected in one sample from RD-57 at 9.9 µg/L, above regulatory criteria. - Naphthalene was detected once at 0.09 µg/L in PZ-99, below regulatory criteria. Naphthalene has not been detected in RS-54 in the Lower Pond (the most likely source of PAHs). - No other PAHs detected; however, detection limits for several PAHs are above regulatory criteria, particularly for benzo(a)pyrene in Lower Pond wells (RS-54, RD-54) where the detection limit is at 5 µg/L, above regulatory criteria.	POSSIBLY (PAHs) Significant transport of large organic molecules to groundwater unlikely because of strong association with soil particles (“hydrophobic”). Detections of PAHs in surrounding wells low. However, since PAHs such as naphthalene are naturally present only in trace amounts, PAHs may be site related. NO (Phthalates) - Bis(2-Ethylhexyl)phthalate was detected at low concentrations, in removed and in-place soil. - Bis(2-Ethylhexyl)phthalate is a common laboratory contaminant. - RD-57 is almost 700 feet north of the nearest detect in soil in the Drum Debris Area and over 500 feet north of the Lower Pond. Bis(2-Ethylhexyl)phthalate is less mobile than TCE, which was detected only in low concentrations (below regulatory criteria) in the same well.	NSGW – YES CFOU- YES However, additional groundwater sampling will be conducted at FSDF to confirm the absence of significant SVOC impacts.

TABLE D.3-2B
FSDF 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 GW? (Above GWCC or Regulatory Criteria?) ³	RFI Site Related?	Groundwater Characterized Sufficiently for Risk Assessment?
TPH	Kerosene was used at the steam lance. Waste hydrocarbons were burned at the Lower and Upper Ponds and the Western Debris Area. Some petroleum releases may also have occurred at the Southern Investigation Area. Removed Soil • 1987-1993: Oil and grease, diesel fuel, TPH, terphenyls, and polychlorinated terphenyls were detected within soil in the Lower Pond area that was removed during the 1992-1993 pond closure excavation. Petroleum hydrocarbons were detected at low concentrations, up to 760 mg/kg (total recoverable petroleum hydrocarbons). Oil and grease was detected up to 2,600 mg/kg, and terphenyls were detected up to 880 mg/kg. • 1995: High boiling petroleum hydrocarbons were detected in samples in the Upper Pond and south of the excavation at low concentrations (highest = 120 mg/kg), indicating that most petroleum hydrocarbons were removed in the 1992-1993 excavation. Some of these samples are still in place.	YES Nine samples have been collected and analyzed for TPH between 1989 and 2003 in two perched piezometers PZ-98, PZ-99 and four Chatsworth formation wells RD-21, RD-22, RD-23, and RD-33A	YES • Total Recoverable Petroleum Hydrocarbons were detected in six samples among three Chatsworth formation wells (RD-21, RD-22 and RD-23), at low concentrations ranging from 50 to 200 µg/L. • Total extractable hydrocarbons (C16-C25) were also detected once in RD-33A, located over 400 feet away from FSDF, at 9,000 µg/L. • TPH was not analyzed in wells within the former Disposal Area, the likely source area, where the highest concentrations would be expected. However, both benzene and xylenes were detected above regulatory criteria in RS-54 at their highest concentrations (benzene up to 15 µg/L and total xylenes at 3,900 µg/L) indicating that fuel constituents have migrated to groundwater. • Petroleum Hydrocarbons were not detected in perched groundwater piezometers away from the disposal area.	YES (Hydrocarbons) Petroleum fuels were disposed at the FSDF and detected in soil prior to removal actions. While groundwater samples were not collected within the immediate former Disposal Area, surrounding groundwater hydrocarbon results and detected fuel constituents at RS-54 indicate groundwater TPH is related to FSDF operations.	NSGW – YES CFOU- YES However, additional groundwater sampling will be conducted at FSDF to confirm potential TPH impacts in the former Disposal Area.
PCBs/ Terphenyls	PCBs were used as heat transfer agents for organic-cooled experimental nuclear reactor program, and may have been disposed of at the site, primarily at the Lower and Upper Pond, Western Debris Area, and the Southern Investigation Area. Removed Soil • Aroclor 1242, 1254, and biphenyls were detected in the Disposal Areas before the 1992-1993 pond closure excavation and before the 2000 IM. Biphenyls were detected up to 102 mg/kg and Aroclors were detected up to 27,000 µg/kg (Aroclor 1254). Biphenyl concentrations were highest in the Lower Pond, and Aroclor 1254 concentrations were the highest in the Western Debris Area. • Aroclor 154 was also detected in Channels A and B. • The disposal area was excavated down to bedrock during the 2000 IM due to the presence of PCBs and other analytes. Remaining In-Place Samples: Aroclor 1254 and 1260 were detected in Disposal Areas, the Southern Investigation Area, and/or Channels A through D. Remaining PCBs at the site are localized in small pockets and concentrations overall across the site are generally low. Only 6 of over 130 samples contained PCB concentrations above 300 mg/kg (maximum 520 mg/kg).	NO PCBs were analyzed in groundwater at other SSFL RFI sites, targeting soil containing high PCB concentrations in recharge areas (see MWH 2006b); and PCBs were not detected in groundwater. Similarly, terphenyls have not been analyzed in FSDF groundwater.	PCB/terphenyls not analyzed in groundwater.	POSSIBLY Significant transport of large organic molecules to groundwater unlikely because of strong association with soil particles (“hydrophobic”). PCBs not detected in other elevated soil PCB areas at SSFL. Therefore, the potential for significant transport of PCBs to groundwater is considered low. Similarly, the potential for significant terphenyl transport is low.	NSGW – YES CFOU- YES Potential for presence of PCBs in groundwater is low and would not significantly add to potential risks caused by VOCs. However, additional groundwater sampling will be conducted at FSDF to confirm the absence of significant PCB/terphenyl groundwater impacts.

TABLE D.3-2B
FSDF 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 GW? (Above GWCC or Regulatory Criteria?) ³	RFI Site Related?	Groundwater Characterized Sufficiently for Risk Assessment?
Dioxins	Dioxins potentially present because waste organics were burned at the site, primarily at the Lower and Upper Ponds and Western Debris Area. Removed Soil - Elevated Dioxin TEQs were detected in the Disposal Areas and Channels. - Dioxin TEQs were detected up to 423.4 ng/kg, located in Channel B. - In 2000, the disposal area and parts of the channels were excavated down to bedrock due to the presence of dioxins and other analytes. Remaining In-Place Samples: Dioxins detected above background in the remaining soil were isolated and in low concentrations.	YES One sample collected and analyzed for dioxin analysis in 2007; located in perched well RS-54 within the former Disposal Area (lower pond).	Dioxins were not detected.	NO Dioxins were not detected in groundwater at the location most likely to have potential impacts from burning activities.	NSGW – YES CFOU- YES Potential for presence of dioxins in groundwater is low.
Metals	Sodium-potassium compounds were disposed of at FSDF, primarily in the Upper and Lower Ponds. Metal debris was found in the Disposal Areas. Acids may have also been disposed of at the site. Removed Soil - Eight metals (cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc) were detected in soil that was removed, either in the 1992-1993 pond closure excavation or in the 2000 IM. - Maximum detected concentrations ranged from 6 times (copper) to 3,000 times (mercury) the maximum respective background concentration. Remaining In Place Soil - Lead was detected above background in one sample at 420 mg/kg taken beneath the former target at the FSDF Pistol Range. Concentrations decrease to within background ranges at depth. - Mercury was also detected up to 6.1 mg/kg in the Drum Debris Area located in the channel west of FSDF. Mercury was also detected just above background (up to 0.35 mg/kg) and in other localized areas. - Sodium was also detected above background, up to 301 mg/kg in the Southern Investigation Area. Sodium was also detected above background in the FSDF Pistol Range area. Manganese and strontium have never been analyzed in soil samples at FSDF. Aluminum, boron, and potassium have been analyzed in soil samples collected in 2007, but were not analyzed in soil later removed. All other metals were below background in FSDF soils.	YES 244 samples have been collected and analyzed for metals between 1989 and 2007 in perched piezometers/wells PZ-98, PZ-99, RS-18, RS-54 and Chatsworth formation wells RD-21, RD-22, RD-23, RD-33A, RD-33B, RD-33C, RD-54A, RD-54B, RD-54C and RD-57	NSGW Of the 21 metals detected in near-surface groundwater; many were detected above GWCCs in at least one sample. Metals can be categorized as follows: ➤ Detected below GWCCs ➤ Detected above GWCCs in early samples but followed by numerous results below GWCCs. ➤ Cadmium, copper, and nickel were up to over 40 times the GWCC and are considered site related based on known soil background exceedances at FSDF. ➤ Cobalt, manganese, selenium, and molybdenum were up to 50 times the GWCC and are considered likely site related, since soil concentrations were either below background or not analyzed. CFOU Of the 22 metals detected in Chatsworth formation groundwater; many were detected above GWCCs in at least one sample. Metals can be categorized as follows: ➤ Detected below GWCCs ➤ Detected above GWCCs in early samples but followed by numerous results below GWCCs. In the case of thallium, a few later data were above the GWCC, and may represent analytical variability or naturally occurring thallium ➤ Groundwater manganese, molybdenum, and selenium were up to 4 times the GWCCs in recent data. A detailed evaluation of metals in groundwater is contained in Tables E-22 and E-23	YES In near-surface groundwater, cadmium, copper, and nickel are considered site related, and cobalt, manganese, molybdenum, and selenium are considered likely site related based on results considerably higher than GWCCs. In Chatsworth formation groundwater, manganese, molybdenum and selenium are considered likely site related based on results considerably higher than GWCCs in recent data.	NSGW – YES CFOU- YES

TABLE D.3-2B
FSDF 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 GW? (Above GWCC or Regulatory Criteria?) ³	RFI Site Related?	Groundwater Characterized Sufficiently for Risk Assessment?
Inorganics	Fluoride was analyzed in site soil samples since it was known to be stored or potentially used at other Group 8 sites (Building 009 LF RFI Site). Fluoride was not detected in soil.	YES 135 samples have been collected and analyzed for inorganics between 1989 and 2007 in perched wells RS-18, RS-54 and Chatsworth formation wells RD-21, RD-22, RD-23, RD-33A, RD-33B, RD-33C, RD-54A, RD-54B, RD-54C and RD-57	YES Six inorganics were detected in groundwater well, three of which were above respective GWCCs (sulfate) or other regulatory criteria (chloride, cyanide). - Chloride was detected twice at concentrations above the regulatory criterion (250 mg/L), up to 363 mg/L in RD-33A, a peripheral well northwest of the site. Concentrations are below or just above the regulatory criterion in on-site wells within the former Disposal Area, the likely source area, where the highest concentrations would be expected. Since concentrations do not indicate migration of chloride from the likely source zone, chloride detects in RD-33A are likely a result of a differing groundwater chemistry in that area as compared to wells within the FSDF site boundary. - Similarly, sulfate was detected once above its GWCC of 376 mg/kg in RD-33B at 512 mg/L, but was not detected in wells located near the former Disposal Area. - Cyanide was only detected above its screening criterion in one sample in well RS-54, at 0.36 mg/L. This single detect is preceded by several results that are non detect or below the screening criterion and another sample taken a few weeks later was also non detect for cyanide. Fluoride was detected at 0.68 mg/L, below the GWCC.	NO Chloride and sulfate detects above screening criterion are likely due to a differing groundwater chemistry in the RD-33 wells compared to wells within the FSDF site boundary. The cyanide detection above the regulatory criterion was a single, non-repeatable detection.	NSGW – YES CFOU- YES
Perchlorate	Perchlorate was apparently used or disposed at the site, likely within the former Disposal Areas and/or the Southern Investigation Area. <u>Removed Soil:</u> A 20 foot by 50 foot area in the Southern Investigation Area was excavated for perchlorate. Concentrations were detected up to 1,300 µg/kg. <u>Remaining In Place Samples:</u> - Perchlorate was detected in six soil leachate samples north of the road in the southeastern portion of the RFI site, up to 2,600 µg/L. - Perchlorate was detected in isolated channel locations, two in Channel B and one in Channel A. Soil leachate concentrations ranged from 0.056 to 6.0 µg/L.	YES 55 samples have been collected and analyzed for perchlorate between 1997 and 2005 in six perched piezometers/wells PZ-98, PZ-99, PZ-100, PZ-101, RS-18, RS-54 and 12 Chatsworth formation wells RD-21, RD-22, RD-23, RD-33A, RD-33B, RD-33C, RD-54A, RD-54B, RD-54C, RD-57, RD-64 and RD-65.	YES Perchlorate was detected above screening criteria in RD-21, RD-54A and RS-54 at concentrations ranging from 3.7 to 18 µg/L.	YES Soil perchlorate was detected in the southern portion of the site, near RD-21. Perchlorate may also have been present within the Disposal Area, but samples were not analyzed before the 2000 IM.	NSGW – YES CFOU- YES
NDMA (hydrazine indicator)	There was no reported use of hydrazine at the site, nor was hydrazine use reported for other Area IV operations (ICF, 1993). NDMA was not detected in representative samples collected around the excavation perimeter in 2007.	YES 13 samples have been collected and analyzed for NDMA between 1989 and 2003 in perched piezometers/wells PZ-98, PZ-99, RS-18, RS-54 and Chatsworth formation wells RD-21, RD-22, RD-23, RD-33A, RD-33B, RD-33C, RD-54A and RD-57	NO NDMA was not detected in any groundwater samples.	NO NDMA was not detected in groundwater.	NSGW – YES CFOU- YES

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

Analytical Group	Site Soil Impacts? (Summary of Relevant Impacts) ¹	Monitored in Groundwater? (Number of Samples / Date Range) ²	Constituents Detected in GW? (Above GWCC or Regulatory Criteria?) ³	RFI Site Related?	Groundwater Characterized Sufficiently for Risk Assessment?
1,4-Dioxane	1,4-dioxane was not analyzed in soil samples; however 1,1,1-trichloroethane (1,1,1-TCA) was detected in removed soil samples from the Lower Pond, up to 840 mg/kg. Soil was removed in the 1992-1993 pond closure excavation, and 1,1,1-TCA was not detected in any post-excavation samples. 1,1,1-TCA results indicate that 1,4-dioxane may have been present in soil.	YES 104 samples have been collected and analyzed for 1,4-Dioxane between 1994 and 2005 in perched piezometers/wells three PZ-101, RS-18, RS-54 and 12 Chatsworth formation wells RD-21, RD-22, RD-23, RD-33A, RD-33B, RD-33C, RD-54A, RD-54B, RD-54C, RD-57, RD-64 and RD-65	NO 1,4-dioxane was not detected in the groundwater samples, but detection limits were above the screening value, except in PZ-101.	POSSIBLY 1,4-Dioxane was not detected in groundwater, but reporting limits elevated.	NSGW – YES CFOU- YES

Notes:
¹ See Table A.3-2A for a complete summary of soil impacts.
² All FSDF RFI Site groundwater monitoring locations are shown on Figure E-4 in Appendix E.
³ See Tables E-8 through E-24 for Groundwater Results. Table E-5 provides regulatory criteria used for comparison.
⁴ All FSDF RFI Site groundwater monitoring locations are shown on Figure E-4 in Appendix E.
⁵ Groundwater comparison concentrations (GWCCs) were developed through a conservative process and approved by DTSC to be equal to or below naturally occurring background levels.
⁶ PZ-099 was abandoned in 2006.

Acronyms:
AOC = Area of Concern
CMS = Corrective Measures Study
NFA = No further action
PAH = Polynuclear aromatic hydrocarbon
PCB = polychlorinated biphenyl
SVOC = Semivolatile organic compound
TPH = total petroleum hydrocarbons
1,1,1-TCA = 1,1,1-trichloroethane
TCE = trichloroethene
PCE = tetrachloroethene

TABLE D.3-2C
FSDF RFI SITE SURFACE WATER DATA SUMMARY
(Page 1 of 2)

RFI Surface Water Samples

Object Name	Sample Name	Collection Date	Mercury (mg/L)	Perchlorate (µg/L)
FSSW01	RX050	05/08/2000	NA	<20
FSSW01	RY050	05/08/2000	NA	<5
FSSW03	MJ224	03/15/2003	<0.0002	<4
FSSW03	SSFL-W-175K	03/15/2003	NA	<2
FSSW04	MJ121	02/14/2003	<0.0002	<4
FSSW04	SSFL-W-099K	02/14/2003	NA	<2
FSSW05	MJ122	02/14/2003	<0.0002	<4
FSSW05	SSFL-W-100K	02/14/2003	NA	<2

Summary of NPDES Permit Limit Exceedance Data^(a)

Sample Name	Date	Analyte	Permit Limit - Daily Max/Monthly Average	Result	Units
Outfall 005	01/20/1999	Antimony	6.0/-	7	ug/L
Outfall 005	02/08/1999	Antimony	6.0/-	8	ug/L
Outfall 005	02/09/1999	Antimony	6.0/-	7	ug/L
Outfall 005	11/08/1999	Copper	11/-	14	ug/L
Outfall 005	11/08/1999	Mercury	0.012/-	8.04	ug/L
Outfall 005	01/25/2000	Mercury	2.1/-	3.6	ug/L
Outfall 005	2/2000	Mercury	0.012/-	0.87	ug/L
Outfall 005	02/21/2000	Mercury	2.1/-	3.7	ug/L
Outfall 005	03/05/2000	Thallium	2.0/-	3.2	ug/L
Outfall 005	03/09/2000	Mercury	2.1/-	4.9	ug/L
Outfall 005	02/27/2001	Nitrate + Nitrite as Nitrogen (N)	8.0/-	14	ug/L
Outfall 005	03/07/2001	Nitrate + Nitrite as Nitrogen (N)	8.0/-	8.4	ug/L
Outfall 005	10/17/2004	TCDD TEQ_NoDNQ	2.80E-08/-	3.32E-06	ug/L
Outfall 005	12/27/2004	Mercury	0.13/-	0.2	ug/L
Outfall 005	01/03/2005	TCDD TEQ_NoDNQ	2.80E-08/-	3.10E-08	ug/L
Outfall 005	10/18/2005	Copper	14.0/-	30	ug/L
Outfall 005	10/18/2005	Mercury	0.13/-	0.41	ug/L
Outfall 005	10/18/2005	Nitrate + Nitrite as Nitrogen (N)	10/-	16	mg/L
Outfall 005	10/18/2005	TCDD TEQ_NoDNQ	2.80E-08/-	1.36E-06	ug/L
Outfall 005	11/09/2005	Copper	14.0/-	20	ug/L
Outfall 005	11/09/2005	TCDD TEQ_NoDNQ	2.80E-08/-	1.76E-06	ug/L
Outfall 005	01/01/2006	Chloride	150/-	160	mg/L
Outfall 005	01/01/2006	Nitrate + Nitrite as Nitrogen (N)	10/-	51	mg/L
Outfall 005	01/01/2006	Total Dissolved Solids	850/-	980	mg/L
Outfall 005	01/01/2006	Chloride	150/-	160	mg/l
Outfall 005	01/01/2006	Nitrate + Nitrite as Nitrogen (N)	10/-	51	mg/l
Outfall 005	01/01/2006	Total Dissolved Solids	850/-	980	mg/l
Outfall 005	02/28/2006	Nitrate + Nitrite as Nitrogen (N)	10/-	40	mg/L
Outfall 005	02/28/2006	Nitrate + Nitrite as Nitrogen (N)	10/-	40	mg/l
Outfall 005	03/29/2006	Nitrate + Nitrite as Nitrogen (N)	10/-	43	mg/L
Outfall 005	03/29/2006	Nitrate + Nitrite as Nitrogen (N)	10/-	43	mg/l

TABLE D.3-2C
FSDf RFI SITE SURFACE WATER DATA SUMMARY
(Page 2 of 2)

Sample Name	Date	Analyte	Permit Limit - Daily Max/Monthly Average	Result	Units
Outfall 005	04/05/2006	Nitrate + Nitrite as Nitrogen (N)	10/-	23	mg/L
Outfall 005	04/05/2006	Nitrate + Nitrite as Nitrogen (N)	10/-	23	mg/l
Outfall 005	04/15/2006	Nitrate + Nitrite as Nitrogen (N)	10/-	22	mg/L
Outfall 005	04/15/2006	TCDD TEQ_NoDNQ	2.80E-08/-	3.38E-07	ug/L
Outfall 005	04/15/2006	Nitrate + Nitrite as Nitrogen (N)	10/-	22	mg/l
Outfall 005	04/15/2006	TCDD TEQ_NoDNQ	2.80E-08/-	3.38E-07	ug/L
Outfall 006	02/09/1999	Mercury	0.012/-	0.45	ug/L
Outfall 005	2/2000	Mercury	0.012/-	0.17	ug/L
Outfall 006	03/08/2000	Oil and Grease	15/-	30.5	mg/L
Outfall 006	10/17/2004	TCDD TEQ_NoDNQ	2.80E-08/-	1.92E-04	ug/L
Outfall 006	10/27/2004	pH (Lab)	8.5/-	6.29	pH Units
Outfall 006	12/27/2004	Mercury	0.13/-	0.22	ug/L
Outfall 006	12/27/2004	pH (Field)	8.5/-	9.7	pH Units
Outfall 006	10/18/2005	Copper	14.0/-	16	ug/L
Outfall 006	10/18/2005	TCDD TEQ_NoDNQ	2.80E-08/-	3.40E-08	ug/L
Outfall 006	11/09/2005	Copper	14.0/-	34	ug/L
Outfall 006	11/09/2005	Mercury	0.13/-	0.89	ug/L
Outfall 006	11/09/2005	TCDD TEQ_NoDNQ	2.80E-08/-	1.89E-06	ug/L
Outfall 006	01/28/2007	Chloride	150/-	210	mg/L
Outfall 006	02/19/2007	Gross Beta	50/-	63.8 ± 2.8	pCi/L

Sources: Boeing, 1999; Boeing, 2000; Boeing, 2001; Boeing, 2002; Boeing, 2003; Boeing, 2004; Boeing, 2005; Boeing, 2006; Boeing, 2007a; Boeing, 2007b

Notes:

(a) Results provided for constituents that have exceeded NPDES permit limits for outfall shown from 1998 to the present. In addition, perchlorate was detected one time above reporting limits at Outfall 006 (4.26J µg/L) when a compliance limit had not been established for that outfall. Perchlorate was not detected again in samples collected at Outfall 006.

mg/L = milligrams per liter

µg/L = micrograms per liter

TCDD TEQ_NoDNQ = Estimated concentrations (DNQ) not indicated in TCDD TEQ calculation.

Table D.3-2D (Page 1 of 5)
Reported FSDF Removed Soil Maximum Concentrations

Table D.3-2D

Analyte (all concentrations are in mg/kg unless indicated)	Chemical Group	1987 Soil Sampling ³		1992-93 Pond Excavation Waste Characterization ⁴		1993 BBI Sediment Sampling ⁵		1995 BBI Sediment Sampling ⁶		1995 FSDF Drainage Sediment Sampling ⁷		1995 Soil Sampling ⁸		2000 IM Removed Samples & Waste Characterization ⁹		Max Conc ¹
		Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	
1,1,1,2-Tetrachloroethane	VOC				Lower Pond, Parts of Upper Pond & Western Debris Area							ND				ND
1,1,1-Trichloroethane	VOC	1840	Lower Pond	0.6		ND						ND				1840.00
1,1,2,2-Tetrachloroethane	VOC	ND		ND		ND						ND				ND
1,1,2-Trichloroethane	VOC			ND		ND						ND				ND
1,1,2-Trichlorotrifluoroethane (Freon 113)	VOC			0.034		ND										0.03
1,1-Dichloroethane	VOC	8.4	Lower Pond	0.011		ND						ND				8.40
1,1-Dichloroethene	VOC	90	Lower Pond	0.07		ND						ND				90.00
1,1-Dichloroethene (TCLP)	VOC			ND												ND
1,1-Dichloropropene	VOC			3												3.00
1,1-Oxybisbenzene (TIC)	VOC			0.62												0.62
1,2,3-Trichloropropane	VOC											ND				ND
1,2,3-Trichlorobenzene	VOC											ND				ND
1,2,3,4-Tetrahydronaphthalene (TIC)	VOC			0.043												0.04
1,2,4-Trimethylbenzene	VOC											ND				ND
1,2-Dibromo-3-chloropropane	VOC											ND				ND
1,2-Dibromoethane	VOC											ND				ND
1,2-Dichlorobenzene	VOC			ND								ND				ND
1,2-Dichloroethane	VOC	ND		ND		ND						ND				ND
1,2-Dichloroethane (TCLP)	VOC			ND												ND
1,2-Dichloroethene (cis)	VOC			ND		ND						ND				ND
1,2-Dichloroethene (trans)	VOC	ND		ND		ND						ND				ND
1,2-Dichloroethene (total)	VOC					ND										ND
1,2-Dichloropropane	VOC	ND				ND						ND				ND
1,3,5-Trimethylbenzene	VOC											ND				ND
1,3-Dichlorobenzene	VOC			1.3		ND						ND				1.30
1,3-Dichloropropane	VOC											ND				ND
1,3-Dichloropropene (cis)	VOC			0.41		ND						ND				0.41
1,3-Dichloropropene (trans)	VOC			ND								ND				ND
1,3-Dichloropropene	VOC	ND				ND										ND
1,4-Dichlorobenzene	VOC			0.0055		ND						ND				0.01
1,4-Dichloropropane	VOC			ND												ND
2-Butanone	VOC					ND										ND
2-Butanone (TCLP)	VOC			ND												ND
2-Chloroethylvinyl Ether	VOC	ND				ND										ND
Acetone	VOC			ND												ND
Alkyl subtituted benzene isomer (TIC)	VOC			0.036												0.04
Benzene	VOC			ND		ND						ND				ND
Bromobenzene	VOC											ND				ND
Bromochloromethane	VOC	ND		ND								ND				ND
Bromodichloromethane	VOC			ND		ND						ND				ND
Bromoform	VOC	ND				ND						ND				ND
Bromomethane	VOC	ND				ND						ND				ND
Carbon disulfide	VOC					ND										ND
Carbon tetrachloride	VOC	500	Lower Pond	ND		ND						ND				500.00
Carbon tetrachloride (TCLP)	VOC			ND												ND
Chlorobenzene	VOC	ND				ND						ND				ND
Chlorobenzene (TCLP)	VOC			ND												ND
Chloroethane	VOC	ND		ND		ND						ND				ND
Chloroform	VOC	ND		0.0041		ND						ND				ND
Chloroform (TCLP)	VOC			ND												ND
Chloromethane	VOC	ND				ND						ND				ND
Cumene	VOC											ND				ND
d-Benzene Hexachloride	VOC					ND										ND
Dibromochloromethane	VOC	ND		ND		ND						ND				ND
Dibromomethane	VOC											ND				ND
Dichlorodifluoromethane	VOC											ND				ND

Table D.3-2D (Page 2 of 5)
Reported FSDF Removed Soil Maximum Concentrations

Table D.3-2D

Analyte (all concentrations are in mg/kg unless indicated)	Chemical Group	1987 Soil Sampling ³		1992-93 Pond Excavation Waste Characterization ⁴		1993 BBI Sediment Sampling ⁵		1995 BBI Sediment Sampling ⁶		1995 FSDF Drainage Sediment Sampling ⁷		1995 Soil Sampling ⁸		2000 IM Removed Samples & Waste Characterization ⁹		Max Conc ¹
		Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	
Dimethylcyclooctane	VOC			0.022	Lower Pond, Parts of Upper Pond & Western Debris Area											0.02
Ethylbenzene	VOC	44	Lower Pond	0.028		ND						ND				44.00
Hexachlorobutadiene	VOC											ND				ND
m,p-Xylene	VOC					0.005	Channel A					ND				ND
Methylene chloride	VOC	ND		ND		0.016	Channel C					ND				ND
Monochlorobenzene	VOC			ND												ND
n-Butylbenzene	VOC											ND				ND
n-Propylbenzene	VOC															
o-Chlorotoluene	VOC											ND				ND
o-Xylene	VOC					ND						ND				ND
p-Chlorotoluene	VOC											ND				ND
p-Cymene	VOC											0.062	Channel A			0.06
Polyaromatic hydrocarbon (TIC)	VOC			4.8												4.80
Polynuclear aromatic hydrocarbons (TIC)	VOC			0.042												0.04
Saturated alipatic hydrocarbons (TIC)	VOC			0.2												0.20
Sec-Butylbenzene	VOC											ND				ND
Sec-Dichloropropane	VOC											ND				ND
Styrene	VOC					ND						ND				ND
Tert-Butylbenzene	VOC											ND				ND
Tetrachloroethene	VOC	1200	Lower Pond	0.61		ND						ND				1200.00
Tetrachlorohexaflurobutane (TIC)	VOC			0.07												0.07
Tetramethylbenzene isomer (TIC)	VOC			0.006												0.01
Thiobismethane (TIC)	VOC			0.018												0.02
Toluene	VOC	800	Lower Pond	0.041		ND						ND				800.00
Trichloroethene (TCE)	VOC	740	Lower Pond	1.7		ND						ND				740.00
Trichloroethene (TCE) (TCLP)	VOC			ND												ND
Trichlorofluoromethane	VOC	7.8	Lower Pond	0.0014		ND						ND				7.80
Tridecane (TIC)	VOC			0.085												0.09
Trimethylbenzene isomer (TIC)	VOC	22	Lower Pond	0.042												22.00
Trimethylcyclohexane isomer (TIC)	VOC			0.04												0.04
Undecane (TIC)	VOC			0.11												0.11
Unknown aromatic hydrocarbon (TIC)	VOC			0.063												0.06
Unknown hydrocarbon (TIC)	VOC			0.49												0.49
Vinyl chloride	VOC			ND		ND						ND				ND
Vinyl chloride (TCLP)	VOC			ND												ND
Xylenes (total)	VOC		Lower Pond	0.097		ND										0.10
1,2,4-Trichlorobenzene	SVOC			ND		ND						ND		ND		ND
1,2-Dichlorobenzene	SVOC			ND		ND								ND		ND
1,2-Diphenylhydrazine	SVOC			ND												ND
1,3-Dichlorobenzene	SVOC			ND										ND		ND
1,4-Dichlorobenzene	SVOC			ND										ND		ND
1,4-Dichloroethalene (TCLP)	SVOC			ND												ND
2,4,5-Trichlorophenol	SVOC			ND		ND						ND		ND		ND
2,4,5-Trichlorophenol (TCLP)	SVOC			ND												ND
2,4,6-Trichlorophenol	SVOC			ND		ND						ND		ND		ND
2,4,6-Trichlorophenol (TCLP)	SVOC			ND												ND
2,4,6-Tribromophenol	SVOC			3.33												3.33
2,4-Dichlorophenol	SVOC			ND		ND						ND		ND		ND
2,4-Dimethylphenol	SVOC			ND		ND						ND		ND		ND
2,4-Dinitrophenol	SVOC			ND		ND						ND		ND		ND
2,4-Dinitrotoluene	SVOC			ND		ND						ND		ND		ND
2,6-Dinitrotoluene	SVOC			ND		ND						ND		ND		ND
2-Chloronaphthalene	SVOC			ND		ND						ND		ND		ND
2-Chlorophenol	SVOC			ND		ND						ND		ND		ND
2-Fluorobiphenyl	SVOC			1.67												1.67
2-Fluorophenol	SVOC			3.33												3.33

Table D.3-2D (Page 3 of 5)
Reported FSDF Removed Soil Maximum Concentrations

Table D.3-2D

Analyte (all concentrations are in mg/kg unless indicated)	Chemical Group	1987 Soil Sampling ³		1992-93 Pond Excavation Waste Characterization ⁴		1993 BBI Sediment Sampling ⁵		1995 BBI Sediment Sampling ⁶		1995 FSDF Drainage Sediment Sampling ⁷		1995 Soil Sampling ⁸		2000 IM Removed Samples & Waste Characterization ⁹		Max Conc ¹
		Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	
2-Hexanone	SVOC			ND	Lower Pond, Parts of Upper Pond & Western Debris Area	ND										ND
2-Methyl-4,6-dinitrophenol	SVOC			ND												ND
2-Methylnaphthalene	SVOC			ND		ND						ND		ND		ND
2-Methylphenol	SVOC			ND		ND						ND				ND
2-Nitroaniline	SVOC			ND		ND						ND		ND		ND
2-Nitrophenol	SVOC			ND		ND						ND		ND		ND
3,3'-Dichlorobenzidine	SVOC			ND		ND						ND		ND		ND
3-Nitroaniline	SVOC			ND		ND						ND		ND		ND
4,6-Dinitro-2-methylphenol	SVOC					ND						ND				ND
4,6-Dinitro-o-cresol	SVOC													ND		ND
4-Bromophenyl phenyl ether	SVOC			ND		ND								ND		ND
4-Chloro-3-methylphenol	SVOC			ND		ND						ND				ND
4-Chloroaniline	SVOC			ND		ND						ND				ND
4-Chlorophenyl phenyl ether	SVOC			ND		ND						ND		ND		ND
4-Methyl-2-pentanone	SVOC					ND										ND
4-Methylphenol	SVOC			ND		ND						ND				ND
4-Nitroaniline	SVOC			ND		ND						ND				ND
4-Nitrophenol	SVOC			ND		ND						ND		ND		ND
Acenaphthene	SVOC			ND		ND						ND		ND		ND
Acenaphthylene	SVOC			ND		ND						ND		ND		ND
Acetone	SVOC					ND										ND
Anthracene	SVOC			0.65		ND						ND		ND		0.65
Azobenzene	SVOC													ND		ND
Benzidine	SVOC			ND										ND		ND
Benzo(a)anthracene	SVOC			0.49								ND		ND		0.49
Benzo(a)pyrene	SVOC			ND		ND						ND		ND		ND
Benzo(b)fluoranthene	SVOC			ND		ND						ND		ND		ND
Benzo(g,h,i)perene	SVOC			ND		ND						ND		ND		ND
Benzo(k)fluoranthene	SVOC			ND		ND						ND		ND		ND
Benzoic Acid	SVOC			ND		0.052	Channel C					ND		ND		ND
Benzyl alcohol	SVOC			ND		ND						ND		ND		ND
bis(2-Chloroethoxy)methane	SVOC			ND		ND						ND		ND		ND
bis(2-Chloroethyl)ether	SVOC			ND		ND						ND		ND		ND
bis(2-Ethylhexyl)phthalate	SVOC			2.2		0.24	Channel C					1.200	Western Debris Area	ND		2.20
bis-(2-chloroisopropyl) ether	SVOC			ND		ND						ND		ND		ND
Butylbenzylphthalate	SVOC					0.12	Channel C					ND		ND		ND
Carbozole	SVOC											ND				ND
Chrysene	SVOC			ND		ND						1.600	Western Debris Area	ND		1.60
Dibenzo(a,h)anthracene	SVOC			ND		ND						ND		ND		ND
Dibenzofuran	SVOC			ND		ND						ND		ND		ND
Dibutyl phthalate	SVOC			ND												ND
Diethyl phthalate	SVOC			ND		ND						ND		ND		ND
Dimethyl phthalate	SVOC			ND		ND						ND		ND		ND
Di-n-butyl phthalate	SVOC					ND						ND		ND		ND
Di-n-octyl phthalate	SVOC			ND		ND						ND		ND		ND
Fluoranthene	SVOC			ND		ND						ND		ND		ND
Fluorene	SVOC			1.5		ND						ND		ND		1.50
Hexachlorobenzene	SVOC			ND		ND						ND		ND		ND
Hexachlorobenzene (TCLP)	SVOC			ND												ND
Hexachlor-1,3-butadiene (TCLP)	SVOC			ND												ND
Hexachlorobutadiene	SVOC			ND		ND								ND		ND
Hexachlorocyclopentadiene	SVOC			ND		ND						ND		ND		ND
Hexachloroethane	SVOC			ND		ND						ND		ND		ND
Hexachloroethane (TCLP)	SVOC			ND												ND

Table D.3-2D (Page 4 of 5)
Reported FSDF Removed Soil Maximum Concentrations

Table D.3-2D

Analyte (all concentrations are in mg/kg unless indicated)	Chemical Group	1987 Soil Sampling ³		1992-93 Pond Excavation Waste Characterization ⁴		1993 BBI Sediment Sampling ⁵		1995 BBI Sediment Sampling ⁶		1995 FSDF Drainage Sediment Sampling ⁷		1995 Soil Sampling ⁸		2000 IM Removed Samples & Waste Characterization ⁹		Max Conc ¹
		Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	
Indeno(1,2,3-cd)pyrene	SVOC			ND	Lower Pond, Parts of Upper Pond & Western Debris Area	ND						ND		ND		ND
Isophorone	SVOC			ND		ND						ND		ND		ND
m+p Cresol (TCLP)	SVOC			ND												ND
Naphthalene	SVOC			0.31								ND				0.31
Naphthalene (TIC)	SVOC			0.031		ND										0.03
Nitrobenzene	SVOC			1.67		ND						ND		ND		1.67
Nitrobenzene (TCLP)	SVOC			ND												ND
N-nitrosodi-n-propylamine	SVOC					ND						ND		ND		ND
N-nitrosodiphenylamine	SVOC					ND						ND		ND		ND
o-Cresol (TCLP)	SVOC			ND												ND
o-Cresol	SVOC													ND		ND
p-Chloroaniline	SVOC													ND		ND
p-Chloro-m-cresol	SVOC													ND		ND
p-Cresol	SVOC					0.088	Channel A							ND		ND
p-Nitroaniline	SVOC													ND		ND
Pentachlorophenol	SVOC			ND		ND								ND		ND
Pentachlorophenol (TCLP)	SVOC			ND								ND				ND
Phenanthrene	SVOC			13		ND						ND		ND		13.00
Phenol	SVOC			3.33		ND						ND		ND		3.33
Pyrene	SVOC			ND		ND						ND		ND		ND
Pyridine (TCLP)	SVOC			ND												ND
Aroclor 4465 (Polychlorinated Terphenyls)	PCB	1.4	Lower Pond													1.40
Aroclor 1016	PCB											ND		ND		ND
Aroclor 1221	PCB											ND		ND		ND
Aroclor 1232	PCB											ND		ND		ND
Aroclor 1242	PCB											0.910	Western Debris Area	ND	Channel A	0.91
Aroclor 1248	PCB											ND		ND		ND
Aroclor 1254	PCB	12	Lower Pond							0.92	Channel A	27.000	Western Debris Area	22	Western Debris Area	27.00
Aroclor 1260	PCB											ND		0.83		0.83
Polychlorinated Biphenyls	PCB			2												2.00
Biphenyl	Biphenyl	102	Lower Pond													102.00
Terphenyls	Terphenyl	880	Lower Pond	1.67												880.00
Antimony	Metals	ND		ND		ND								ND		ND
Arsenic	Metals	ND		2.7		24	Channel A					13.500	Lower Pond	5	Southern Investigation Area	13.50
Barium	Metals	ND		13										120	Southern Investigation Area	120.00
Beryllium	Metals	ND		0.58		0.39	Channel B							0.76	Southern Investigation Area	0.76
Cadmium	Metals	6	Lower Pond	7.5		ND								0.52	Southern Investigation Area	7.50
Chromium	Metals	710	Lower Pond	66		11	Channel B					50.600	Western Debris Area	28	Southern Investigation Area	710.00
Cobalt	Metals	ND		9.8										8.6	Southern Investigation Area	9.80
Copper	Metals	159	Lower Pond	78		6.9	Channel B					187.000	Lower Pond	14	Southern Investigation Area	187.00
Lead	Metals	864	Lower Pond	85		26	Channel C					232.000	Upper Pond	8.1	Southern Investigation Area	864.00
Mercury	Metals	3	Lower Pond	85		0.4	Channel C	0.14	Channel B			25.000	Upper Pond	280	Upper Pond	280.00
Molybdenum	Metals	ND		1.8										ND		1.80
Nickel	Metals	129	Western Debris Area	240		7.3	Channel B					50.600	Western Debris Area	17	Southern Investigation Area	240.00
Selenium	Metals	ND		ND		ND								ND		ND

Table D.3-2D (Page 5 of 5)
Reported FSDF Removed Soil Maximum Concentrations

Table D.3-2D

Analyte (all concentrations are in mg/kg unless indicated)	Chemical Group	1987 Soil Sampling ³		1992-93 Pond Excavation Waste Characterization ⁴		1993 BBI Sediment Sampling ⁵		1995 BBI Sediment Sampling ⁶		1995 FSDF Drainage Sediment Sampling ⁷		1995 Soil Sampling ⁸		2000 IM Removed Samples & Waste Characterization ⁹		Max Conc ¹
		Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	Max Conc ¹	Location ²	
Silver	Metals	ND		5	Lower Pond, Parts of Upper Pond & Western Debris Area	ND								ND		5.00
Thallium	Metals	ND		ND		ND								ND		ND
Vanadium	Metals	ND		41										49	Southern Investigation Area	49.00
Zinc	Metals	ND		1100		41	Channel B					140.000	Western Debris Area	52	Southern Investigation Area	1100.00
TCDD TEQ (ND = 0) (ng/kg)	Dioxin									1.2294	Channel A	423.400	Channel B	17.5	Western Debris Area	423.40
Perchlorate	Perchlorate													0.75	Southern Investigation Area	0.75
High boiling petroleum hydrocarbons	Hydrocarbons											120.000	Upper Pond			120.00
Diesel fuel	Hydrocarbons	375	Lower Pond													375.00
Total petroleum hydrocarbons (method 418.1)	Hydrocarbons	760	Lower Pond	ND												760.00
Oil and grease	Hydrocarbons	2600	Western Debris Area													2600.00
Aniline	Herbicide			ND										ND		ND
2,4-D (TCLP)	Pesticides			ND												ND
4,4'-DDD	Pesticides					ND										ND
4,4'-DDE	Pesticides					ND										ND
4,4'-DDT	Pesticides					ND										ND
a-Benzene Hexachloride	Pesticides					ND										ND
Aldrin	Pesticides					ND										ND
b-Benzene Hexachloride	Pesticides					ND										ND
Clorodane (TCLP)	Pesticides			ND												ND
Dieldrin	Pesticides					ND										ND
Endosulfan sulfate	Pesticides					ND										ND
Endrin	Pesticides					ND										ND
Endrin (TCLP)	Pesticides			ND												ND
Heptachlor	Pesticides					ND										ND
Heptachlor (TCLP)	Pesticides			ND												ND
Heptachlor epoxide	Pesticides					ND										ND
Heptachlor epoxide (TCLP)	Pesticides			ND												ND
Lindane (gamma-BHC)	Pesticides					ND										ND
Lindane (TCLP)	Pesticides			ND												ND
Methoxychlor (TCLP)	Pesticides			ND												ND
Silvex (TCLP)	Pesticides			ND												ND
Toxaphene (TCLP)	Pesticides			ND												ND

Acronyms:
FSDF = Former sodium disposal facility
IM = Interim Measure
Max Conc = Maximum Concentration
PCB = Polychlorinated biphenyl
SVOC = Semivolatile Organic Compound
TCLP = Toxicity Characteristic Leaching Procedure
TPH = Total petroleum hydrocarbon
VOC = Volatile organic compound

Notes:
¹ Concentrations indicated are the maximum concentrations reported in removed soil at FSDF.
² The location indicated are the general site locations at which the maximum concentration was detected in the removed soil at FSDF.
³ Source: GRC, 1990
⁴ Source: Boeing 1999b
⁵ Source: McLaren Hart 1993
⁶ Source: McLaren Hart 1995a
⁷ Source: McLaren Hart 1995b
⁸Source: ICF 1997. Results reported are as indicated within the text of the Draft FSDF Characterization Report, which did not describe estimated concentrations.
⁹Source: IT 2002

TABLE D.3-3A
FSDF RFI SITE ANALYTICAL DATA SCREENING SUMMARY AND DATA QUALITY (SOIL)
(Page 1 of 6)

TABLE D.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	690	1100	2.5	85	39	0.14	28.1	0	0	19	46	0.1	6	0	0	3	--	--
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	ng/kg	690	820	13	85	54	0.12	218	0	0	19	31	0.182	4.21	0	0	0	--	--
	1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	690	280	0.19	85	14	0.11	12.1	0	0	12	71	0.058	2.5	0	0	62	--	--
	1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	69	28	0.73	85	19	0.174	5.18	0	0	11	66	0.0761	3.1	0	0	19	--	--
	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	69	28	0.34	85	13	0.16	3.5	0	0	10	72	0.074	2.4	0	0	39	--	--
	1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	69	28	0.3	85	18	0.13	3	0	0	14	67	0.046	3.1	0	0	27	--	--
	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	69	130	0.95	85	36	0.095	8.56	0	0	23	49	0.071	2.3	0	0	16	--	--
	1,2,3,7,8,9-Hexachlorodibenzofuran	ng/kg	69	28	0.43	85	24	0.065	1.8	0	0	4	61	0.046	2	0	0	24	--	--
	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	69	28	1.1	85	30	0.21	6.4	0	0	13	55	0.073	2.1	0	0	6	--	--
	1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	230	92	0.59	85	14	0.114	1.4	0	0	5	71	0.034	4.21	0	0	23	--	--
	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	6.9	2.8	0.18	85	6	0.14	0.72	0	0	5	79	0.096	5.2	0	2	67	Elevated DLs	a, k
	2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	69	28	0.45	85	23	0.16	5.8	0	0	13	62	0.059	2.1	0	0	25	--	--
	2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	23	9.2	0.64	85	15	0.182	3.4	0	0	9	70	0.033	4.68	0	0	25	--	--
	2,3,7,8-TCDD	ng/kg	6.9	2.8	0.5	85	1	0.07	0.07	0	0	0	84	0.056	4.8	0	2	30	Elevated DLs	a, k
	2,3,7,8-Tetrachlorodibenzofuran	ng/kg	69	4.4	1.8	85	26	0.198	15.1	0	5	8	59	0.07	1.1	0	0	0	--	--
	Heptachlorodibenzofurans	ng/kg	NA (4)	NA (4)	NA (3)	85	48	0.15	76.4	NA (4)	NA (4)	NA (3)	37	0.135	5	NA (4)	NA (4)	NA (3)	--	--
	Heptachlorodibenzo-p-dioxins	ng/kg	NA (4)	NA (4)	NA (3)	85	62	0.19	1010	NA (4)	NA (4)	NA (3)	23	0.2	2.6	NA (4)	NA (4)	NA (3)	--	--
	Hexachlorodibenzofurans	ng/kg	NA (4)	NA (4)	NA (3)	85	49	0.18	50.2	NA (4)	NA (4)	NA (3)	36	0.08	5	NA (4)	NA (4)	NA (3)	--	--
	Hexachlorodibenzo-p-dioxins	ng/kg	NA (4)	NA (4)	NA (3)	85	50	0.22	64.5	NA (4)	NA (4)	NA (3)	35	0.0998	5.8	NA (4)	NA (4)	NA (3)	--	--
	Octachlorodibenzofuran	ng/kg	23000	27000	8.1	85	38	0.088	176	0	0	11	47	0.2	10	0	0	2	--	--
	Octachlorodibenzo-p-dioxin	ng/kg	23000	37000	140	85	68	0.49	4890	0	0	18	17	1.02	8.4	0	0	0	--	--
	Pentachlorodibenzofurans	ng/kg	NA (4)	NA (4)	NA (3)	85	40	0.28	106	NA (4)	NA (4)	NA (3)	45	0.08	5	NA (4)	NA (4)	NA (3)	--	--
	Pentachlorodibenzo-p-dioxins	ng/kg	NA (4)	NA (4)	NA (3)	85	16	0.31	15.4	NA (4)	NA (4)	NA (3)	69	0.096	5.6	NA (4)	NA (4)	NA (3)	--	--
	TCDD TEQ (ND=0) 2005 WHO	ng/kg	6.9	2.8	0.87	85	85	0	6.67394	0	5	18	0						--	--
	Tetrachlorodibenzofurans	ng/kg	NA (4)	NA (4)	NA (3)	85	40	0.28	218	NA (4)	NA (4)	NA (3)	45	0.1	2.6	NA (4)	NA (4)	NA (3)	--	--
	Tetrachlorodibenzo-p-dioxins	ng/kg	NA (4)	NA (4)	NA (3)	85	13	0.12	2	NA (4)	NA (4)	NA (3)	72	0.056	4.8	NA (4)	NA (4)	NA (3)	--	--
Inorganics																				
	Fluoride	mg/kg	4600	NA (4)	6.7	20	20	0.819	5.69	0	NA (4)	0	0						--	--
	pH	pH Units	NA (4)	NA (4)	NA (3)	46	46	5.23	8.32	NA (4)	NA (4)	NA (3)	0						--	--
METALS (mg/kg)																				
	Aluminum	mg/kg	75000	14	20000	18	18	10000	26900	0	18	2	0						--	--
	Antimony	mg/kg	30	0.096	8.7	18	13	0.046	2.7	0	11	0	5	0.112	10	0	5	2	Elevated DLs	a, b, i
	Arsenic	mg/kg	0.095	0.26	15	49	47	1.7	34.9	47	47	5	2	0.5	0.5	2	2	0	Elevated DLs	b
	Barium	mg/kg	15000	15	140	18	18	58	132	0	18	0	0						--	--
	Beryllium	mg/kg	150	5.9	1.1	18	18	0.34	0.86	0	0	0	0						--	--
	Boron	mg/kg	15000	9.3	9.7	14	4	2.9	4.8	0	0	0	10	1.1	6.5	0	0	0	--	--
	Cadmium	mg/kg	2.6	0.0026	1	18	16	0.1	0.59	0	16	0	2	0.5	0.5	0	2	0	Elevated DLs	b
	Chromium	mg/kg	3400	940	36.8	34	34	10	30	0	0	0	0						--	--
	Cobalt	mg/kg	1500	10	21	18	18	4.3	10	0	0	0	0						--	--
	Copper	mg/kg	3000	1.1	29	34	34	6.6	24.9	0	34	0	0						--	--
	Lead	mg/kg	150	0.063	34	37	37	4.5	420	1	37	1	0						--	--
	Lithium	mg/kg	1522	43	37	14	11	18	35	0	0	0	3	25	31	0	0	0	--	--
	Mercury	mg/kg	23	0.88	0.09	99	65	0.0039	6.1	0	2	21	34	0.017	0.2	0	0	18	--	--
	Molybdenum	mg/kg	380	0.11	5.3	18	14	0.31	0.71	0	14	0	4	0.5	2	0	4	0	Elevated DLs	b
	Nickel	mg/kg	1500	0.1	29	34	34	7.1	19.1	0	34	0	0						--	--
	Potassium	mg/kg	NA (4)	NA (4)	6400	14	14	2300	5800	NA (4)	NA (4)	0	0						--	--
	Selenium	mg/kg	380	0.18	0.655	18	12	0.25	0.43	0	12	0	6	0.23	2	0	6	2	Elevated DLs	a, b
	Silver	mg/kg	380	0.55	0.79	18	8	0.047	0.15	0	0	0	10	0.054	1	0	2	2	Elevated DLs	a, m
	Sodium	mg/kg	NA (4)	NA (4)	110	28	27	28	360	NA (4)	NA (4)	13	1	68	68	NA (4)	NA (4)	0	--	--
	Thallium	mg/kg	6.1	3.2	0.46	18	14	0.23	0.36	0	0	0	4	0.5	10	2	2	4	Elevated DLs	a, m
	Vanadium	mg/kg	76	1.6	62	18	18	22	54	0	18	0	0						--	--
	Zinc	mg/kg	23000	22	110	34	34	39	70.2	0	34	0	0						--	--
	Zirconium	mg/kg	NA (4)	NA (4)	8.6	27	22	1.7	5.4	NA (4)	NA (4)	0	5	1.6	1.9	NA (4)	NA (4)	0	--	--

TABLE D.3-3A
FSDF RFI SITE ANALYTICAL DATA SCREENING SUMMARY AND DATA QUALITY (SOIL)
(Page 2 of 6)

TABLE D.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		
PCB (ug/kg)																				
	Aroclor 1016	ug/kg	3900	1600	NA (3)	151	0						151	3.44	250	0	0	NA (3)	--	--
	Aroclor 1221	ug/kg	350	1600	NA (3)	151	0						151	3.44	250	0	0	NA (3)	--	--
	Aroclor 1232	ug/kg	350	79	NA (3)	151	0						151	3.44	250	0	14	NA (3)	Elevated DLs	a, c
	Aroclor 1242	ug/kg	350	80	NA (3)	151	1	23.4	23.4	0	0	NA (3)	150	3.44	250	0	14	NA (3)	Elevated DLs	a, c
	Aroclor 1248	ug/kg	350	16	NA (3)	151	0						151	3.44	250	0	146	NA (3)	Elevated DLs	a, c, k
	Aroclor 1254	ug/kg	350	79	NA (3)	155	53	3.4	520	4	24	NA (3)	102	3.44	200	0	5	NA (3)	Elevated DLs	a, c
	Aroclor 1260	ug/kg	350	79	NA (3)	150	15	1.7	330	0	8	NA (3)	135	3.44	250	0	13	NA (3)	Elevated DLs	a, c
	Aroclor 1262	ug/kg	350	79	NA (3)	6	0						6	33	33	0	0	NA (3)	--	--
	Aroclor 1268	ug/kg	350	79	NA (3)	6	0						6	33	33	0	0	NA (3)	--	--
	Decachlorobiphenyl	ug/kg	NA (4)	NA (4)	NA (3)	2	0						2	0.04	0.08	NA (4)	NA (4)	NA (3)	--	--
	PCB-105	ug/kg	NA (4)	NA (4)	NA (3)	2	2	0.55	9	NA (4)	NA (4)	NA (3)	0						--	--
	PCB-114	ug/kg	NA (4)	NA (4)	NA (3)	2	2	0.74	5.1	NA (4)	NA (4)	NA (3)	0						--	--
	PCB-118	ug/kg	NA (4)	NA (4)	NA (3)	2	2	1.5	23	NA (4)	NA (4)	NA (3)	0						--	--
	PCB-123	ug/kg	NA (4)	NA (4)	NA (3)	2	2	0.08	0.5	NA (4)	NA (4)	NA (3)	0						--	--
	PCB-126	ug/kg	NA (4)	NA (4)	NA (3)	2	2	0.03	0.06	NA (4)	NA (4)	NA (3)	0						--	--
	PCB-156	ug/kg	NA (4)	NA (4)	NA (3)	2	2	0.18	1	NA (4)	NA (4)	NA (3)	0						--	--
	PCB-157	ug/kg	NA (4)	NA (4)	NA (3)	2	2	0.1	0.27	NA (4)	NA (4)	NA (3)	0						--	--
	PCB-167	ug/kg	NA (4)	NA (4)	NA (3)	2	2	0.16	0.41	NA (4)	NA (4)	NA (3)	0						--	--
	PCB-169	ug/kg	NA (4)	NA (4)	NA (3)	2	0						2	0.004	0.005	NA (4)	NA (4)	NA (3)	--	--
	PCB-170	ug/kg	NA (4)	NA (4)	NA (3)	2	2	1.4	4	NA (4)	NA (4)	NA (3)	0						--	--
	PCB-180	ug/kg	NA (4)	NA (4)	NA (3)	2	2	1.6	4.7	NA (4)	NA (4)	NA (3)	0						--	--
	PCB-189	ug/kg	NA (4)	NA (4)	NA (3)	2	2	0.07	0.21	NA (4)	NA (4)	NA (3)	0						--	--
	PCB-77	ug/kg	NA (4)	NA (4)	NA (3)	2	0						2	0.06	0.24	NA (4)	NA (4)	NA (3)	--	--
	PCB-81	ug/kg	NA (4)	NA (4)	NA (3)	2	2	0.08	0.2	NA (4)	NA (4)	NA (3)	0						--	--
	Total DiCB	ug/kg	NA (4)	NA (4)	NA (3)	2	2	0.13	0.14	NA (4)	NA (4)	NA (3)	0						--	--
	Total HpCB	ug/kg	NA (4)	NA (4)	NA (3)	2	2	7.3	20.9	NA (4)	NA (4)	NA (3)	0						--	--
	Total HxCB	ug/kg	NA (4)	NA (4)	NA (3)	2	2	19.1	55.7	NA (4)	NA (4)	NA (3)	0						--	--
	Total MoCB	ug/kg	NA (4)	NA (4)	NA (3)	2	1	0.003	0.003	NA (4)	NA (4)	NA (3)	1	0.004	0.004	NA (4)	NA (4)	NA (3)	--	--
	Total NoCB	ug/kg	NA (4)	NA (4)	NA (3)	2	2	0.08	0.23	NA (4)	NA (4)	NA (3)	0						--	--
	Total OcCB	ug/kg	NA (4)	NA (4)	NA (3)	2	2	0.7	2.3	NA (4)	NA (4)	NA (3)	0						--	--
	Total PeCB	ug/kg	NA (4)	NA (4)	NA (3)	2	2	9.8	81.1	NA (4)	NA (4)	NA (3)	0						--	--
	Total TeCB	ug/kg	NA (4)	NA (4)	NA (3)	2	2	1.5	10.3	NA (4)	NA (4)	NA (3)	0						--	--
	Total TrCB	ug/kg	NA (4)	NA (4)	NA (3)	2	2	0.17	0.49	NA (4)	NA (4)	NA (3)	0						--	--
Perchlorate 300.0 (ug/kg)																				
	Perchlorate	ug/kg	9100	0.021	NA (3)	66	0						66	20	20000	3	66	NA (3)	Elevated DLs	a, i, k
	Perchlorate	ug/L	NA (4)	NA (4)	NA (3)	48	8	0.056	3600	NA (4)	NA (4)	NA (3)	40	4	80	NA (4)	NA (4)	NA (3)	--	--
SVOC (ug/kg)																				
	1,2,4-Trichlorobenzene	ug/kg	120	68000	NA (3)	17	0						17	100	398	15	0	NA (3)	Elevated DLs	c, j
	1,2-Dichlorobenzene	ug/kg	1800	390000	NA (3)	17	0						17	100	398	0	0	NA (3)	--	--
	1,2-Diphenylhydrazine	ug/kg	NA (4)	NA (4)	NA (3)	13	0						13	346	398	NA (4)	NA (4)	NA (3)	--	--
	1,3-Dichlorobenzene	ug/kg	1700	350000	NA (3)	17	0						17	100	398	0	0	NA (3)	--	--
	1,4-Dichlorobenzene	ug/kg	10	170000	NA (3)	17	0						17	100	398	17	0	NA (3)	Elevated DLs	a, j
	1-Methyl naphthalene	ug/kg	230000	230000	NA (3)	8	0						8	17.7	24	0	0	NA (3)	--	--
	2,4,5-Trichlorophenol	ug/kg	5700000	230000	NA (3)	33	0						33	150	4200	0	0	NA (3)	--	--
	2,4,6-Trichlorophenol	ug/kg	10000	460000	NA (3)	33	0						33	150	1700	0	0	NA (3)	--	--
	2,4-Dichlorophenol	ug/kg	170000	1400	NA (3)	20	0						20	100	1700	0	3	NA (3)	--	--
	2,4-Dimethylphenol	ug/kg	1100000	120000	NA (3)	33	0						33	250	1700	0	0	NA (3)	--	--
	2,4-Dinitrophenol	ug/kg	110000	590	NA (3)	33	0						33	250	4200	0	31	NA (3)	Elevated DLs	a, c, j, k
	2,4-Dinitrotoluene	ug/kg	NA (4)	NA (4)	NA (3)	33	0						33	100	1700	NA (4)	NA (4)	NA (3)	--	--
	2,6-Dichlorophenol	ug/kg	NA (4)	NA (4)	NA (3)	13	0						13	346	398	NA (4)	NA (4)	NA (3)	--	--
	2,6-Dinitrotoluene	ug/kg	NA (4)	NA (4)	NA (3)	33	0						33	100	1700	NA (4)	NA (4)	NA (3)	--	--
	2-Chloronaphthalene	ug/kg	NA (4)	NA (4)	NA (3)	33	0						33	34.6	1700	NA (4)	NA (4)	NA (3)	--	--
	2-Chlorophenol	ug/kg	290000	23000	NA (3)	33	0						33	250	1700	0	0	NA (3)	--	--
	2-Methylnaphthalene	ug/kg	230000	230000	NA (3)	35	0						35	10	1700	0	0	NA (3)	--	--

TABLE D.3-3A
FSDf RFI SITE ANALYTICAL DATA SCREENING SUMMARY AND DATA QUALITY (SOIL)
(Page 3 of 6)

TABLE D.3-3A

Analyte Group			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		
	2-Nitroaniline	ug/kg	NA (4)	NA (4)	NA (3)	33	0						33	200	4200	NA (4)	NA (4)	NA (3)	--	--
	2-Nitrophenol	ug/kg	NA (4)	25000	NA (3)	33	0						33	100	1700	NA (4)	0	NA (3)	--	--
	3,3'-Dichlorobenzidine	ug/kg	NA (4)	NA (4)	NA (3)	33	0						33	346	3500	NA (4)	NA (4)	NA (3)	--	--
	3-Nitroaniline	ug/kg	NA (4)	NA (4)	NA (3)	33	0						33	200	4200	NA (4)	NA (4)	NA (3)	--	--
	4,6-Dinitro-o-cresol	ug/kg	5700	25000	NA (3)	33	0						33	250	4200	0	0	NA (3)	--	--
	4-Bromophenyl phenyl ether	ug/kg	NA (4)	NA (4)	NA (3)	33	0						33	150	1700	NA (4)	NA (4)	NA (3)	--	--
	4-Chlorophenylphenyl ether	ug/kg	NA (4)	NA (4)	NA (3)	33	0						33	100	1700	NA (4)	NA (4)	NA (3)	--	--
	4-Nitrophenol	ug/kg	NA (4)	25000	NA (3)	33	0						33	346	4200	NA (4)	0	NA (3)	--	--
	Acenaphthene	ug/kg	3400000	2500	NA (3)	35	0						35	10	350	0	0	NA (3)	--	--
	Acenaphthylene	ug/kg	1700000	810000	NA (3)	35	0						35	10	350	0	0	NA (3)	--	--
	Aniline	ug/kg	130000	58000	NA (3)	15	0						15	150	398	0	0	NA (3)	--	--
	Anthracene	ug/kg	17000000	2400	NA (3)	35	0						35	10	350	0	0	NA (3)	--	--
	Azobenzene	ug/kg	NA (4)	NA (4)	NA (3)	2	0						2	150	150	NA (4)	NA (4)	NA (3)	--	--
	Benzidine	ug/kg	NA (4)	NA (4)	NA (3)	15	0						15	346	1000	NA (4)	NA (4)	NA (3)	--	--
	Benzo(a)anthracene	ug/kg	600	1400	NA (3)	35	1	12	12	0	0	NA (3)	34	10	350	0	0	NA (3)	--	--
	Benzo(a)pyrene	ug/kg	60	4700	NA (3)	35	1	6.3	6.3	0	0	NA (3)	34	10	350	18	0	NA (3)	Elevated DLs	a, k
	Benzo(b)fluoranthene	ug/kg	600	4600	NA (3)	35	0						35	10	350	0	0	NA (3)	--	--
	Benzo(ghi)perylene	ug/kg	NA (4)	6200	NA (3)	35	0						35	10	350	NA (4)	0	NA (3)	--	--
	Benzo(k)fluoranthene	ug/kg	600	3600	NA (3)	35	0						35	10	350	0	0	NA (3)	--	--
	Benzoic acid	ug/kg	230000000	4400	NA (3)	33	0						33	500	4200	0	0	NA (3)	--	--
	Benzyl alcohol	ug/kg	17000000	4400	NA (3)	33	0						33	200	1700	0	0	NA (3)	--	--
	bis(2-Chloroethoxy)methane	ug/kg	NA (4)	160000	NA (3)	33	0						33	100	1700	NA (4)	0	NA (3)	--	--
	bis(2-Chloroethyl) ether	ug/kg	290	160000	NA (3)	33	0						33	100	1700	31	0	NA (3)	Elevated DLs	a, j, k
	bis(2-Chloroisopropyl) ether	ug/kg	2300000	160000	NA (3)	33	0						33	100	1700	0	0	NA (3)	--	--
	bis(2-Ethylhexyl) phthalate	ug/kg	250000	4900	NA (3)	35	16	15	540	0	0	NA (3)	19	17.7	1700	0	0	NA (3)	--	--
	Butyl benzyl phthalate	ug/kg	11000000	370000	NA (3)	32	0						32	17.7	1700	0	0	NA (3)	--	--
	Carbazole	ug/kg	36000	4600000	NA (3)	16	0						16	340	1700	0	0	NA (3)	--	--
	Chrysene	ug/kg	6000	2400	NA (3)	35	2	6.4	11	0	0	NA (3)	33	10	350	0	0	NA (3)	--	--
	Dibenzo(a,h)anthracene	ug/kg	170	1700	NA (3)	35	0						35	10	350	3	0	NA (3)	--	--
	Dibenzofuran	ug/kg	110000	4600000	NA (3)	33	0						33	100	1700	0	0	NA (3)	--	--
	Diethyl phthalate	ug/kg	46000000	5200000	NA (3)	35	2	8.9	12	0	0	NA (3)	33	17.7	1700	0	0	NA (3)	--	--
	Dimethyl phthalate	ug/kg	570000000	7500000	NA (3)	32	0						32	17.7	1700	0	0	NA (3)	--	--
	Di-n-butyl phthalate	ug/kg	5700000	490	NA (3)	35	19	6.49	220	0	0	NA (3)	16	19.8	1700	0	1	NA (3)	Elevated DLs	a
	Di-n-octyl phthalate	ug/kg	2300000	1600000	NA (3)	32	0						32	17.7	1700	0	0	NA (3)	--	--
	Diphenylamine	ug/kg	NA (4)	NA (4)	NA (3)	13	0						13	346	398	NA (4)	NA (4)	NA (3)	--	--
	Fluoranthene	ug/kg	2300000	130000	NA (3)	35	1	27	27	0	0	NA (3)	34	10	350	0	0	NA (3)	--	--
	Fluorene	ug/kg	2300000	1600	NA (3)	35	0						35	10	350	0	0	NA (3)	--	--
	Hexachlorobenzene	ug/kg	400	370	NA (3)	33	0						33	100	1700	1	6	NA (3)	Elevated DLs	a, c, j, k
	Hexachlorobutadiene	ug/kg	9200	920	NA (3)	17	0						17	100	398	0	0	NA (3)	--	--
	Hexachlorocyclopentadiene	ug/kg	340000	14000	NA (3)	33	0						33	340	1700	0	0	NA (3)	--	--
	Hexachloroethane	ug/kg	18000	2300	NA (3)	33	0						33	200	1700	0	0	NA (3)	--	--
	Indeno(1,2,3-cd)pyrene	ug/kg	600	3900	NA (3)	35	0						35	10	350	0	0	NA (3)	--	--
	Isophorone	ug/kg	750000	520000	NA (3)	33	0						33	100	1700	0	0	NA (3)	--	--
	Naphthalene	ug/kg	6000	230000	NA (3)	19	0						19	10	150	0	0	NA (3)	--	--
	Nitrobenzene	ug/kg	29000	2100	NA (3)	33	0						33	330	1700	0	0	NA (3)	--	--
	n-Nitrosodimethylamine	ug/kg	45	60000	NA (3)	15	0						15	17.7	369	7	0	NA (3)	Elevated DLs	c, j
	n-Nitrosodi-n-propylamine	ug/kg	100	60000	NA (3)	33	0						33	150	1700	33	0	NA (3)	Elevated DLs	a, j, k
	n-Nitrosodiphenylamine	ug/kg	80000	60000	NA (3)	20	0						20	200	1700	0	0	NA (3)	--	--
	o-Cresol	ug/kg	2867000	120000	NA (3)	33	0						33	150	1700	0	0	NA (3)	--	--
	p-Chloroaniline	ug/kg	NA (4)	NA (4)	NA (3)	33	0						33	100	1700	NA (4)	NA (4)	NA (3)	--	--
	p-Chloro-m-cresol	ug/kg	NA (4)	23000	NA (3)	33	0						33	100	1700	NA (4)	0	NA (3)	--	--
	p-Cresol	ug/kg	290000	4300	NA (3)	33	0						33	150	1700	0	0	NA (3)	--	--
	Pentachlorophenol	ug/kg	8800	14000	NA (3)	33	0						33	346	4200	0	0	NA (3)	--	--
	Phenanthrene	ug/kg	1700000	1300	NA (3)	35	1	13	13	0	0	NA (3)	34	10	350	0	0	NA (3)	--	--
	Phenol	ug/kg	18000000	5000	NA (3)	33	0						33	150	1700	0	0	NA (3)	--	--

TABLE D.3-3A
FSDF RFI SITE ANALYTICAL DATA SCREENING SUMMARY AND DATA QUALITY (SOIL)
(Page 4 of 6)

TABLE D.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		
	p-Nitroaniline	ug/kg	NA (4)	NA (4)	NA (3)	33	0						33	346	4200	NA (4)	NA (4)	NA (3)	--	--
	Pyrene	ug/kg	1700000	79000	NA (3)	35	1	30	30	0	0	NA (3)	34	10	350	0	0	NA (3)	--	--
SVOC (ug/kg) -TICs																				
	6-Isopropenyl-4,8a-dimethyl-4a,5,6,7,8,8	ug/kg	NA (4)	NA (4)	NA (3)	1	1	329	329	NA (4)	NA (4)	NA (3)	0						--	--
	Eicosane	ug/kg	NA (4)	NA (4)	NA (3)	4	4	220	585	NA (4)	NA (4)	NA (3)	0						--	--
	Heptadecane	ug/kg	NA (4)	NA (4)	NA (3)	1	1	271	271	NA (4)	NA (4)	NA (3)	0						--	--
	Octacosane	ug/kg	NA (4)	NA (4)	NA (3)	3	3	162	448	NA (4)	NA (4)	NA (3)	0						--	--
	Pentadecane, 8-heptyl-	ug/kg	NA (4)	NA (4)	NA (3)	1	1	343	343	NA (4)	NA (4)	NA (3)	0						--	--
	Tetratetracontane	ug/kg	NA (4)	NA (4)	NA (3)	1	1	377	377	NA (4)	NA (4)	NA (3)	0						--	--
	Tetratriacontane	ug/kg	NA (4)	NA (4)	NA (3)	1	1	457	457	NA (4)	NA (4)	NA (3)	0						--	--
	Tritetracontane	ug/kg	NA (4)	NA (4)	NA (3)	2	2	287	350	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 1	ug/kg	NA (4)	NA (4)	NA (3)	2	2	153	339	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 10	ug/kg	NA (4)	NA (4)	NA (3)	2	2	298	557	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 11	ug/kg	NA (4)	NA (4)	NA (3)	2	2	201	584	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 12	ug/kg	NA (4)	NA (4)	NA (3)	2	2	234	530	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 13	ug/kg	NA (4)	NA (4)	NA (3)	2	2	184	310	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 14	ug/kg	NA (4)	NA (4)	NA (3)	2	2	353	480	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 15	ug/kg	NA (4)	NA (4)	NA (3)	2	2	314	440	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 16	ug/kg	NA (4)	NA (4)	NA (3)	1	1	285	285	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 17	ug/kg	NA (4)	NA (4)	NA (3)	1	1	198	198	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 18	ug/kg	NA (4)	NA (4)	NA (3)	1	1	210	210	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 19	ug/kg	NA (4)	NA (4)	NA (3)	1	1	317	317	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 2	ug/kg	NA (4)	NA (4)	NA (3)	4	4	147	355	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 20	ug/kg	NA (4)	NA (4)	NA (3)	1	1	182	182	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 21	ug/kg	NA (4)	NA (4)	NA (3)	1	1	194	194	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 22	ug/kg	NA (4)	NA (4)	NA (3)	1	1	414	414	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 23	ug/kg	NA (4)	NA (4)	NA (3)	1	1	274	274	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 3	ug/kg	NA (4)	NA (4)	NA (3)	3	3	167	326	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 4	ug/kg	NA (4)	NA (4)	NA (3)	2	2	168	320	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 5	ug/kg	NA (4)	NA (4)	NA (3)	2	2	338	452	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 6	ug/kg	NA (4)	NA (4)	NA (3)	2	2	169	564	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 7	ug/kg	NA (4)	NA (4)	NA (3)	2	2	267	397	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 8	ug/kg	NA (4)	NA (4)	NA (3)	2	2	205	306	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown 9	ug/kg	NA (4)	NA (4)	NA (3)	2	2	277	303	NA (4)	NA (4)	NA (3)	0						--	--
	Unknown alcohol	ug/kg	NA (4)	NA (4)	NA (3)	1	1	205	205	NA (4)	NA (4)	NA (3)	0						--	--
Terphenyls (mg/kg)																				
	m-Terphenyl	mg/kg	NA (4)	NA (4)	NA (3)	17	0						17	0.172	0.199	NA (4)	NA (4)	NA (3)	--	--
	o-Terphenyl	mg/kg	NA (4)	NA (4)	NA (3)	17	0						17	0.172	0.199	NA (4)	NA (4)	NA (3)	--	--
	p-Terphenyl	mg/kg	NA (4)	NA (4)	NA (3)	17	0						17	0.172	0.199	NA (4)	NA (4)	NA (3)	--	--
TPH (mg/kg)																				
	Diesel Range Organics (C15-C20)	mg/kg	1400	NA (4)	NA (3)	9	2	1.64	2.6	0	NA (4)	NA (3)	7	3.54	6.1	0	NA (4)	NA (3)	--	--
	Gasoline Range Organics (C8-C11)	mg/kg	1.1	NA (4)	NA (3)	9	0						9	3.46	6.1	9	NA (4)	NA (3)	Elevated DLs	a, k
	High Boiling Petroleum Hydrocarbon	mg/kg	1400	NA (4)	NA (3)	16	6	5.4	75	0	NA (4)	NA (3)	10	5.4	6	0	NA (4)	NA (3)	--	--
	Kerosene Range Organics (C12-C14)	mg/kg	1400	NA (4)	NA (3)	9	0						9	3.46	6.1	0	NA (4)	NA (3)	--	--
	Low Boiling Petroleum Hydrocarbon	mg/kg	1.1	NA (4)	NA (3)	16	0						16	5.2	6	16	NA (4)	NA (3)	Elevated DLs	a, k
	Lubricant Oil Range Organics (C21-C30)	mg/kg	1400	NA (4)	NA (3)	9	6	1.67	31.7	0	NA (4)	NA (3)	3	5.6	6.1	0	NA (4)	NA (3)	--	--
VOC (ug/kg)																				
	1,1,1,2-Tetrachloroethane	ug/kg	0.25	82000	NA (3)	19	0						19	4.6	6	19	0	NA (3)	Elevated DLs	a, c, k
	1,1,1-Trichloroethane	ug/kg	490	2100000	NA (3)	19	0						19	1.8	6	0	0	NA (3)	--	--
	1,1,2,2-Tetrachloroethane	ug/kg	1.4	6400	NA (3)	19	0						19	1.8	6	19	0	NA (3)	Elevated DLs	a, c, k
	1,1,2-Trichloro-1,2,2-trifluoroethane	ug/kg	16000	230000	NA (3)	3	0						3	4.6	6	0	0	NA (3)	--	--
	1,1,2-Trichloroethane	ug/kg	1.2	9000	NA (3)	19	0						19	1.8	6	19	0	NA (3)	Elevated DLs	a, c, k
	1,1-Dichloroethane	ug/kg	1.6	230000	NA (3)	19	0						19	1.8	6	19	0	NA (3)	Elevated DLs	a, c, k
	1,1-Dichloroethene	ug/kg	23	320	NA (3)	19	0						19	4.6	6	0	0	NA (3)	--	--
	1,1-Dichloropropene	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	1.8	6	NA (4)	NA (4)	NA (3)	--	--

TABLE D.3-3A
FSDF RFI SITE ANALYTICAL DATA SCREENING SUMMARY AND DATA QUALITY (SOIL)
(Page 5 of 6)

TABLE D.3-3A

Analyte Group			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		
	1,2,3-Trichlorobenzene	ug/kg	120	68000	NA (3)	19	0						19	4.6	6	0	0	NA (3)	--	--
	1,2,3-Trichloropropane	ug/kg	0.051	13000	NA (3)	19	0						19	5	12	19	0	NA (3)	Elevated DLs	a, c, k
	1,2,4-Trichlorobenzene	ug/kg	120	68000	NA (3)	19	0						19	4.6	6	0	0	NA (3)	--	--
	1,2,4-Trimethylbenzene	ug/kg	35	140000	NA (3)	19	0						19	1.8	6	0	0	NA (3)	--	--
	1,2-Dibromo-3-chloropropane	ug/kg	29	23000	NA (3)	19	0						19	4.6	6	0	0	NA (3)	--	--
	1,2-Dibromoethane	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	1.8	6	NA (4)	NA (4)	NA (3)	--	--
	1,2-Dichlorobenzene	ug/kg	1800	390000	NA (3)	19	0						19	1.8	6	0	0	NA (3)	--	--
	1,2-Dichloroethane	ug/kg	0.5	76000	NA (3)	19	0						19	1.8	6	19	0	NA (3)	Elevated DLs	a, c, k
	1,2-Dichloropropane	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	1.8	6	NA (4)	NA (4)	NA (3)	--	--
	1,3,5-Trimethylbenzene	ug/kg	36	140000	NA (3)	19	0						19	1.8	6	0	0	NA (3)	--	--
	1,3-Dichlorobenzene	ug/kg	1700	350000	NA (3)	19	0						19	1.8	6	0	0	NA (3)	--	--
	1,3-Dichloropropane	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	1.8	6	NA (4)	NA (4)	NA (3)	--	--
	1,4-Dichlorobenzene	ug/kg	10	170000	NA (3)	19	0						19	1.8	6	0	0	NA (3)	--	--
	2-Chloro-1,1,1-trifluoroethane	ug/kg	NA (4)	NA (4)	NA (3)	3	0						3	9.1	12	NA (4)	NA (4)	NA (3)	--	--
	2-Chloroethylvinyl ether	ug/kg	0.0096	780	NA (3)	3	0						3	4.6	6	3	0	NA (3)	Elevated DLs	a, c, k
	2-Hexanone	ug/kg	NA (4)	2600000	NA (3)	3	0						3	9.1	12	NA (4)	0	NA (3)	--	--
	Acetone	ug/kg	51000	46000	NA (3)	3	0						3	9.1	12	0	0	NA (3)	--	--
	Benzene	ug/kg	0.13	4600	NA (3)	19	2	1	1	2	0	NA (3)	17	1.8	6	17	0	NA (3)	Elevated DLs	a, k
	Bromobenzene	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	4.6	6	NA (4)	NA (4)	NA (3)	--	--
	Bromochloromethane	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	4.6	6	NA (4)	NA (4)	NA (3)	--	--
	Bromodichloromethane	ug/kg	0.31	16000	NA (3)	19	0						19	1.8	6	19	0	NA (3)	Elevated DLs	a, c, k
	Bromoform	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	4.6	6	NA (4)	NA (4)	NA (3)	--	--
	Bromomethane	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	4.6	6	NA (4)	NA (4)	NA (3)	--	--
	Carbon Tetrachloride	ug/kg	0.042	1600	NA (3)	19	0						19	4.6	6	19	0	NA (3)	Elevated DLs	a, c, k
	Chlorobenzene	ug/kg	97	94000	NA (3)	19	2	2	3	0	0	NA (3)	17	1.8	6	0	0	NA (3)	--	--
	Chloroethane	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	4.6	6	NA (4)	NA (4)	NA (3)	--	--
	Chloroform	ug/kg	0.77	260	NA (3)	19	0						19	1.8	6	19	0	NA (3)	Elevated DLs	a, c, k
	Chloromethane	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	4.6	6	NA (4)	NA (4)	NA (3)	--	--
	Chlorotrifluoroethylene	ug/kg	NA (4)	17000	NA (3)	3	0						3	9.1	12	NA (4)	0	NA (3)	--	--
	cis-1,2-Dichloroethene	ug/kg	14	74000	NA (3)	19	0						19	1.8	6	0	0	NA (3)	--	--
	cis-1,3-Dichloropropene	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	1.8	6	NA (4)	NA (4)	NA (3)	--	--
	Cumene	ug/kg	380	447000	NA (3)	19	0						19	1.8	6	0	0	NA (3)	--	--
	Dibromochloromethane	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	1.8	6	NA (4)	NA (4)	NA (3)	--	--
	Dibromomethane	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	1.8	6	NA (4)	NA (4)	NA (3)	--	--
	Dichlorodifluoromethane	ug/kg	15	69000	NA (3)	19	0						19	4.6	6	0	0	NA (3)	--	--
	Ethylbenzene	ug/kg	1200	220000	NA (3)	19	0						19	1.8	6	0	0	NA (3)	--	--
	Hexachlorobutadiene	ug/kg	9200	920	NA (3)	19	0						19	4.6	6	0	0	NA (3)	--	--
	Methyl ethyl ketone	ug/kg	62000	8200000	NA (3)	3	0						3	9.1	12	0	0	NA (3)	--	--
	Methyl isobutyl ketone (MIBK)	ug/kg	20000	2625000	NA (3)	3	0						3	4.6	6	0	0	NA (3)	--	--
	Methyl tert-butyl ether	ug/kg	NA (4)	NA (4)	NA (3)	3	0						3	4.6	6	NA (4)	NA (4)	NA (3)	--	--
	Methylene chloride	ug/kg	4	27000	NA (3)	19	9	1	3	0	0	NA (3)	10	5	24	10	0	NA (3)	Elevated DLs	a, k
	m-Xylene & p-Xylene	ug/kg	150	140000	NA (3)	19	0						19	1.8	12	0	0	NA (3)	--	--
	Naphthalene	ug/kg	6000	230000	NA (3)	19	1	1	1	0	0	NA (3)	18	4.6	6	0	0	NA (3)	--	--
	n-Butylbenzene	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	4.6	6	NA (4)	NA (4)	NA (3)	--	--
	n-Propylbenzene	ug/kg	200	447000	NA (3)	19	0						19	1.8	6	0	0	NA (3)	--	--
	o-Chlorotoluene	ug/kg	1222000	345000	NA (3)	19	0						19	4.6	6	0	0	NA (3)	--	--
	o-Xylene	ug/kg	190	140000	NA (3)	19	0						19	1.8	6	0	0	NA (3)	--	--
	p-Chlorotoluene	ug/kg	1222000	345000	NA (3)	19	0						19	4.6	6	0	0	NA (3)	--	--
	p-Cymene	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	1.8	6	NA (4)	NA (4)	NA (3)	--	--
	sec-Butylbenzene	ug/kg	77000	447000	NA (3)	19	0						19	4.6	6	0	0	NA (3)	--	--
	sec-Dichloropropane	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	1.8	6	NA (4)	NA (4)	NA (3)	--	--
	Styrene	ug/kg	7200	690000	NA (3)	19	0						19	1.8	6	0	0	NA (3)	--	--
	tert-Butylbenzene	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	4.6	6	NA (4)	NA (4)	NA (3)	--	--
	Tetrachloroethene	ug/kg	0.43	2300	NA (3)	19	0						19	1.8	6	19	0	NA (3)	Elevated DLs	a, c, k
	Toluene	ug/kg	300	2700	NA (3)	19	4	1	3	0	0	NA (3)	15	1.8	6	0	0	NA (3)	--	--

TABLE D.3-3A
FSDF RFI SITE ANALYTICAL DATA SCREENING SUMMARY AND DATA QUALITY (SOIL)
(Page 6 of 6)

TABLE D.3-3A

Analyte Group			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		
	trans-1,2-Dichloroethene	ug/kg	16	1000000	NA (3)	19	0						19	1.8	6	0	0	NA (3)	--	--
	trans-1,3-Dichloropropene	ug/kg	NA (4)	NA (4)	NA (3)	19	0						19	1.8	6	NA (4)	NA (4)	NA (3)	--	--
	Trichloroethene	ug/kg	2.2	3200	NA (3)	21	1	18	18	1	0	NA (3)	20	0.37	6	17	0	NA (3)	Elevated DLs	a, k
	Trichlorofluoromethane	ug/kg	110	320000	NA (3)	19	0						19	4.6	6	0	0	NA (3)	--	--
	Vinyl chloride	ug/kg	0.0096	780	NA (3)	19	0						19	1.8	6	19	0	NA (3)	Elevated DLs	a, c, k

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) 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.
- (b) DL are below background levels.
- (c) The MDL is less than the RBSL, so if the compound was present at concentrations greater than the RBSL but less that the DL, it would have been reported.
- (d) Elevated DL for sodium is not significant because there is no RBSL associated with this metal.
- (e) Sample diluted due to matrix effect
- (f) Sample diluted due to high concentrations of other constituents
- (g) Sample contains high TPH levels which may have caused elevated DLs
- (h) Compound is a commonly used laboratory solvent and often has elevated DLs due to laboratory contamination.
- (i) Duplicate samples and recollected samples at representative locations had adequate DLs; Results do not indicate that elevated DLs in earlier samples are an issue.
- (j) DLs are elevated for SVOCs analyzed by method 8270C rather than 8270CSIM, which was used to target the presence of tentatively identified compounds (TICs). Elevated detection limits are typical for this method.
- (k) Elevated DLs are located within an area recommended for further evaluation in CMS.
- (l) Elevated DLs were observed group-wide in areas with no indications of a source.
- (m) Site history does not indicate a source; results of other analytes in the same area suggest low concentrations.

Acronyms

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

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

TABLE D.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) (Vapor Flux)																	
	Trichloroethene	ug/L	1.4	6.4	2	2	0.000172	0.000632	0	0	0					--	--
VOCs (µg/L) (Active Soil Vapor)																	
	1,1,1,2-Tetrachloroethane	ug/L	0.048	NA (2)	6	0					6	1	1	6	NA (2)	Elevated DLs	a, k
	1,1,1-Trichloroethane	ug/L	640	38	6	0					6	1	1	0	0	--	--
	1,1,2,2-Tetrachloroethane	ug/L	0.048	NA (2)	6	0					6	1	2	6	NA (2)	Elevated DLs	a, k
	1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	8800	NA (2)	6	0					6	5	5	0	NA (2)	--	--
	1,1,2-Trichloroethane	ug/L	0.17	0.057	6	0					6	1	1	6	6	Elevated DLs	a, k
	1,1-Dichloroethane	ug/L	1.7	36	6	0					6	1	1	0	0	--	--
	1,1-Dichloroethene	ug/L	58	0.6	9	3	0.00972	1.13025	0	2	6	1	1	0	6	Elevated DLs	a, k
	1,2-Dichloroethane	ug/L	0.13	42	6	0					6	1	1	6	0	Elevated DLs	a, k
	Benzene	ug/L	0.095	0.57	6	0					6	1	1	6	6	Elevated DLs	a, k
	Carbon Tetrachloride	ug/L	0.063	0.63	6	0					6	1	1	6	6	Elevated DLs	a, k
	Chloroethane	ug/L	NA (2)	NA (2)	6	0					6	1	1	NA (2)	NA (2)	--	--
	Chloroform	ug/L	0.5	0.24	6	0					6	1	1	6	6	Elevated DLs	a, k
	cis-1,2-Dichloroethene	ug/L	10	1.9	9	2	0.68134	0.77206	0	0	7	0.01571	1	0	0	--	--
	Dichlorodifluoromethane	ug/L	58	91	6	0					6	1	1	0	0	--	--
	Ethylbenzene	ug/L	290	23	6	0					6	1	1	0	0	--	--
	Isopropanol	ug/L	NA (2)	NA (2)	3	1	0.4275	0.4275	NA (2)	NA (2)	2	0.2545	0.2615	NA (2)	NA (2)	--	--
	Methylene chloride	ug/L	2.7	0.87	6	0					6	20	50	6	6	Elevated DLs	a, k
	m-Xylene & p-Xylene	ug/L	NA (2)	NA (2)	6	0					6	2	2	NA (2)	NA (2)	--	--
	o-Xylene	ug/L	29	15	6	0					6	1	1	0	0	--	--
	Tetrachloroethene	ug/L	0.45232	24	9	4	0.02628	3.4	2	0	5	0.02692	1	4	0	Elevated DLs	a, k
	Toluene	ug/L	110	0.084	6	0					6	1	1	0	6	Elevated DLs	a, k
	trans-1,2-Dichloroethene	ug/L	20	1.9	9	2	0.10926	0.15755	0	0	7	0.01415	1	0	0	--	--
	Trichloroethene	ug/L	1.4	6.4	9	3	0.21097	12.31535	2	2	6	1	1	0	0	--	--
	Trichlorofluoromethane	ug/L	200	91	6	0					6	1	1	0	0	--	--
	Vinyl chloride	ug/L	0.035	0.56	9	1	0.02647	0.02647	0	0	8	0.01014	2	7	6	Elevated DLs	a, k

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.
- (a) 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.
- (b) DL are below background levels.
- (c) The MDL is less than the RBSL, so if the compound was present at concentrations greater than the RBSL but less than the DL, it would have been reported.
- (d) Elevated DL for sodium is not significant because there is no RBSL associated with this metal.
- (e) Sample diluted due to matrix effect
- (f) Sample diluted due to high concentrations of other constituents
- (g) Sample contains high TPH levels which may have caused elevated DLs
- (h) Compound is a commonly used laboratory solvent and often has elevated DLs due to laboratory contamination.
- (i) Duplicate samples and recollected samples at representative locations had adequate DLs; Results do not indicate that elevated DLs in earlier samples are an issue.
- (j) DLs are elevated for SVOCs analyzed by method 8270C rather than 8270CSIM, which was used to target the presence of tentatively identified compounds (TICs). Elevated detection limits are typical for this method.
- (k) Elevated DLs are located within an area recommended for further evaluation in CMS.
- (l) Elevated DLs were observed group-wide in areas with no indications of a source.
- (m) Site history does not indicate a source; results of other analytes in the same area suggest low concentrations.

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

TABLE D.3-3C

Analyte Group	Constituent		Units	Total Number Samples Analyzed	Detect Data Summary			Non-Detect Data Summary		
					Total Samples w/ Detections	Minimum Detected Concentration	Maximum Detected Concentration	Total Samples ND	Minimum Detection Limit	Maximum Detection Limit
METALS (mg/L)										
	Mercury	mg/L	3	0			3	0.0002	0.0002	
Perchlorate (ug/L)										
	Perchlorate	ug/L	8	0			8	2	20	

Note: NPDES data collected at Outfalls 005 and 006, and data summary provided in Table D.3-2C.

Table D.4-1 (1 of 2)

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

Chemical	Soil (0 to 2 feet bgs)	Soil (0 to 10 feet bgs)	FSDF RFI Site Perched Groundwater (Indirect Pathway)	Group 8 Perched Groundwater (Direct Pathway)	Soil Vapor
Inorganic Compounds					
Arsenic	X	X			
Cadmium				X	
Cobalt				X	
Copper				X	
Lead	X	X			
Mercury	X	X			
Molybdenum				X	
Nickel				X	
Perchlorate	X	X		X	
VOCs					
1,1,1,2-Tetrachloroethane			X	X	
1,1,2-Trichloro-1,2,2-trifluoroethane			X	X	
1,1-Dichloroethane			X	X	
1,1-Dichloroethene			X	X	X
1,2-Dichloroethane			X	X	
Benzene	X	X			X
Chlorobenzene	X	X			X
cis-1,2-Dichloroethene			X	X	X
Methylene chloride	X	X	X	X	X
o-Xylene			X	X	
Tetrachloroethene			X	X	X
Toluene	X	X			X
trans-1,2-Dichloroethene					X
Trichloroethene		X	X	X	X
SVOCs					
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			
Chrysene	X	X			
Dibenz(a,h)anthracene	X	X			
Diethylphthalate	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			
Total Petroleum Hydrocarbons					
C14-C20(Diesel Range)	X	X			
C20-C30(Lubricant Oil Range)	X	X			
PCDD/PCDFs					
1,2,3,7,8-PeCDD	X	X			
1,2,3,4,7,8-HxCDD	X	X			
1,2,3,6,7,8-HxCDD	X	X			
1,2,3,7,8,9-HxCDD	X	X			
1,2,3,4,6,7,8-HpCDD	X	X			
OCDD	X	X			
2,3,7,8-TCDF	X	X			
1,2,3,7,8-PeCDF	X	X			
2,3,4,7,8-PeCDF	X	X			
1,2,3,4,7,8-HxCDF	X	X			
1,2,3,6,7,8-HxCDF	X	X			
2,3,4,6,7,8-HxCDF	X	X			
1,2,3,7,8,9-HxCDF	X	X			
1,2,3,4,6,7,8-HpCDF	X	X			
1,2,3,4,7,8,9-HpCDF	X	X			
OCDF	X	X			

Table D.4-1 (2 of 2)

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

Chemical	Soil (0 to 2 feet bgs)	Soil (0 to 10 feet bgs)	FSDF RFI Site Perched Groundwater (Indirect Pathway)	Group 8 Perched Groundwater (Direct Pathway)	Soil Vapor
PCBs					
Aroclor-1242	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:

X - selected as a chemical of potential concern

VOC - volatile organic compound

SVOC - semi-volatile organic compound

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

PCBs - polychlorinated biphenyls

bgs - below ground surface

Table D.4-2 (1 of 1)

Human Health Risk Estimates¹
FSDF 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
Adult Worker	0.005 - 0.03		2E-07 - 2E-06		0.1 - 0.4		9E-07 - 6E-06	a,b	0.1 - 0.4		1E-06 - 8E-06	a,b
Future Adult Recreator	<0.001 - 0.009		4E-09 - 2E-07		<0.001 - <0.001		2E-09 - 1E-08		<0.001 - 0.01		5E-09 - 2E-07	
Future Child Recreator	0.005 - 0.02		4E-08 - 3E-07		0.003 - 0.01		1E-08 - 4E-08		0.007 - 0.03		5E-08 - 3E-07	
Future Adult Resident	0.01 - 0.07		5E-07 - 7E-06	b,c,d	0.5 - 1	e	3E-06 - 2E-05	a,b	0.5 - 1	e	3E-06 - 3E-05	a,b,c,d
Future Child Resident	0.08 - 0.3		2E-06 - 6E-06	b,c,d	3 - 4	e	1E-05 - 2E-05	a,b	3 - 4	e	1E-05 - 2E-05	a,b,c,d

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 or risk > 1x10⁻⁶. Only major risk contributors listed if cumulative HI >> 1 or cancer risk >> 1x10⁻⁶.
5. Total risk estimates do not include arsenic since this chemical is considered to be naturally-occurring. Aresnic concentrations above the background comparison level are located adjacent to, and slightly down-stream of, a shale outcrop.

a = 1,1-Dichloroethane
b = Trichloroethene (TCE)
c = Benzene
d = Tetrachloroethene (PCE)
e = 1,1 -Dichloroethene

CD = Chemical risk driver
COPC = Chemical of potential concern
HI = Hazard index
NA = Not Applicable

Table D.4-3 (1 of 2)
Human Health Risk Assessment Uncertainty Analysis
FSDF RFI Site

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
COPC Selection	Bedrock sample results from the FSDF excavation were not included in the quantitative risk assessment. The bedrock samples were analyzed for mercury, PCBs, perchlorate, and dioxins. Sample results were either non-detect or lower than values used to estimate risks.	Low	Not Conservative
	A number of inorganics (e.g., arsenic, mercury, and lead) that were demonstrated to be consistent with background concentrations through Wilcoxon Rank Sum test were included as COPCs because the maximum detected concentrations were substantially above the maximum detected background concentration.	Moderate	Conservative
	Benzene, chlorobenzene, methylene chloride, and toluene were selected as soil vapor COPC as they were detected in soil.	Moderate	Conservative
	PCB 169 and PCB 77 were selected as soil COPC since Aroclor 1254 and Aroclor 1260 were selected as soil COPCs.	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 commercial or recreational, which have lower risks than residential.	Moderate	Uncertain
EPC Calculations	TPH-G was detected in a single surface sample at very low concentrations; the chemical is not considered site related, and no BTEX related compounds were detected in any soil or active/passive soil gas samples near the location, therefore extrapolation of the single hit to BTEX compounds was not conducted.	Low	Not Conservative
	For soil matrix COPC benzene, significant risks are estimated associated with vapor concentrations related to 1/2 the DL though the chemical was not detected in soil vapor.	Low	Conservative
	For perched groundwater matrix COPC 1,1-Dichloroethane, significant risks are estimated associated with vapor concentrations related to 1/2 the DL though the chemical was not detected in soil vapor.	Low	Conservative
	Although risks were estimated for arsenic, these risks may represent the risk from naturally-occurring rather than site-related concentrations. Higher concentrations of arsenic are often associated with shales, which are present at the SSFL and in the site vicinity. Furthermore, the highest arsenic concentrations were detected in samples from an isolated area near the property boundary, away from any SSFL facility operations. Therefore, the arsenic concentrations detected in the FSDF samples are believed to be naturally-occurring (see Appendix D, Section D.3.4.2).	High	Conservative
	The extrapolation of soil TPH concentrations to individual petroleum constituent (i.e., BTEX and PAHs) concentrations introduces some uncertainty into the EPC estimates for petroleum constituents.	Low	Conservative
	The extrapolation of soil Aroclor 1254 and Aroclor 1260 concentrations to individual PCB congener concentrations introduces some uncertainty into the EPC estimates for the PCB congeners.	Low	Conservative
	Soil vapor exposure point concentrations for chlorobenzene, methylene chloride, and toluene are estimated using soil to soil vapor partitioning extrapolations introducing some degree of uncertainty.	Moderate	Conservative
	The 95% UCL concentration of some chemicals is greater than the maximum concentration, therefore the maximum was used as the EPC. This is considered to be a likely overestimation of the representative EPC because samples were collected in areas with the highest likelihood to detect the highest concentrations at the site.	Moderate	Conservative
	The maximum detected concentration of each COPC detected in groundwater was used as the EPC.	Moderate	Conservative

Table D.4-3 (2 of 2)
Human Health Risk Assessment Uncertainty Analysis
FSDf RFI Site

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
EPC Calculations	The evaluation of metals concentrations in groundwater was based on both filtered and unfiltered samples. Additional unfiltered groundwater data is being collected per DTSC direction that might affect this evaluation.	Moderate	Conservative
	Sample 414502, a duplicate of 413580, was included in the risk assessment dataset. The sample only consisted of dioxins. The impact is low because there were a high number of dioxin samples and none of the dioxin congeners were risk drivers.	Low	Uncertain
	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 measurements.	Moderate	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
Cancer Slope Factor	Extrapolation of dose-response data from laboratory animals to humans.	High	Conservative
	Assumes that all carcinogens do not have a threshold below which carcinogenic response occurs, and therefore, any dose, no matter how small, results in some potential risk.	Moderate	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.	Moderate	Conservative
Reference Dose	High degree of uncertainty in extrapolation of dose-response data from laboratory animals to humans.	High	Conservative

Notes:

COPC - chemical of potential concern
PAH - polycyclic aromatic hydrocarbon
COPC - chemical of potential concern
PAH - polycyclic aromatic hydrocarbon
TPH - total petroleum hydrocarbons
BTEX - benzene, toluene, ethylbenzene, and xylenes
EPC - exposure point concentration
UCL - upper confidence limit
HRA - human health risk assessment
DL - detection limit

Table D.4-4 (1 of 2)

**Summary of Chemicals of Potential Ecological Concern
FSDF RFI Site**

Chemical	Soil (0 to 2 feet bgs)	Soil (0 to 4 feet bgs)	Soil (0 to 6 feet bgs)	Soil Vapor (0 to 6 feet bgs)
Inorganic Compounds				
Arsenic	X	X	X	
Lead	X	X	X	
Mercury	X	X	X	
VOCs				
1,1,1-Trichloroethane				X
1,1,2-Trichloro-1,2,2-trifluoroethane				X
1,1-Dichloroethane				X
1,1-Dichloroethene				X
1,2-Dichloroethane				X
Benzene	X	X	X	X
Chlorobenzene	X	X	X	X
cis-1,2-Dichloroethene				X
Methylene chloride	X	X	X	X
o-Xylene				X
Tetrachloroethene				X
Toluene	X	X	X	X
Trichloroethene				X
SVOCs				
2,4-Dinitrophenol	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	
Chrysene	X	X	X	
Dibenz(a,h)anthracene	X	X	X	
Diethylphthalate	X	X	X	
Di-n-butylphthalate	X	X	X	
Fluoranthene	X	X	X	
Fluorene	X	X	X	
Hexachlorobenzene	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				
C14-C20(Diesel Range)	X	X	X	
C20-C30(Lubricant Oil Range)	X	X	X	

Table D.4-4 (2 of 2)

**Summary of Chemicals of Potential Ecological Concern
FSDf RFI Site**

Chemical	Soil (0 to 2 feet bgs)	Soil (0 to 4 feet bgs)	Soil (0 to 6 feet bgs)	Soil Vapor (0 to 6 feet bgs)
Dioxins				
1,2,3,7,8-PeCDD	X	X	X	
1,2,3,4,7,8-HxCDD	X	X	X	
1,2,3,6,7,8-HxCDD	X	X	X	
1,2,3,7,8,9-HxCDD	X	X	X	
1,2,3,4,6,7,8-HpCDD	X	X	X	
OCDD	X	X	X	
2,3,7,8-TCDF	X	X	X	
1,2,3,7,8-PeCDF	X	X	X	
2,3,4,7,8-PeCDF	X	X	X	
1,2,3,4,7,8-HxCDF	X	X	X	
1,2,3,6,7,8-HxCDF	X	X	X	
2,3,4,6,7,8-HxCDF	X	X	X	
1,2,3,7,8,9-HxCDF	X	X	X	
1,2,3,4,6,7,8-HpCDF	X	X	X	
1,2,3,4,7,8,9-HpCDF	X	X	X	
OCDF	X	X	X	
PCBs				
Aroclor-1242	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:

X - selected as a chemical of potential ecological concern

VOC - volatile organic compound

SVOC - semi-volatile organic compound

CPEC - chemical of potential ecological concern

bgs - below ground surface

Table D.4-5 (1 of 1)

**Risk Estimates for Ecological Receptors
FSDF RFI Site**

Receptor	Total for Site Media (Soil Only)	
	HI Range ¹	CD ²
Deer Mouse	12 - 48	Lead, perchlorate
without inhalation pathway	12 - 48	Lead, perchlorate
Thrush	>100 - >1000	Lead
Hawk	>100 - >100	Lead
Using Large Home Range Factor ³	4 - 14	Lead
Bobcat	0 - 4	Lead
Using Large Home Range Factor ³	0 - 0.01	None
Mule Deer	3 - 16	Lead, perchlorate
Using Large Home Range Factor ³	0.08 - 0.4	None

Notes:

1. HI Range is the sum of the hazard quotients for all exposure pathways; the range reported is for the mean and 95% upper confidence limit estimates, respectively.
 2. Chemical risk drivers are those CPECs detected onsite with an HQ > 1, or major risk contributors if cumulative HIs >> 1. "None" indicates that no chemical's HQs > 1.
 3. 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.
 4. Total risk estimates do not include arsenic since this chemical is considered to be naturally-occurring.
- CD = Chemical risk driver
CPEC = Chemical of potential ecological concern
HI = Hazard index
HQ = Hazard Quotient

Table D.4-6 (1 of 2)

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

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
CPEC Selection	A number of inorganics (e.g., arsenic, mercury, and lead) that were demonstrated to be consistent with background concentrations through Wilcoxon Rank Sum test were included as CPECs because the maximum detected concentrations were substantially above the maximum detected background concentration.	Moderate	Conservative
	Benzene, chlorobenzene, methylene chloride, and toluene were selected as soil vapor CPECs as they were detected in soil.	Moderate	Conservative
	PCB 169 and PCB 77 were selected as soil CPECs since Aroclor 1254 and Aroclor 1260 were selected as soil CPECs.	Low	Conservative
EPC Calculations	The extrapolation of soil TPH concentrations to individual petroleum constituent (i.e., BTEX and PAHs) concentrations introduces some uncertainty into the EPC estimates for petroleum constituents.	Low	Conservative
	The extrapolation of soil Aroclor 1254 and Aroclor 1260 concentrations to individual PCB congener concentrations introduces some uncertainty into the EPC estimates for the PCB congeners.	Low	Conservative
	Sample 414502, a duplicate of 413580, was included in the risk assessment dataset. The sample only consisted of dioxins. The impact is low because there were a high number dioxin samples and none of the dioxin congeners were risk drivers.	Low	Uncertain
	The 95% UCL concentration of some chemicals is greater than the maximum concentration, therefore the maximum was used as the 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.	Moderate	Conservative
	Estimation of soil vapor concentrations overstates actual burrow concentrations: 1. Model is conservative 2. Model does not account for attenuation between depth to soil or 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 allometric adjustments or taxonmically similar species	Low	Conservative
Exposure Pathways	Dermal and inhalation (for surface-dwelling animals) exposure pathway not quantified	Low	Not Conservative
	Although risks were estimated for arsenic, these risks may represent the risk from naturally-occurring rather than site-related concentrations. Higher concentrations of arsenic are often associated with shales, which are present at the SSFL and in the site vicinity. Furthermore, the highest arsenic concentrations were detected in samples from an isolated area near the property boundary, away from any SSFL facility operations. Therefore, the arsenic concentrations detected in the FSDF samples are believed to be naturally-occurring (see Appendix D, Section D.3.4.2).	High	Conservative

Table D.4-6 (2 of 2)

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

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
Toxicity Reference Value	Lead exposures are based upon toxicity values derived from lead acetate, which is a form of lead that is significantly more bioavailable than weathered lead expected to be present in RFI site soils.	High	Conservative
	High degree of uncertainty in extrapolation of dose-response data from laboratory animals to representative receptors.	High	Uncertain
	Avian toxicity values are only available for a limited number of chemicals. For the types of chemicals observed at the ESADA RFI site, there is likely little difference in the degree of toxicity between mammals and avian species.	Moderate	Not conservative
	Use of acute/subchronic-to-chronic and endpoint-to-NOAEL uncertainty factors to estimate chronic NOAEL-equivalent TRVs.	Moderate	Conservative
	Lack of TRVs for amphibians and reptiles -- note that no threatened or endangered amphibians or reptiles are known to reside at SSFL	Moderate	Not conservative
	Use of chronic NOAEL-equivalent TRVs	High	Conservative

Notes:

CPEC - chemical of potential ecological concern

UCL - upper confidence limit

PAH - polycyclic aromatic hydrocarbon

EPC - exposure point concentration

bgs - below ground surface

TPH - total petroleum hydrocarbons

SVOC - semivolatile organic chemicals

BTEX - benzene, toluene, ethylbenzene, and xylenes

SQL - sample quantitation limit

ESL - ecological screening level

Table D.5-1
FSDF 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)	Industrial Receptor (2)	Recreational Receptor (2)	Ecological Receptor (2)
Former Upper Pond (included in SWMU 7.3)	1a		(3)	(3)	--	--
Former Lower Pond (included in SWMU 7.3)	1b		(3)	(3)	--	
Former Western Debris Area (included in SWMU 7.3)	1c		--	--	--	--
Former Concrete Pool (included in SWMU 7.3)	1d	FSDF-1 ⁽⁴⁾	--	--	--	Perchlorate (5)
Former Steam Lance	2	--	--	--	--	--
Southern Investigation Area	3	--	--	--	--	--
Former Drum Debris Area	4	FSDF-2*	--	--	--	Mercury
FSDF Pistol Range	5	FSDF-3*	--	--	--	Lead
Down-gradient Channels A, B, C, and D	Down-gradient of above	--	(6)	(6)	(6)	(6)

General Notes:

'--' Indicates area is recommended for No Further Action (NFA) for respective receptor, or parameter not applicable; not recommended for CMS evaluation.
' * ' Indicates area also recommended for source stabilization to address potential surficial migration of contamination.

Notes:

- (1) CMS Areas are numbered in sequence (e.g. FSDF-1). Extent of CMS Areas shown on Figures D.5-1 and are approximate and reflect site action recommendations based on characterization and risk assessment results inclusive for all receptors (See Section D.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) Potential risks due to TCE in soil vapor are considered to result from VOCs in groundwater since this area had been excavated to bedrock and backfilled with clean soil.
- (4) CMS area is not located within the Former Concrete Pool Area, but southeast of the Former Disposal Areas.
- (5) Perchlorate detected in area south of former concrete pool area.
- (6) Although arsenic concentrations in drainage at one location exceed the established background level, these are considered to be naturally-occurring associated with a shale outcrop; therefore, CMS is not recommended for potential risks associated with this metal.

Acronyms:

SWMU = Solid Waste Management Unit
CMS = Corrective Measures Study
NFA = no further actions
TCE = Trichloroethene
VOCs = Volatile Organic Compounds

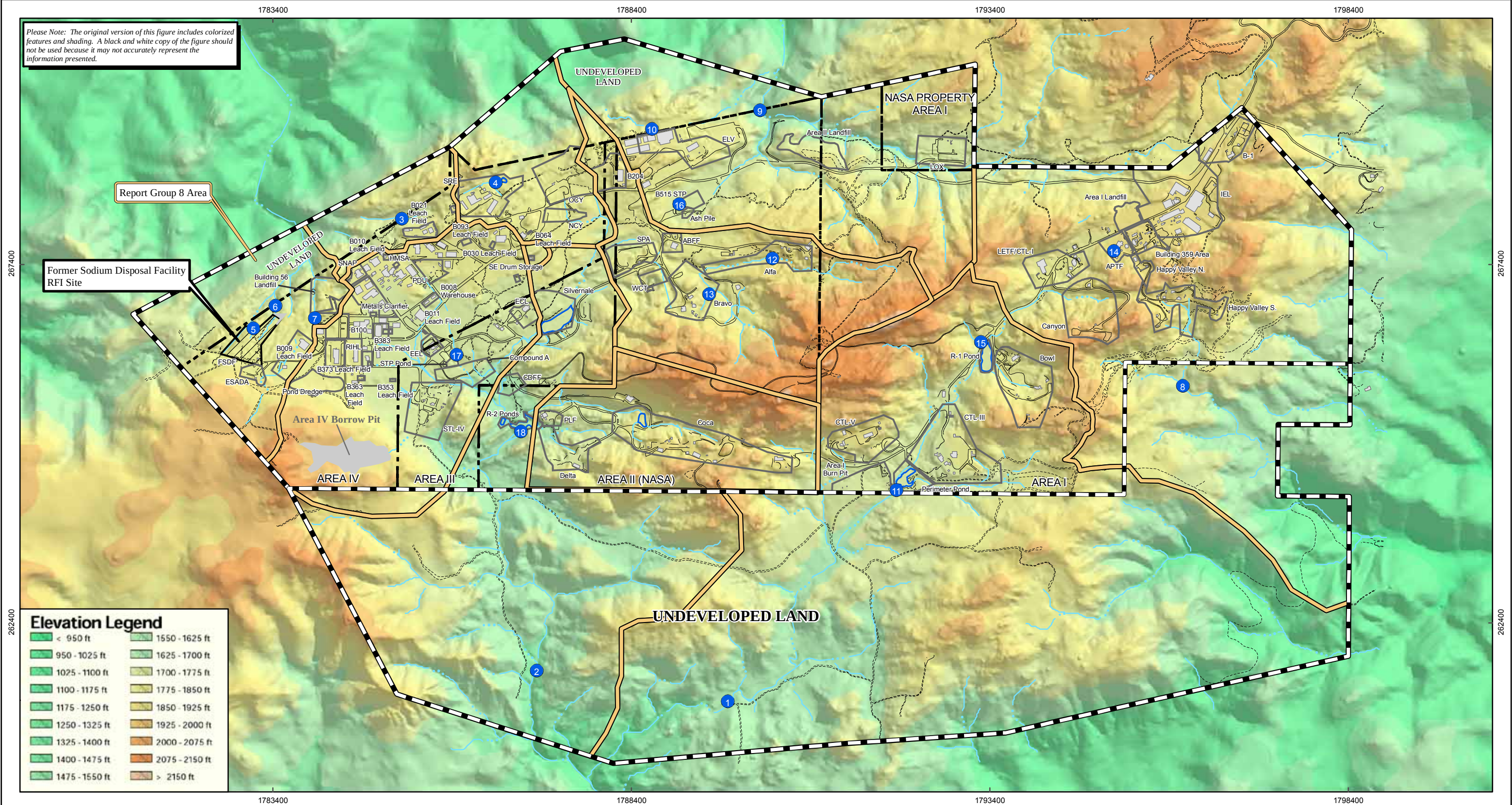
TABLE D.5-2
SUMMARY OF FSDF RFI SITE SURFICIAL MEDIA CMS RECOMMENDATIONS
(Page 1 of 1)

CMS Area	Description	Chemical Risk Drivers and Contributors	Rationale
FSDF-1	Southeast of Former Disposal Area (Chemical Use Area 1)	Perchlorate	Elevated perchlorate detected in the southeastern portion of the FSDF RFI Site, north of H Street. Extent delineated based on step-out sampling data.
FSDF-2*	Former Drum Debris Area (Chemical Use Area 4)	Mercury	Elevated mercury detected in former drum debris area located in the drainage west of FSDF. Extent delineated based on step-out sampling data and rock outcrops.
FSDF-3*	FSDF Pistol Range (Chemical Use Area 5)	Lead	Pistol firing range area with visible lead shot and elevated lead detected in soil. Highest concentrations detected in southern hill slope soils in target area. Extent delineated based on step-out sampling data and rock outcrops.

* Indicates area also recommended for source stabilization to address potential surficial migration of contaminants.

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

RFI SITES

AREA I

SWMU 4.1 - B-1 Area
SWMU 4.2 - Area I Landfill
SWMUs 4.3, 4.4 and AOC - Instrument and Equipment Laboratories (IEL)
SWMUs 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, AOC - Advanced Propulsion Test Facility (APTF) Area
SWMU 4.12 - Laser Engineering Test Facility (LET)/Component Test Lab I (CTL-I) 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 359 Sump
AOC - Happy Valley Area

AREA II

SWMU 5.1 - Area II Landfill
SWMU 5.2 - ELV Final Assembly, Building 206
SWMU 5.5 and AOC - Building 204 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 - Delta Area
SWMU 5.26 - R-2A and R-2B Ponds
AOC - Building 515 Sewage Treatment Plant
AOC - Storable Propellant Area (SPA)
AOC - Alfa/Bravo Fuel Farm
AOC - Coca/Delta Fuel Farm
AOC - Building 224 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 - Silverdale Reservoir
SWMU 6.9 - Environmental Effects Laboratory (EEL)
AOC - Sewage Treatment Plant (STP) Pond Area
AREA IV
SWMU 7.1 - Building 56 Landfill
SWMU 7.3 - Former Sodium Disposal Facility (FSDF)
SWMU 7.4 - Old Conservation Yard (OCY)
SWMU 7.5 - Building 100 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
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 - Bosing Are IV Leach Fields
AOC - DOE Area IV Leach Fields

Legend

- | | |
|-------------------------|---------------|
| SSFL Property Boundary | Building |
| Report Group Boundary | Pond |
| Administrative Boundary | Drainage |
| RFI Site Boundary | Dirt Road |
| FSDF Site | Road |
| | NPDES Outfall |
| | 5 |

Former Sodium Disposal Facility RFI Site Location Map

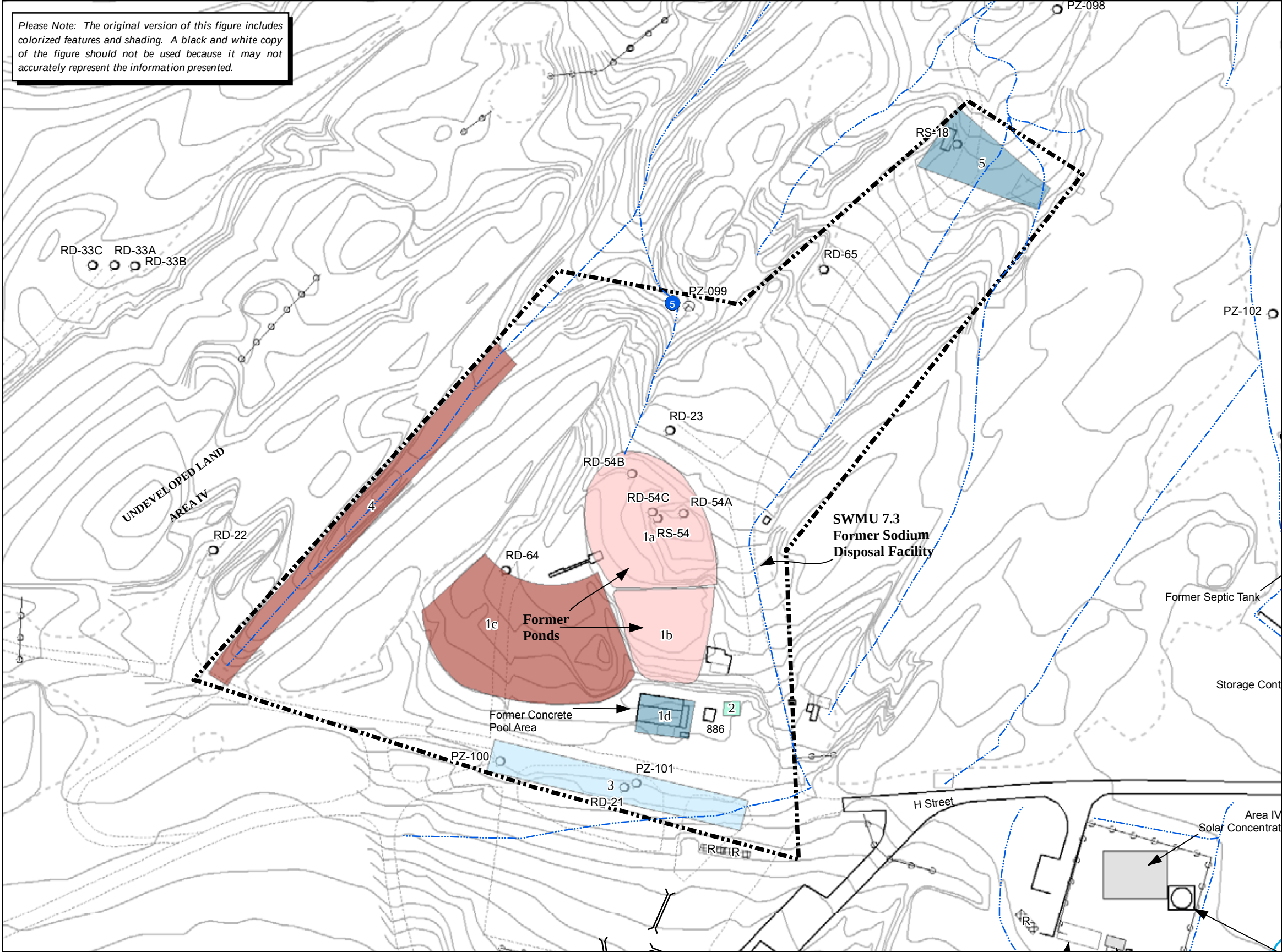
SANTA SUSANA FIELD LABORATORY

Date: Sep 18, 2007

Document: RFI-Report-Group8_FSDF_RFI.mxd



FIGURE
D.1-1



Base Map Legend

- Report Group Boundary
 - RFI Site Boundary
 - Existing Building or Structure
 - Removed Building or Structure
 - Awning
 - Other Tanks
 - Solvent Tank
 - Petroleum Fuel/Oil Tank
 - Hydrazine Tank
 - Dirt Road
 - A/C Curbing
 - Fence
 - Rock Outcrop
 - Elevation Contour
 - Surface Water Divide
 - Drainage
 - Pond
 - Possible Pond
 - Leachfield
 - Pipe
 - NPDES Outfall
 - Well
 - Abandoned Well
 - Trench
- Note: R = Removed Tank

Chemical Use Areas

- Multiple Use
 - Solvent
 - Petroleum
 - Oils / PCBs
 - Metal
 - Perchlorate
 - Hydrazine
 - Debris
 - Landfill
 - Leach Field
 - Potential
- (* Chemical Use Area present in this RFI site)

CODE	CATEGORY	Chemical Use Area Name
1a	Mutiple Use	FSDF Lower Pond
1b	Mutiple Use	FSDF Upper Pond
1c	Debris	FSDF Western Debris Area
1d	Metals	FSDF Concrete Pool
2	Petroleum	Steam Lance
3	Potential	Southern Investigation Area
4	Debris	Drum Debris Area
5	Metals	FSDF Pistol Range

Chemical Use Areas
Former Sodium Disposal Facility
RFI Site



FIGURE
D.2-1



Soil Sample Location Symbol Legend

▼ Soil Matrix Sample • Soil Vapor Sample

CODE	CATEGORY	Chemical Use Area Name
1a	Multiple Use	FSDF Lower Pond
1b	Multiple Use	FSDF Upper Pond
1c	Debris	FSDF Western Debris Area
1d	Metals	FSDF Concrete Pool
2	Petroleum	Steam Lance
3	Potential	Southern Investigation Area
4	Debris	Drum Debris Area
5	Metals	FSDF Pistol Range

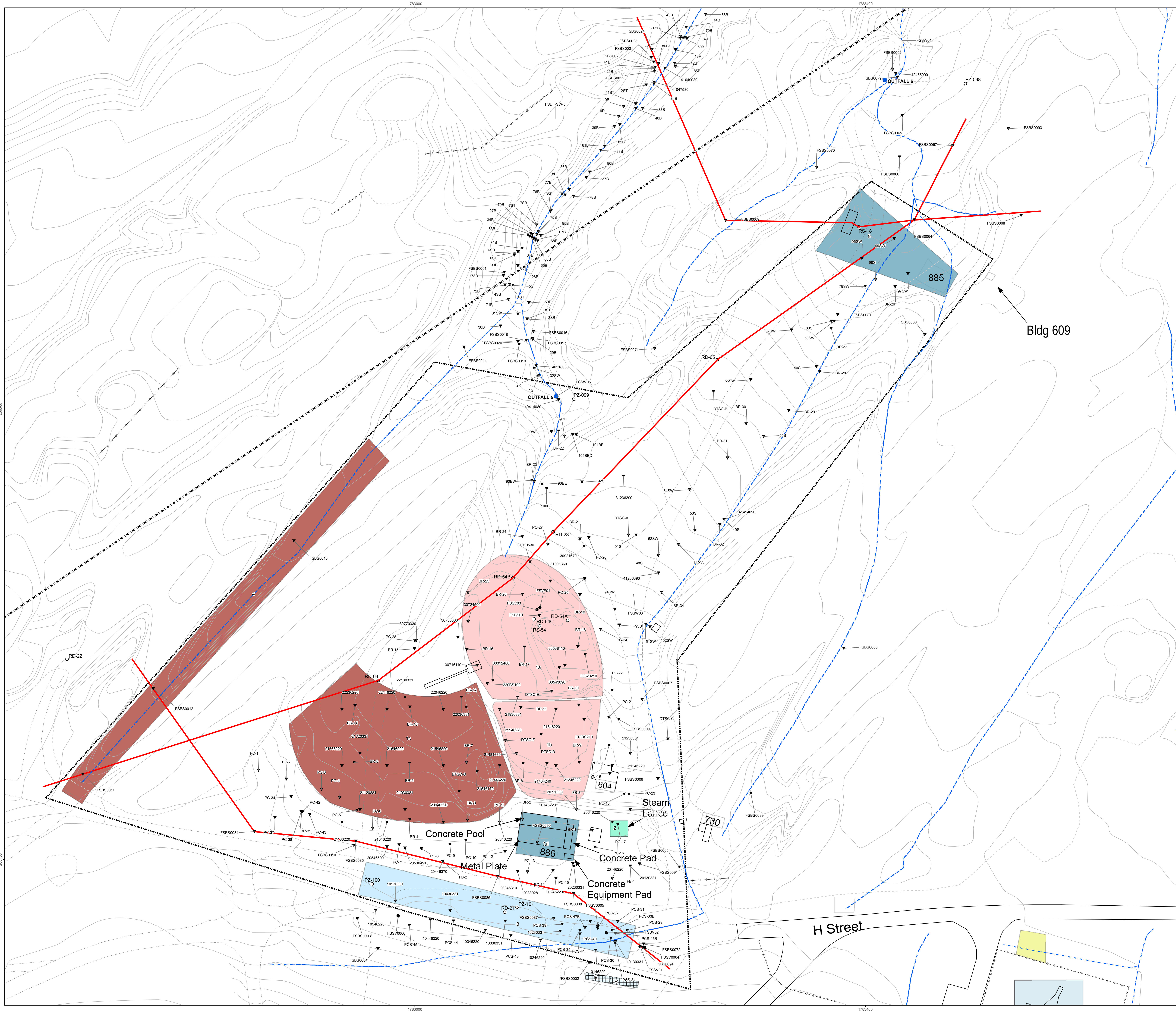
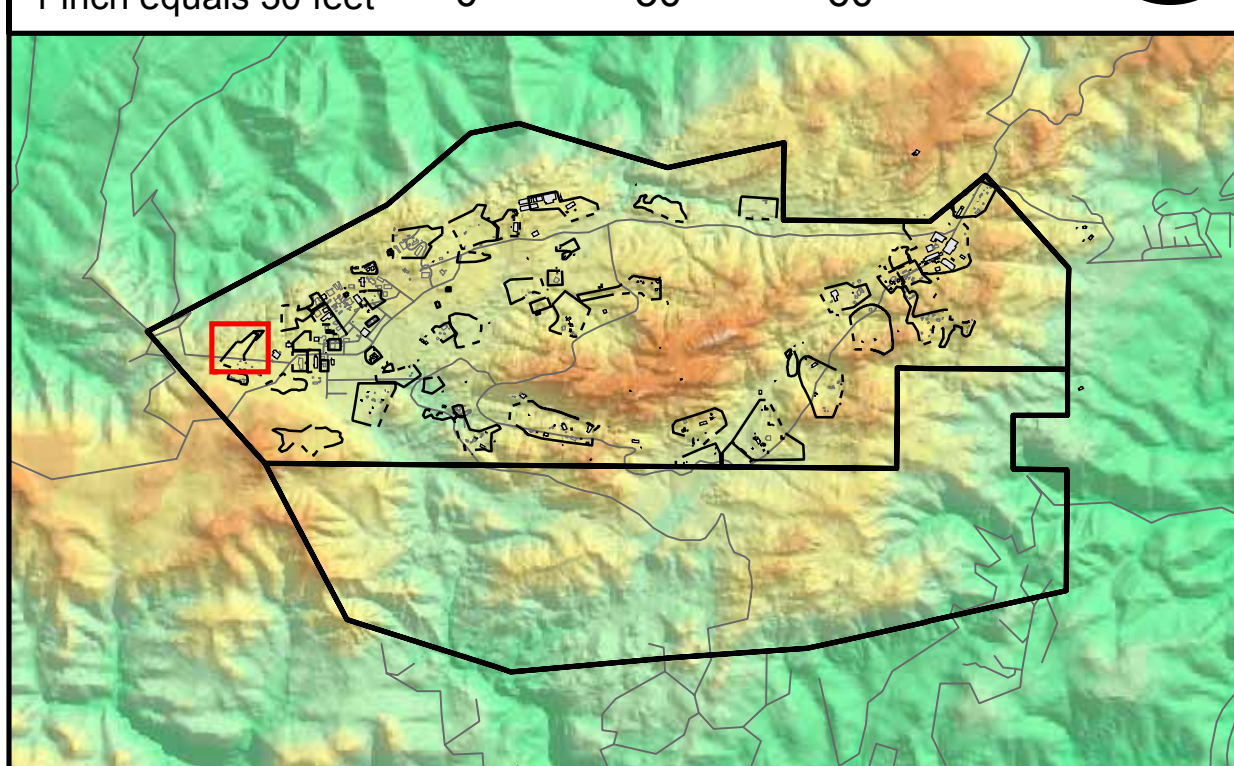
Chemical Use Areas			
(*Chemical Use Area present in this RFI site)			
★ Multiple Use	★ Metal	★ Landfill	
★ Solvent	★ Perchlorate	★ Leach Field	
★ Petroleum	★ Hydrazine	★ Potential	
★ Oils / PCBs	★ Debris		

Base Map Legend	
Administrative Area Boundary	Fence
RFI Site Boundary	Pipe
Report Group Boundary	Leach Field
Existing Building or Structure	NPDES Outfall
Removed Building or Structure	Well
Other Tanks	Pond
Solvent Tank	Possible Pond
Petroleum Fuel/Oil Tank	Drainage
Hydrazine Tank	Surface Water Divide
Awning	Elevation Contour
Dirt Road	Rock Outcrop
A/C Curbing	Cross Section
Note: = Removed Tank	Trench

Date: Oct 01, 2007 Document: RFI-Report-Group8_FSDF_Samples_E.mxd

ANSI E 44x34

1 inch equals 30 feet 0 30 60 Feet



Santa Susana Field Laboratory

Sample Location Map (1 of 3)
Former Sodium Disposal Facility RFI Site

FIGURE
D.2-2A

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

Topographic map showing contour lines and a dashed orange line. Numerous labeled points (FSBS0001 to FSBS0063) are marked with arrows pointing to specific locations. The map includes a legend in the top left corner stating: "Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented."

Key labeled points and features include:

- 416380, 413580, 414502
- FSBS0096, FSBS0095, FSBS0036, FSBS0031, FSBS0034, FSBS0032, FSBS0035, FSBS0033, 322680, 321750, 326502, 23S, 22B, FSBS0053, FSBS0055, FSBS0052, FSBS0051, FSBS0054, 21B, 20B, 24B, 311560, 19R, FSBS0048, FSBS0046, FSBS0047, FSBS0049, FSBS0045, FSDF-SW-4, 18B, FSBS0043, FSBS0041, FSBS0042, 60B, 120380, FSBS0063, FSBS0015, 110500, 61B, 15B, 15R, 125502, 44B, FSBS0044, 130240, 210810, FSBS0030, 210660, 210040, 46B, 42570590, 45B, 42559090, 47B, FSBS0028, FSBS0026, FSBS0027, FSBS0029, 310700, FSBS0050, 312850, 50000, 21B, FSBS0062, 25B, 20B, 24B, 311560, 19R, FSBS0048, FSBS0046, FSBS0047, FSBS0049, FSBS0045, FSDF-SW-4, 18B, FSBS0043, FSBS0041, FSBS0042, 60B, 120380, FSBS0063, FSBS0015, 110500, 61B, 15B, 15R, 125502, 44B, FSBS0044, 130240, 210810, FSBS0030, 210660, 210040, 46B, 42570590, 45B, 42559090, 47B, FSBS0028, FSBS0026, FSBS0027, FSBS0029, 310700, FSBS0050, 312850, 50000, 21B, FSBS0062, 25B, 20B, 24B, 311560, 19R, FSBS0048, FSBS0046, FSBS0047, FSBS0049, FSBS0045, FSDF-SW-4, 18B, FSBS0043, FSBS0041, FSBS0042, 60B, 120380, FSBS0063, FSBS0015, 110500, 61B, 15B, 15R, 125502, 44B, FSBS0044, 130240, 210810, FSBS0030, 210660, 210040, 46B, 42570590, 45B, 42559090, 47B, FSBS0028, FSBS0026, FSBS0027, FSBS0029, 310700, FSBS0050, 312850, 50000, 21B, FSBS0062, 25B, 20B, 24B, 311560, 19R, FSBS0048, FSBS0046, FSBS0047, FSBS0049, FSBS0045, FSDF-SW-4, 18B, FSBS0043, FSBS0041, FSBS0042, 60B, 120380, FSBS0063, FSBS0015, 110500, 61B, 15B, 15R, 125502, 44B, FSBS0044, 130240, 210810, FSBS0030, 210660, 210040, 46B, 42570590, 45B, 42559090, 47B, FSBS0028, FSBS0026, FSBS0027, FSBS0029, 310700, FSBS0050, 312850, 50000, 21B, FSBS0062, 25B, 20B, 24B, 311560, 19R, FSBS0048, FSBS0046, FSBS0047, FSBS0049, FSBS0045, FSDF-SW-4, 18B, FSBS0043, FSBS0041, FSBS0042, 60B, 120380, FSBS0063, FSBS0015, 110500, 61B, 15B, 15R, 125502, 44B, FSBS0044, 130240, 210810, FSBS0030, 210660, 210040, 46B, 42570590, 45B, 42559090, 47B, FSBS0028, FSBS0026, FSBS0027, FSBS0029, 310700, FSBS0050, 312850, 50000, 21B, FSBS0062, 25B, 20B, 24B, 311560, 19R, FSBS0048, FSBS0046, FSBS0047, FSBS0049, FSBS0045, FSDF-SW-4, 18B, FSBS0043, FSBS0041, FSBS0042, 60B, 120380, FSBS0063, FSBS0015, 110500, 61B, 15B, 15R, 125502, 44B, FSBS0044, 130240, 210810, FSBS0030, 210660, 210040, 46B, 42570590, 45B, 42559090, 47B, FSBS0028, FSBS0026, FSBS0027, FSBS0029, 310700, FSBS0050, 312850, 50000, 21B, FSBS0062, 25B, 20B, 24B, 311560, 19R, FSBS0048, FSBS0046, FSBS0047, FSBS0049, FSBS0045, FSDF-SW-4, 18B, FSBS0043, FSBS0041, FSBS0042, 60B, 120380, FSBS0063, FSBS0015, 110500, 61B, 15B, 15R, 125502, 44B, FSBS0044, 130240, 210810, FSBS0030, 210660, 210040, 46B, 42570590, 45B, 42559090, 47B, FSBS0028, FSBS0026, FSBS0027, FSBS0029, 310700, FSBS0050, 312850, 50000, 21B, FSBS0062, 25B, 20B, 24B, 311560, 19R, FSBS0048, FSBS0046, FSBS0047, FSBS0049, FSBS0045, FSDF-SW-4, 18B, FSBS0043, FSBS0041, FSBS0042, 60B, 120380, FSBS0063, FSBS0015, 110500, 61B, 15B, 15R, 125502, 44B, FSBS0044, 130240, 210810, FSBS0030, 210660, 210040, 46B, 42570590, 45B, 42559090, 47B, FSBS0028, FSBS0026, FSBS0027, FSBS0029, 310700, FSBS0050, 312850, 50000, 21B, FSBS0062, 25B, 20B, 24B, 311560, 19R, FSBS0048, FSBS0046, FSBS0047, FSBS0049, FSBS0045, FSDF-SW-4, 18B, FSBS0043, FSBS0041, FSBS0042, 60B, 120380, FSBS0063, FSBS0015, 110500, 61B, 15B, 15R, 125502, 44B, FSBS0044, 130240, 210810, FSBS0030, 210660, 210040, 46B, 42570590, 45B, 42559090, 47B, FSBS0028, FSBS0026, FSBS0027, FSBS0029, 310700, FSBS0050, 312850, 50000, 21B, FSBS0062, 25B, 20B, 24B, 311560, 19R, FSBS0048, FSBS0046, FSBS0047, FSBS0049, FSBS0045, FSDF-SW-4, 18B, FSBS0043, FSBS0041, FSBS0042, 60B, 120380, FSBS0063, FSBS0015, 110500, 61B, 15B, 15R, 125502, 44B, FSBS0044, 130240, 210810, FSBS0030, 210660, 210040, 46B, 42570590, 45B, 42559090, 47B, FSBS0028, FSBS0026, FSBS0027, FSBS0029, 310700, FSBS0050, 312850, 50000, 21B, FSBS0062, 25B, 20B, 24B, 311560, 19R, FSBS0048, FSBS0046, FSBS0047, FSBS0049, FSBS0045, FSDF-SW-4, 18B, FSBS0043, FSBS0041, FSBS0042, 60B, 120380, FSBS0063, FSBS0015, 110500, 61B, 15B, 15R, 125502, 44B, FSBS0044, 130240, 210810, FSBS0030, 210660, 210040, 46B, 42570590, 45B, 42559090, 47B, FSBS0028, FSBS0026, FSBS0027, FSBS0029, 310700, FSBS0050, 312850, 50000, 21B, FSBS0062, 25B, 20B, 24B, 311560, 19R, FSBS0048, FSBS0046, FSBS0047, FSBS0049, FSBS0045, FSDF-SW-4, 18B, FSBS0043, FSBS0041, FSBS0042, 60B, 120380, FSBS0063, FSBS0015, 110500, 61B, 15B, 15R, 125502, 44B, FSBS0044, 130240, 210810, FSBS0030, 210660, 210040, 46B, 42570590, 45B, 42559090, 47B, FSBS0028, FSBS0026, FSBS0027, FSBS0029, 310700, FSBS0050,

▼ Soil Matrix Sample ● Soil Vapor Sample

	Report Group Boundary		Fence
	RFI Site Boundary		Rock Outcrop
	Existing Building or Structure		Elevation Contour
	Removed Building or Structure		Surface Water Divide
	Awning		Drainage
	Other Tanks		Pond
	Solvent Tank		Possible Pond
	Petroleum Fuel/Oil Tank		Leachfield
	Hydrazine Tank		Pipe
	Dirt Road		Well
	A/C Curbing		Abandoned Well
			Trench

Note: R = Removed Tank

	Multiple Use		Hydrazine
	Solvent		Debris
	Petroleum		Landfill
	Oils / PCBs		Leach Field
	Metal		Potential
	Perchlorate		

(* Chemical Use Area present in this RFI site)

CODE	CATEGORY	Chemical Use Area Name
1a	Mutliple Use	FSDF Lower Pond
1b	Mutliple Use	FSDF Upper Pond
1c	Debris	FSDF Western Debris Area
1d	Metals	FSDF Concrete Pool
2	Petroleum	Steam Lance
3	Potential	Southern Investigation Area
4	Debris	Drum Debris Area
5	Metals	FSDF Pistol Range

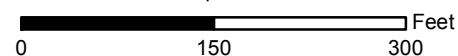
Sample Location Map (map 2 of 3)
Former Sodium RFI Disposal Facility
RFI Site



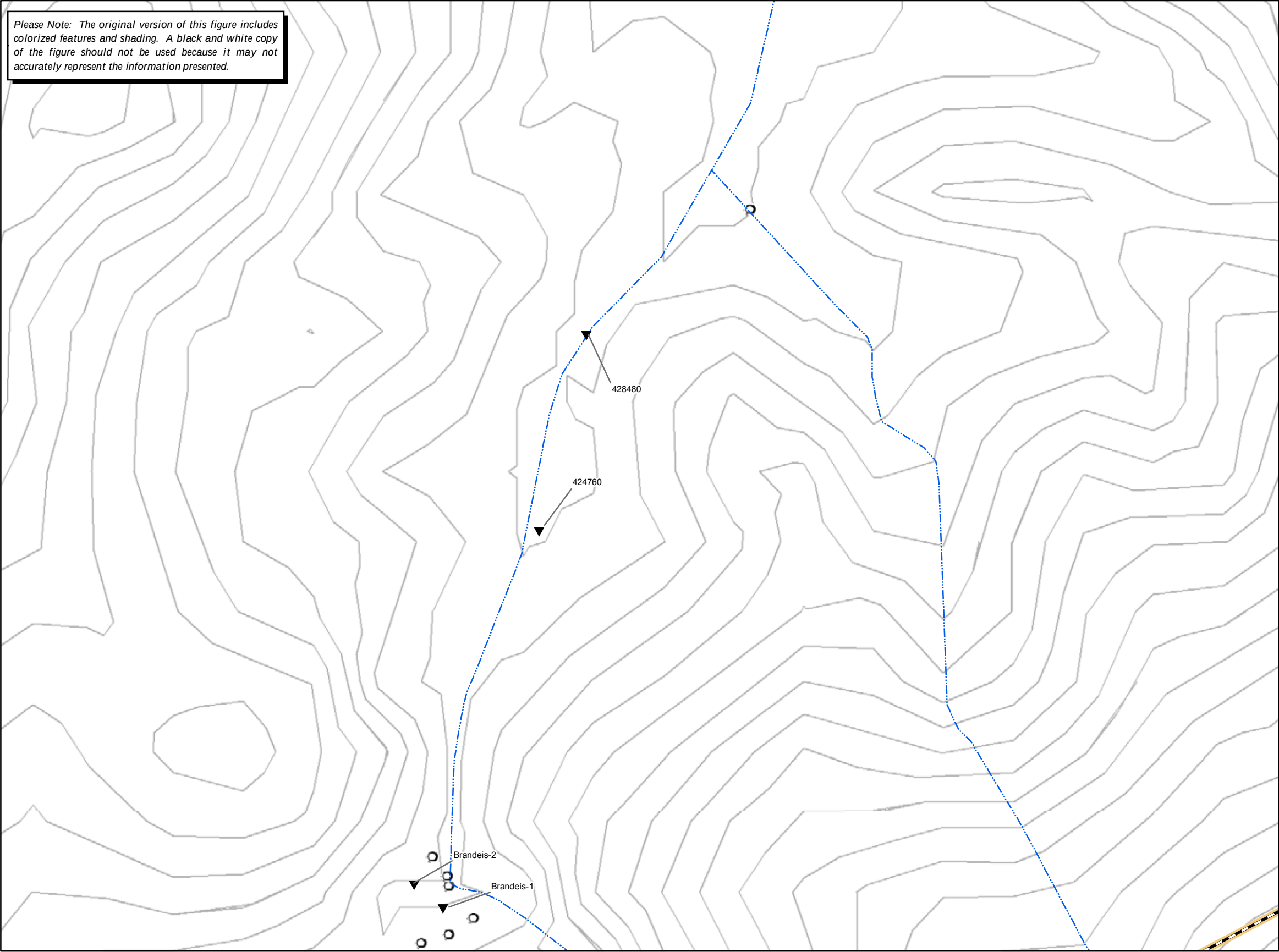
**FIGURE
D.2-2B**

Document: RFI-Report-Group8_FSDF_Samples_11x17.mxd

1 inch equals 150 feet



SANTA SUSANA FIELD LABORATORY



Sample Location

▼ Soil Matrix Sample ● Soil Vapor Sample

Base Map Legend

	Report Group Boundary		Fence
	RFI Site Boundary		Rock Outcrop
	Existing Building or Structure		Elevation Contour
	Removed Building or Structure		Surface Water Divide
	Awning		Drainage
	Other Tanks		Pond
	Solvent Tank		Possible Pond
	Petroleum Fuel/Oil Tank		Leachfield
	Hydrazine Tank		Pipe
	Dirt Road		Well
	A/C Curbing		Abandoned Well
			Trench

Note: R = Removed Tank

Chemical Use Areas

	Multiple Use		Hydrazine
	Solvent		Debris
	Petroleum		Landfill
	Oils / PCBs		Leach Field
	Metal		Potential
	Perchlorate		

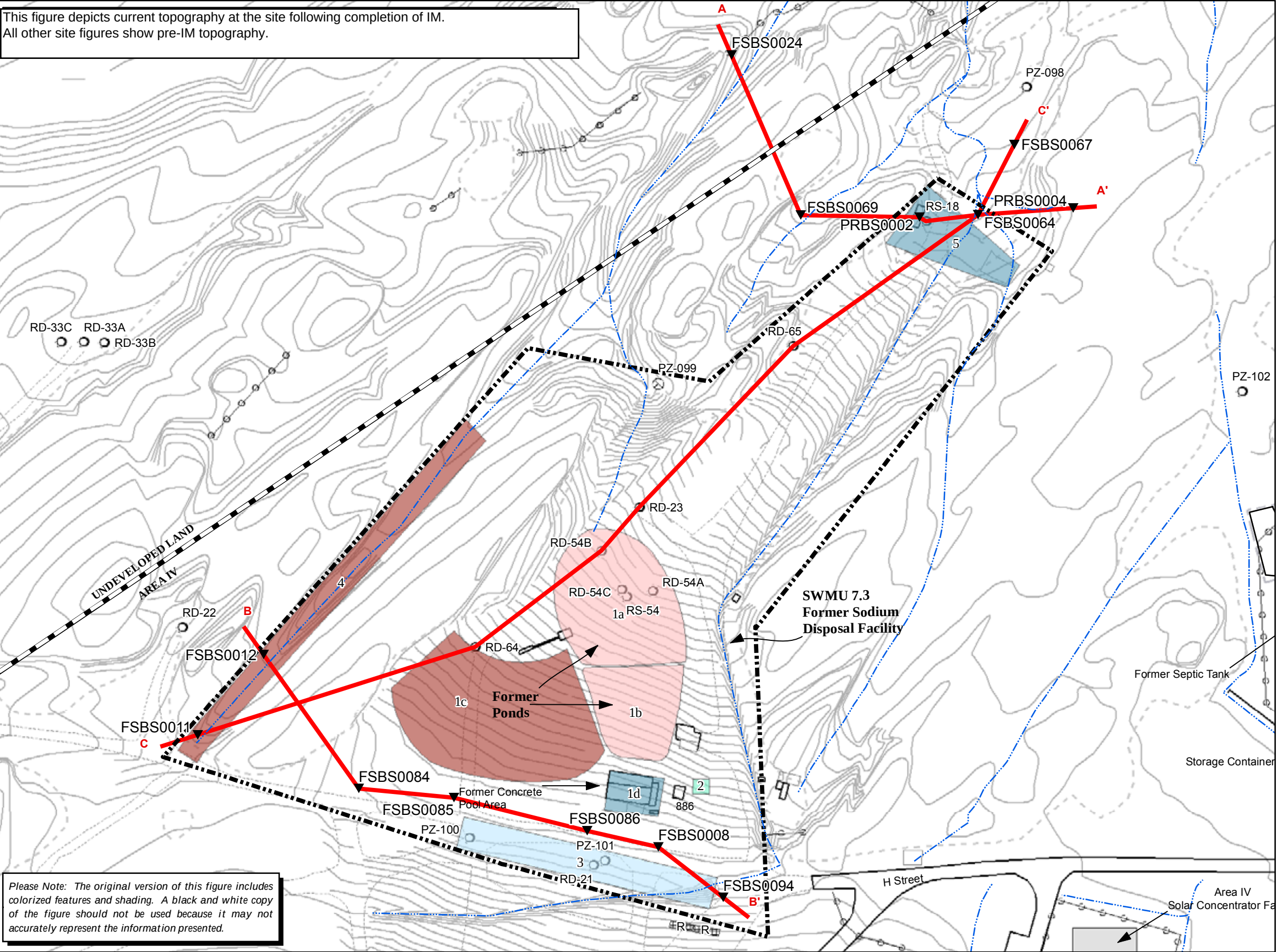
(* Chemical Use Area present in this RFI site)

CODE	CATEGORY	Chemical Use Area Name
1a	Mutliple Use	FSDF Lower Pond
1b	Mutliple Use	FSDF Upper Pond
1c	Debris	FSDF Western Debris Area
1d	Metals	FSDF Concrete Pool
2	Petroleum	Steam Lance
3	Potential	Southern Investigation Area
4	Debris	Drum Debris Area
5	Metals	FSDF Pistol Range

Sample Location Map (map 3 of 3)
Former Sodium Disposal Facility
RFI Site



This figure depicts current topography at the site following completion of IM.
All other site figures show pre-IM topography.



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.

Sample Location Associated With Cross Sections

▼ Soil Matrix Sample ● Soil Vapor Sample

Base Map Legend

Administrative Area Boundary

Report Group Boundary

RFI Boundary

Existing Building or Structure

Removed Building or Structure

Awning

Other Tanks

Solvent Tank

Petroleum Fuel/Oil Tank

Hydrazine Tank

Dirt Road

A/C Curbing

Fence

Rock Outcrop

Elevation Contour

Surface Water Divide

Drainage

Pond

Possible Pond

Leachfield

Pipe

Well

Abandoned Well

Cross Section

Trench

Note: R = Removed Tank

Chemical Use Areas

Multiple Use

Solvent

Petroleum

Oils / PCBs

Metal

Perchlorate

Hydrazine

Debris

Landfill

Leach Field

Potential

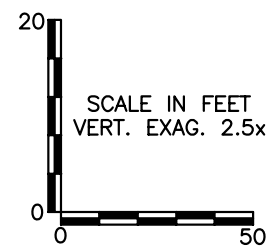
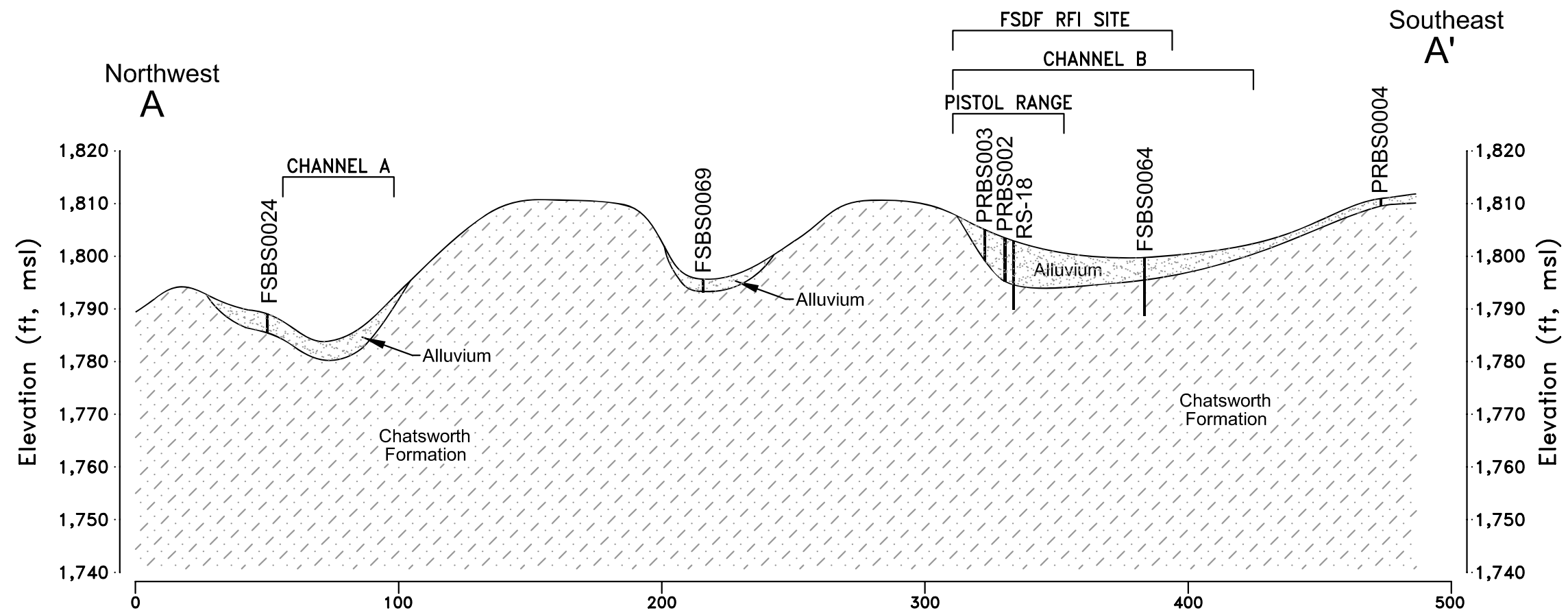
(* Chemical Use Area present in this RFI site)

CODE	CATEGORY	Chemical Use Area Name
1a	Mutiple Use	FSDF Lower Pond
1b	Mutiple Use	FSDF Upper Pond
1c	Debris	FSDF Western Debris Area
1d	Metals	FSDF Concrete Pool
2	Petroleum	Steam Lance
3	Potential	Southern Investigation Area
4	Debris	Drum Debris Area
5	Metals	FSDF Pistol Range

Cross Section Location Map
Former Sodium Disposal Facility
RFI Site



JOB No. --- FILE No. --- INDSTR\INDUSTRIAL\CAD_MUERKE\BOEING SANTA SUSANA\GROUP 8 FIGS\GROUP 8 SECTIONS

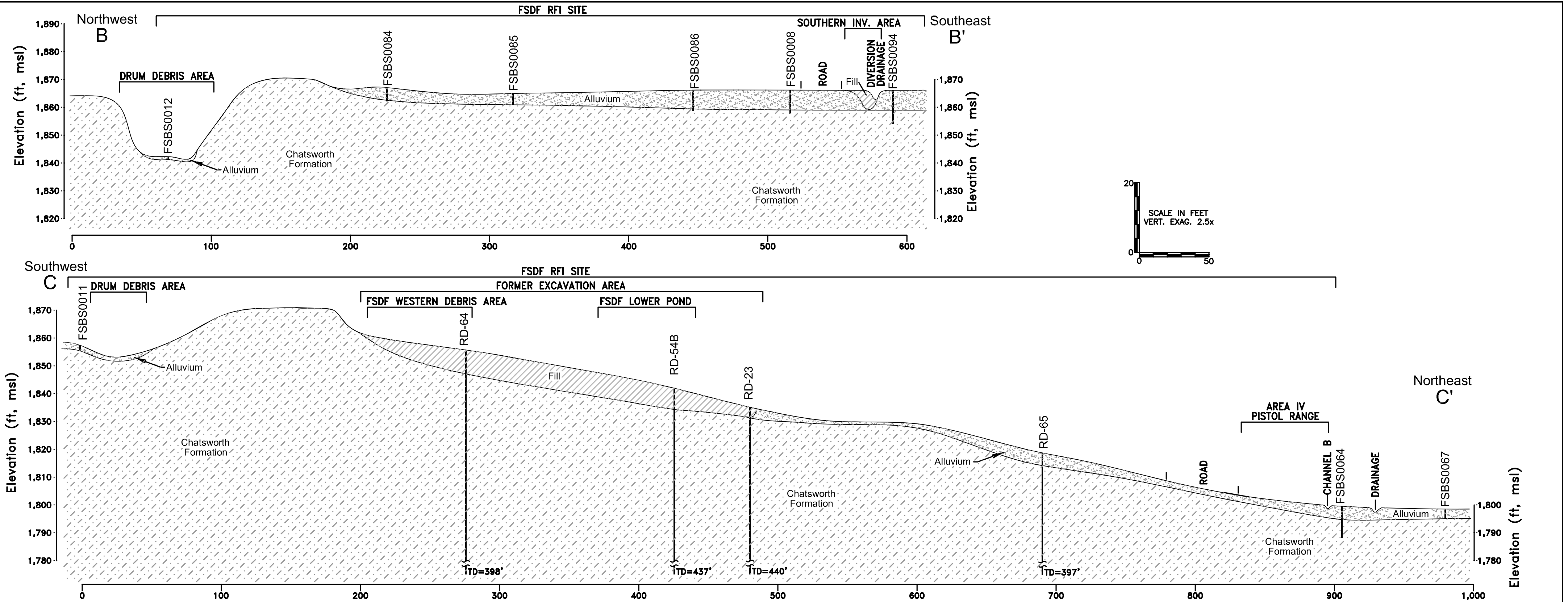


SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
SEPTEMBER 2007

SURFICIAL CROSS SECTION A-A'
FSDf RFI SITE

FIGURE D.2-3A

JOB No. --- FILE No. --- INDSTR\INDUSTRIAL\CAD_M\JEBKE\BOEING_SANTA_SUSANA\GROUP 8 FIGS\GROUP 8 SECTIONS



SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
SEPTEMBER 2007
**SURFICIAL CROSS SECTIONS
B-B' & C-C'**
FSDF RFI SITE
FIGURE D.2-3B

Soil Sample Location Symbol Legend

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

Comparison Levels

VOCs (soil)	Background (µg/kg)	Res RBSL (µg/kg)	Eco RBSL (µg/kg)
1,1-Dichloroethene	--	23	320
Benzene	--	0.13	4600
Chlorobenzene	--	97	94000
cis-1,2-Dichloroethene	--	14	74000
Methylene chloride	--	4	27000
Naphthalene	--	6000	230000
Tetrachloroethene	--	0.43	2300
Toluene	--	300	2700
trans-1,2-Dichloroethene	--	16	1000000
Trichloroethene	--	2.2	3200
Vinyl chloride	--	0.0096	780

VOCs (vapor)	Background (µg/L)	Res RBSL (µg/L)	Eco RBSL (µg/L)
1,1-Dichloroethene	--	58	0.6
Benzene	--	0.095	0.57
cis-1,2-Dichloroethene	--	10	1.9
Isopropanol	--	--	--
Methylene chloride	--	2.7	0.87
Tetrachloroethene	--	0.45232	24
Toluene	--	110	0.084
trans-1,2-Dichloroethene	--	1.4	6.4
Trichloroethene	--	0.035	0.56

Note: (µg/kg) = micrograms per kilogram (µg/L) = micrograms per liter Data Date: 2/07/2007

Background Level
Res RBSL
Eco RBSL

Data Box Information

Sample Location ID	Primary Sample Type	Depth in Feet	Sample Type	Unique Sample Identifier	(Historical Sample)
FSB501	FSB501501	7/10/2005	12.05	12.05	12.05
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					
Analysis not conducted					
If more than one result per sample depth, the maximum is presented, with number of results in brackets.					

Chemical Use Areas

Multiple Use	Metal	Landfill
Solvent	Perchlorate	Leach Field
Petroleum	Hydrazine	Potential
Oils / PCBs	Debris	

Base Map Legend

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

Note: R = Removed Tank

Date: Sept 30, 2007 Document: RFI-Report-Group8_FSDF_VOC_E.mxd

ANSI E 44x34

1 inch equals 60 feet

0 60 120 Feet

North Arrow

Scale Bar

Scale Bar

Scale Bar

Scale Bar

Scale Bar

Scale Bar

Scale Bar

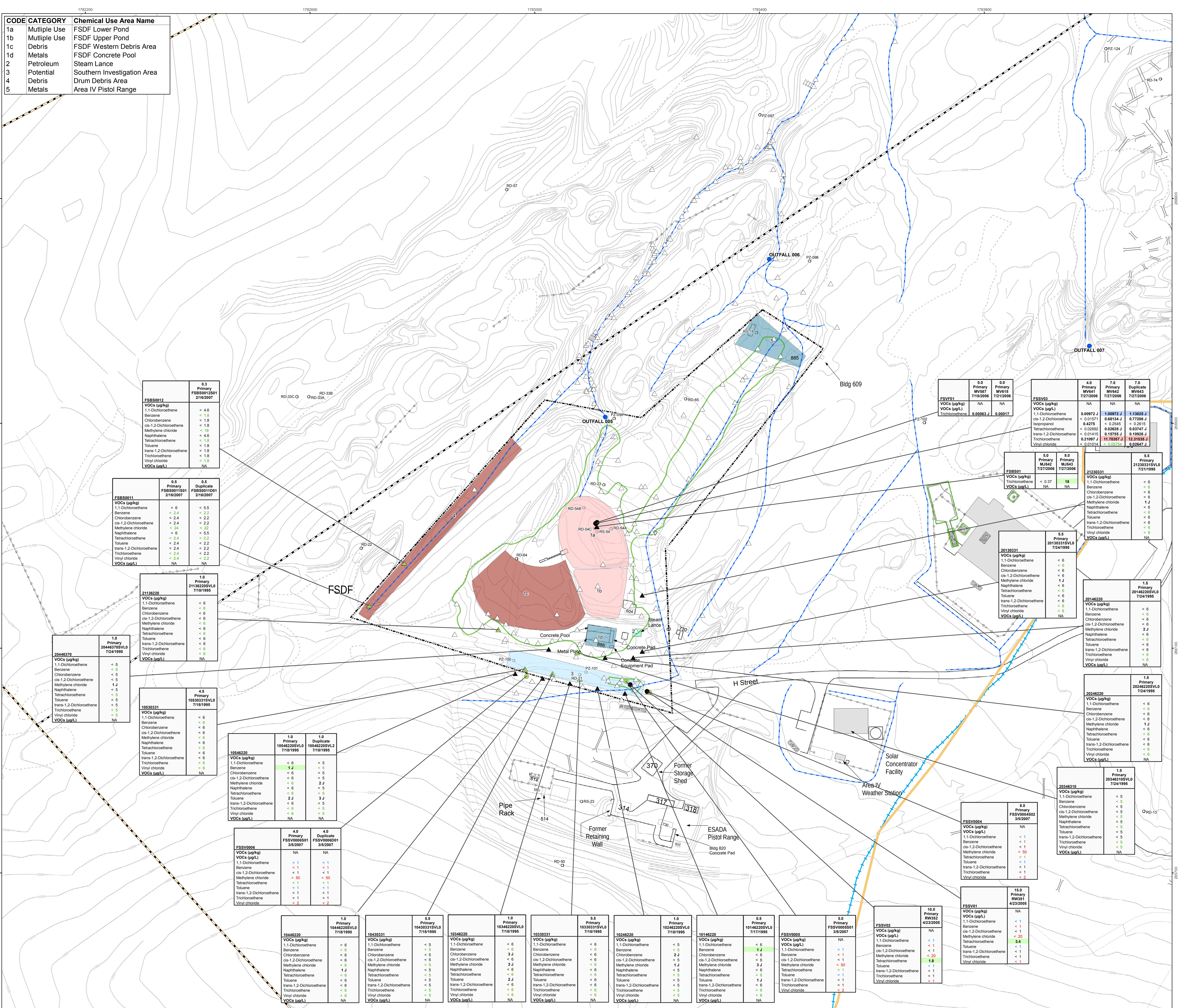
Scale Bar

Scale Bar

Scale Bar

Scale Bar

Scale Bar



Santa Susana Field Laboratory

VOCs Chemical Data Results
Former Sodium Disposal Facility RFI Site

FIGURE
D.3-1

Soil Sample Location Symbol Legend

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

Comparison Levels

SVOCs	Background (µg/kg)	Res RBSL (µg/kg)	Eco RBSL (µg/kg)
Benzo(a)anthracene	--	600	1400
Benzo(a)pyrene	--	60	4700
bis(2-Ethylhexyl) phthalate	--	250000	4900
Chrysene	--	6000	2400
Diethyl phthalate	--	46000000	5200000
Di-n-butyl phthalate	--	5700000	490
Fluoranthene	--	2300000	130000
Naphthalene	--	6000	230000
Phenanthrene	--	1700000	1300
Pyrene	--	1700000	79000
TPH	Background (mg/kg)	Res RBSL (mg/kg)	Eco RBSL (mg/kg)
Diesel Range Organics (C14-C20)	--	1400	--
Diesel Range Organics (C15-C20)	--	1400	--
Lubricant Oil Range Organics (C20-C30)	--	1400	--
Lubricant Oil Range Organics (C21-C30)	--	1400	--
Lubricant Oil Range Organics (C21-C30)	--	1400	--

Note: (mg/kg) = milligrams per kilogram
(µg/kg) = micrograms per kilogram
Data Date: 20070920

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

Data Box Information

Sample Location ID: FBS01

1.00 Primary FBS01501 7/10/2005

Depth in Feet: 0.06
Sample Type: J
Unique Sample Identifier: NA
Date: [J]

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
Analysis not conducted
If more than one result per sample depth, the maximum is presented, with number of results in brackets.

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

Chemical Use Areas

- (★ Chemical Use Area present in this RFI site)
- Multiple Use
 - Solvent
 - Petroleum
 - Oils / PCBs
 - Metal
 - Perchlorate
 - Hydrazine
 - Debris
 - Landfill
 - Leach Field
 - Potential

Base Map Legend

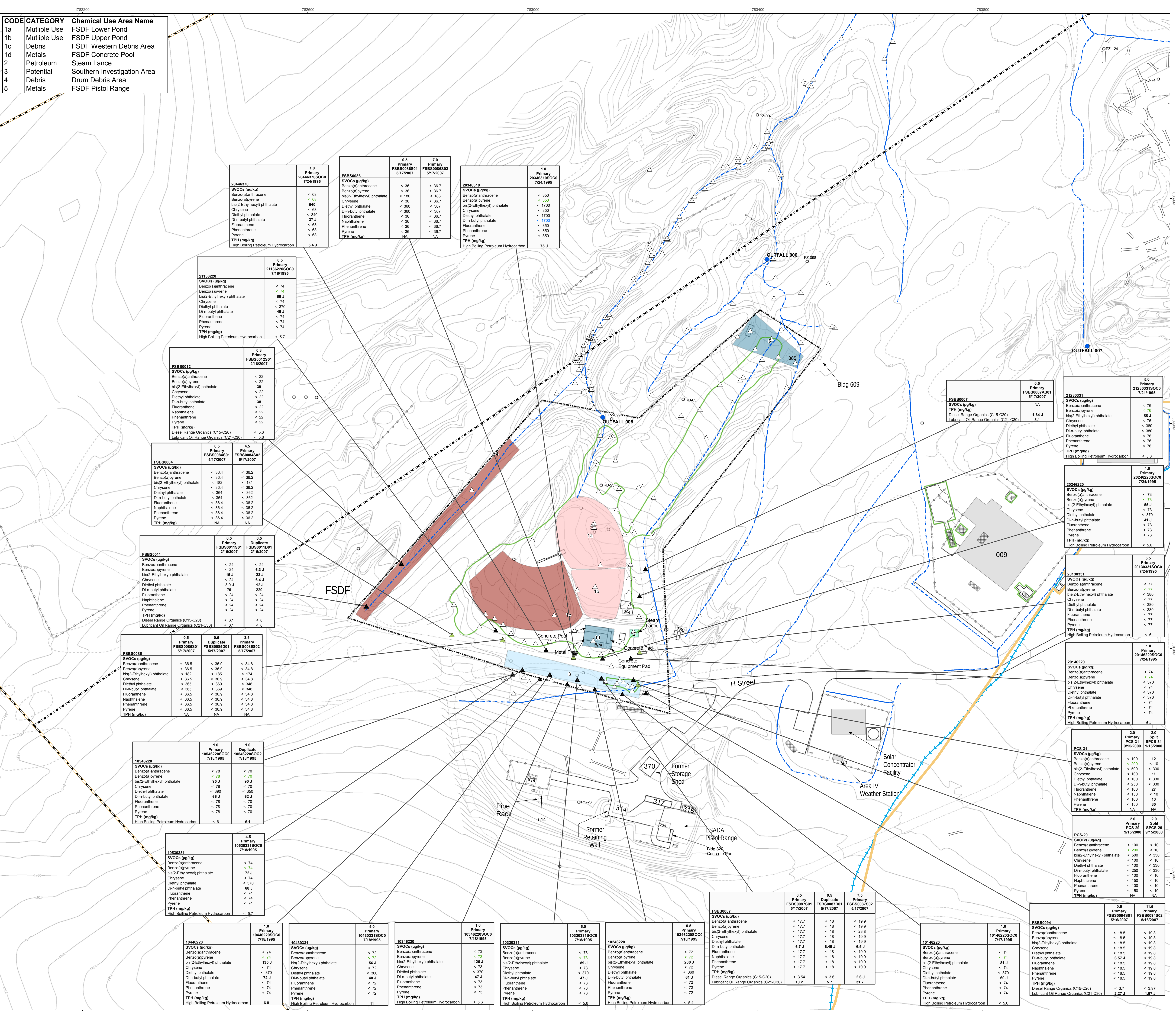
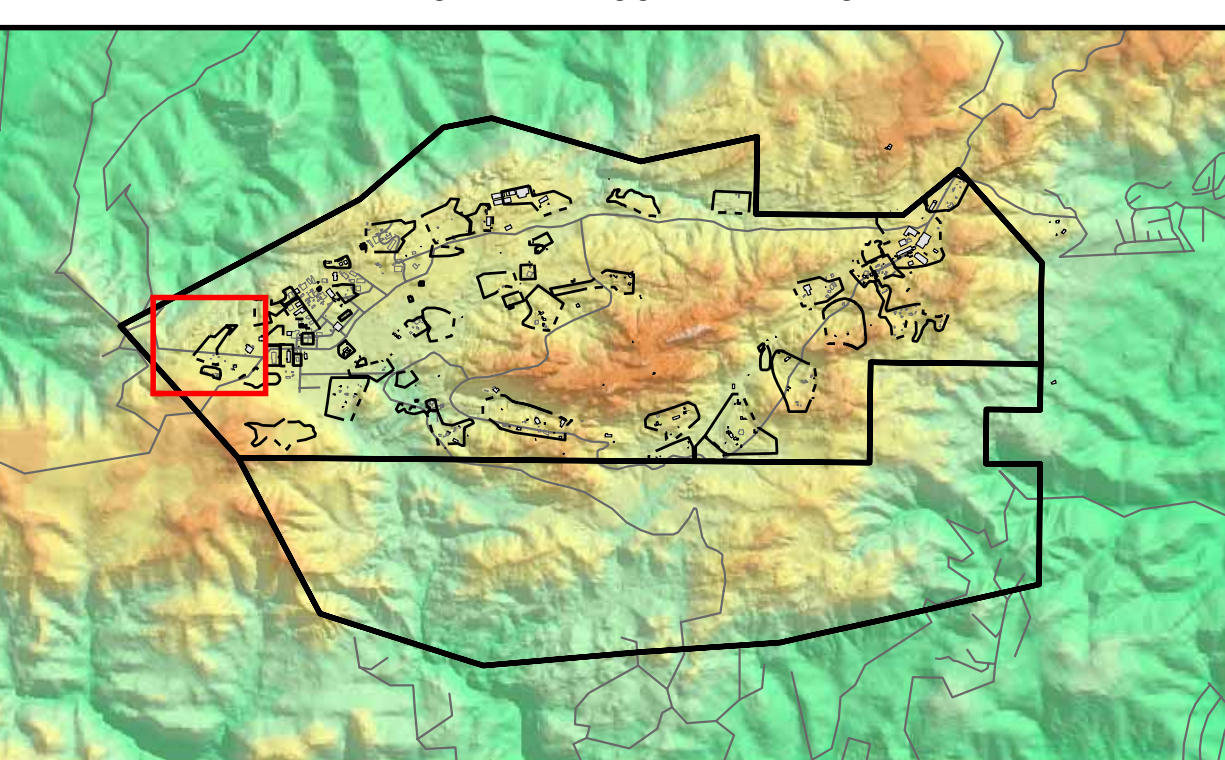
- Administrative Area Boundary
- RFI Site Boundary
- Report Group Boundary
- Existing Building or Structure
- Removed Building or Structure
- Other Tanks
- Solvent Tank
- Petroleum Fuel/Oil Tank
- Hydrazine Tank
- Awning
- Dirt Road
- A/C Curbing
- Fence
- Pipe
- Leach Field
- NPDES Outfall
- Well
-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

Note: R = Removed Tank

Date: Sept 30, 2007 Document: RFI-Report-Group8_FSDV_SVOC_TPH_Terphenyls_E.mxd

ANSI E 44x34

1 inch equals 60 feet



Santa Susana Field Laboratory

SVOCs/TPH/Terphenyls Chemical Data Results
Former Sodium Disposal Facility RFI Site

FIGURE
D.3-2

[illegible]

2.2.6.7 <i>Penicillium chrysogenum</i>	16.2	2.2	
2.2.7.0 TQD	9.6	6.2	2.2.7.0 TQD
2.2.7.1 <i>Penicillium chrysogenum</i>	9.6	6.2	2.2.7.1 <i>Penicillium chrysogenum</i>
<i>Resporibacterium</i> sp.	6.4	4.7	<i>Resporibacterium</i> sp.
<i>Resporibacterium</i> sp.	9.6	6.2	<i>Resporibacterium</i> sp.
<i>Resporibacterium</i> sp.	21.0	14.2	<i>Resporibacterium</i> sp.
<i>Resporibacterium</i> sp.	14.2	14.2	<i>Resporibacterium</i> sp.
<i>Resporibacterium</i> sp.	43.1	6.1	<i>Resporibacterium</i> sp.
<i>Resporibacterium</i> sp.	6.2	5.2	<i>Resporibacterium</i> sp.
<i>Resporibacterium</i> sp.	10.0	10.0	<i>Resporibacterium</i> sp.
<i>Resporibacterium</i> sp.	22.2	26.2	<i>Resporibacterium</i> sp.
<i>Resporibacterium</i> sp.	6.6	6.2	<i>Resporibacterium</i> sp.
TQD TQD (M=0) 2000 WHO	10.0	10.0	TQD TQD (M=0) 2000 WHO
Resporibacterium sp.	54.2	40.1	Resporibacterium sp.
<i>Resporibacterium</i> sp.	< 1.1	< 0.7	<i>Resporibacterium</i> sp.

[illegible][illegible][illegible][illegible][illegible]

Soil Sample Location Symbol Legend

- ▲ Soil sample location with detected Metals/Energetics/pH
Chemical Data
▲ pH Chemical Data
△ pH Chemical Data not analyzed for Metals/Energetics/
pH Chemical Data
△ Contained unit soil sample
▲ Refused sample (refusal depth < 1' below ground surface)
▲ Soil sample not analyzed by any sample method

Comparison Levels

Metals	Background (mg/kg)	Res RBSL (mg/kg)	Eco RBSL (mg/kg)
Aluminum	20000	75000	14
Antimony	8.7	30	0.096
Arsenic	15	0.095	0.26
Barium	140	15000	15
Beryllium	1.1	150	5.9
Boron	9.7	15000	9.3
Cadmium	1	2.6	0.0026
Chromium	36.8	3400	940
Cobalt	21	1500	10
Copper	29	3000	1.1
Lead	34	150	0.063
Lithium	37	1522	43
Mercury	0.09	23	0.88
Molybdenum	5.3	380	0.11
Nickel	29	1500	0.1
Potassium	6455	380	0.18
Selenium	0.79	380	0.55
Sodium	110	--	--
Thallium	0.46	6.1	3.2
Vanadium	62	76	1.6
Zinc	110	23000	22
Zirconium	8.6	--	--

Note: (mg/kg) = milligrams per kilogram

Date Data: 20070920

Data Box Information

Sample Location ID	1.00 Primary FSBS01501 7/10/2005	Depth in Feet	Sample Type	Unique Sample Identifier	(Historical Sample)
FSBS01					
		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		
		*	Data validation not performed		
		NA	Analysis not conducted		
		[#]	If more than one result per sample depth, the maximum is presented, with number of results in brackets.		

Detect	Non-Detect
12.05	< 0.06
12.05	< 0.06
12.05	< 0.06
12.05	< 0.06

Chemical Use Areas

Multiple Use	Metal	Landfill
Solvent	Perchlorate	Leach Field
Petroleum	Hydrazine	Potential
Oils / PCBs	Debris	

Base Map Legend

Administrative Area Boundary	Pipe
RFI Boundary	Leach Field
Report Group Boundary	NPDES Outfall
Existing Building or Structure	Well
Removed Building or Structure	Pond
Other Tanks	Possible Pond
Solvent Tank	Drainage
Petroleum Fuel/Oil Tank	Surface Water Divide
Hydrazine Tank	Elevation Contour
Awning	Rock Outcrop
Dirt Road	Trench
A/C Curbing	Excavation-Backfill
Fence	

Note: R = Removed Tank

Document: RFI-Report-Group8_FSDP_Metals_Perchlorate_pH_N_E.mxd

Date: Sep 30, 2007

ANSI E 44x34

1 inch equals 60 feet

0 60 120 Feet

North Arrow

Scale Bar

Scale Bar

Scale Bar

Scale Bar

Scale Bar

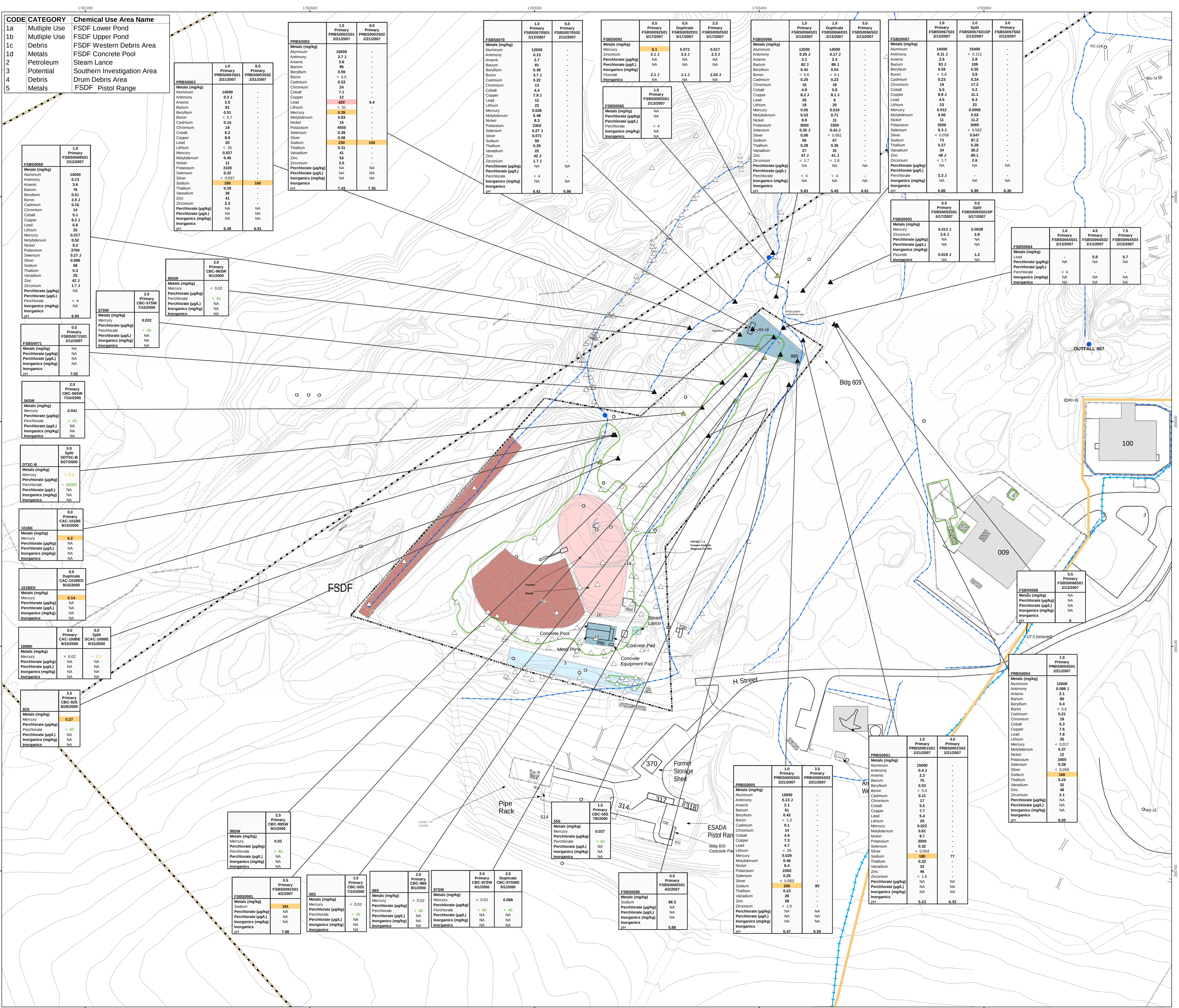
Scale Bar

Scale Bar

Scale Bar

Scale Bar

Scale Bar



Santa Susana Field Laboratory

Metals/Perchlorate/pH Chemical Data Results - North
Former Sodium Disposal Facility RFI Site

FIGURE
D.3-4A

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

Inorganics	Background	Res RBSL	Eco RBSL
Fluoride (mg/kg)	6.7	4600	--
pH	--	--	--
Metals	Background (mg/kg)	Res RBSL (mg/kg)	Eco RBSL (mg/kg)
Aluminum	20000	75000	14
Antimony	8.7	30	0.096
Arsenic	15	0.095	0.26
Barium	140	15000	15
Beryllium	1.1	150	5.9
Boron	9.7	15000	9.3
Cadmium	1	2.6	0.0026
Chromium	36.8	3400	940
Cobalt	21	1500	10
Copper	29	3000	1.1
Lead	34	150	0.063
Lithium	37	1522	43
Mercury	0.09	23	0.88
Molybdenum	5.3	380	0.11
Nickel	29	1500	0.1
Potassium	6400	--	--
Selenium	0.655	380	0.18
Silver	0.79	380	0.55
Sodium	110	--	--
Thallium	0.46	6.1	3.2
Vanadium	62	76	1.6
Zinc	110	23000	22
Zirconium	8.6	--	--

Perchlorate analyzed as soil matrix (µg/kg) and as soil leachates (µg/L). Leachate concentration directly comparable to soil concentration (i.e., µg/L approximately equal to µg/kg).

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

Sample Location ID: FSB001

Sample Type: 1.00

Primary Sample Identifier: FSB001005

Date: 7/10/2005

Depth in Feet: (indicated by a line pointing to the Sample Type field)

Historical Sample: (empty box)

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

12.05	Detect with sample concentration shown
<0.06	Non-Detect with lab detection limit shown
J	Analyze positively identified, Associated numerical value is considered estimated
*	Data validation not performed
NA	Analysis not conducted
[#]	If more than one result per sample depth, the maximum is presented, with number of results in brackets.

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

Multiple Use	Metal	Landfill
Solvent	Perchlorate	Leach Field
Petroleum	Hydrazine	Potential

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

Note: R = Removed Tank

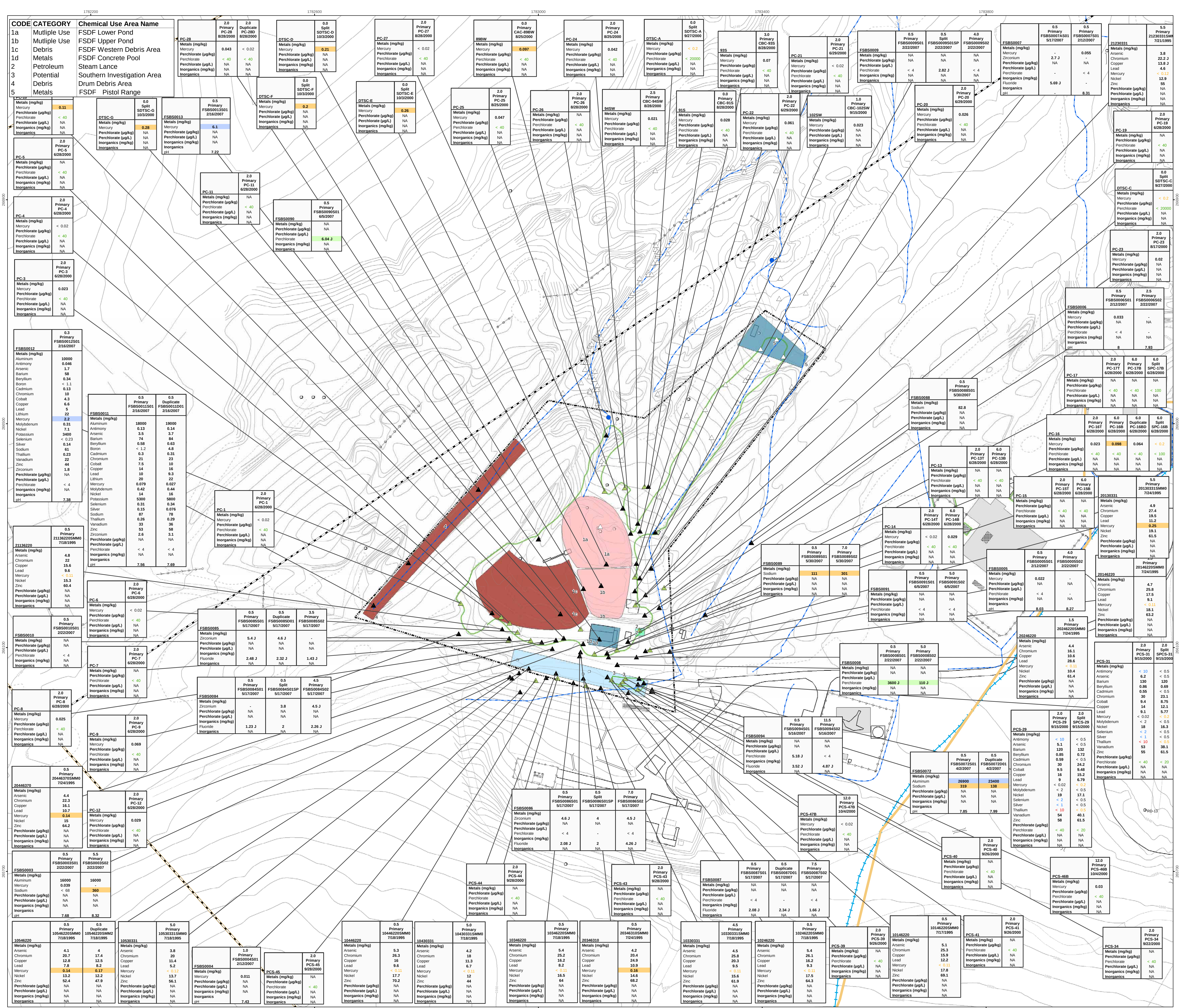
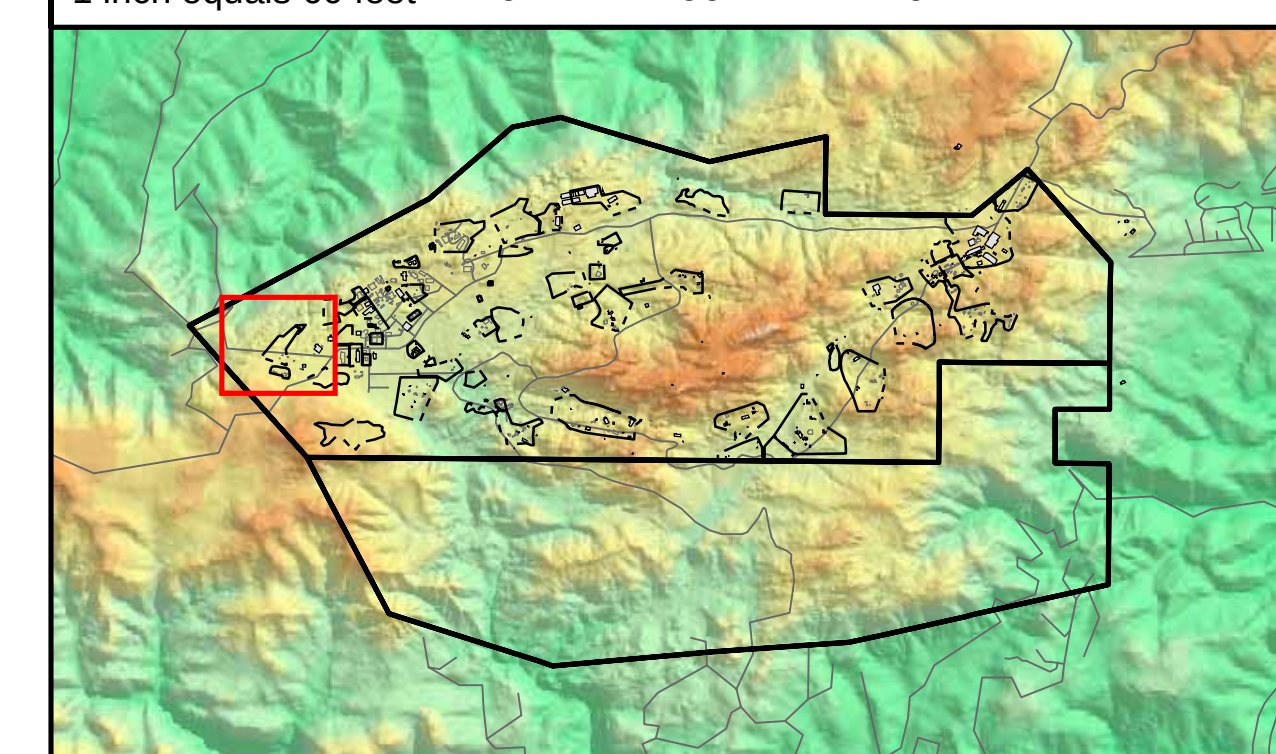
Date: Oct 11, 2005; File: RFI-Report-Group8 ESDE Metals Perchlorate pH S E.mxd

ANSI E 44x34

1 inch equals 60 feet



0 60 120 Feet



Soil Sample Location Symbol Legend

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

Comparison Levels	SVOCs	Background (mg/kg)	Res RBSL (mg/kg)	Eco RBSL (mg/kg)
Benzocyclopentadiene	--	600	1400	1400
Benzocyclopentadiene	--	600	1400	1400
Diethylhexyl phthalate	--	250000	4900	4900
Chrysene	--	6000	2400	2400
Diethyl phthalate	--	46000000	520000	520000
Di-n-butyl phthalate	--	2700000	4900	4900
Fluorene	--	230000	13000	13000
Naphthalene	--	6000	23000	23000
Phenanthrene	--	170000	3300	3300
Pyrene	--	170000	7000	7000

Dioxins/Furans	Background (mg/kg)	Res RBSL (mg/kg)	Eco RBSL (mg/kg)
1,2,3,4,6,7,8-Hexachlorodibenzofuran	2.5	600	1150
1,2,3,4,6,7,8-Hexachlorodibenzofuran-p-dioxin	0.19	600	820
1,2,3,4,7,8-Hexachlorodibenzofuran	0.73	69	28
1,2,3,4,7,8-Hexachlorodibenzofuran-p-dioxin	0.34	69	28
1,2,3,6,7,8-Hexachlorodibenzofuran	0.3	69	28
1,2,3,6,7,8-Hexachlorodibenzofuran-p-dioxin	0.05	69	130
1,2,3,7,8-Hexachlorodibenzofuran	0.43	69	28
1,2,3,7,8-Hexachlorodibenzofuran-p-dioxin	0.09	69	28
1,2,3,7,8-Hexachlorodibenzofuran-p-dioxin	1.1	6.9	28
2,3,4,6,7,8-Hexachlorodibenzofuran	0.48	69	28
2,3,4,6,7,8-Hexachlorodibenzofuran-p-dioxin	0.64	23	9.2
2,3,7,8-TCDD	0.8	69	2.8
2,3,7,8-Tetrachlorodibenzofuran	1.8	69	4.4
2,3,7,8-Tetrachlorodibenzofuran-p-dioxin	--	--	--
Heptachlorodibenzofuran	--	--	--
Heptachlorodibenzofuran-p-dioxin	--	--	--
Octachlorodibenzofuran	8.1	23000	27000
Octachlorodibenzofuran-p-dioxin	140	23000	37000
Pentachlorodibenzofuran	--	--	--
Pentachlorodibenzofuran-p-dioxin	--	--	--
Tetrachlorodibenzofuran	--	--	--
Tetrachlorodibenzofuran-p-dioxin	--	--	--
TCDD TEQ (WHO) 2005 WHO	0.87	--	--

TPH	Background (mg/kg)	Res RBSL (mg/kg)	Eco RBSL (mg/kg)
Diesel Range Organics (C14-C20)	--	1400	--
Diesel Range Organics (C15-C20)	--	1400	--
Lubricant Oil Range Organics (C20-C30)	--	1400	--
Lubricant Oil Range Organics (C21-C30)	--	1400	--
High Boiling Petroleum Hydrocarbon	--	1400	--

Inorganics	Background (mg/kg)	Res RBSL (mg/kg)	Eco RBSL (mg/kg)
Fluoride (mg/kg)	6.7	4600	--
pH	--	--	--
PCBs	Background (mg/kg)	Res RBSL (mg/kg)	Eco RBSL (mg/kg)
Aroclor 1242	--	350	80
Aroclor 1254	--	350	80
Aroclor 1260	--	350	79

Note: (mg/kg) = milligrams per kilogram
(mg/kg) = nanograms per kilogram
(ug/kg) = micrograms per kilogram
(ug/L) = micrograms per liter

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

Data Box Information

Sample Location ID	1.00 Primary FBS010101 7/10/2005	Depth in Feet	Sample Type	Unique Sample Identifier	(Historical Sample)
FBS01					

- 12.05 Detect with sample concentration shown
- 0.06 Not-Detected with lab detection limit shown
- J Analyte positively identified; Associated numerical value is considered estimated
- Data validation not performed
- NA Analysis not conducted
- [#] If more than one result per sample depth, the maximum is presented, with number of results in brackets.

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

Exceeds Background + Res RBSL
Exceeds Background + Eco RBSL

Chemical Use Areas

- Multiple Use
- Solvent
- Petroleum
- Oils / PCBs
- Metal
- Perchlorate
- Hydrazine
- Debris
- Landfill
- Leach Field
- Potential

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
- Dirt Road
- A/C Curbing
- Fence
- Pipe
- Leach Field
- NPDES Outfall
- Well
- Pond
- Possible Pond
- Drainage
- Surface Water Divide
- Elevation Contour
- Rock Outcrop
- Trench
- Excavation-Backfill

Note: R = Removed Tank

Date: Oct 01, 2007 Document: RFI-Report-Group8_FSDP_Channels_N_E.mxd

ANSI E 44x34

1 inch equals 80 feet

0 80 160 Feet

North Arrow

Scale Bar

Scale Bar

Scale Bar

Scale Bar

Scale Bar

Scale Bar

Scale Bar

Scale Bar

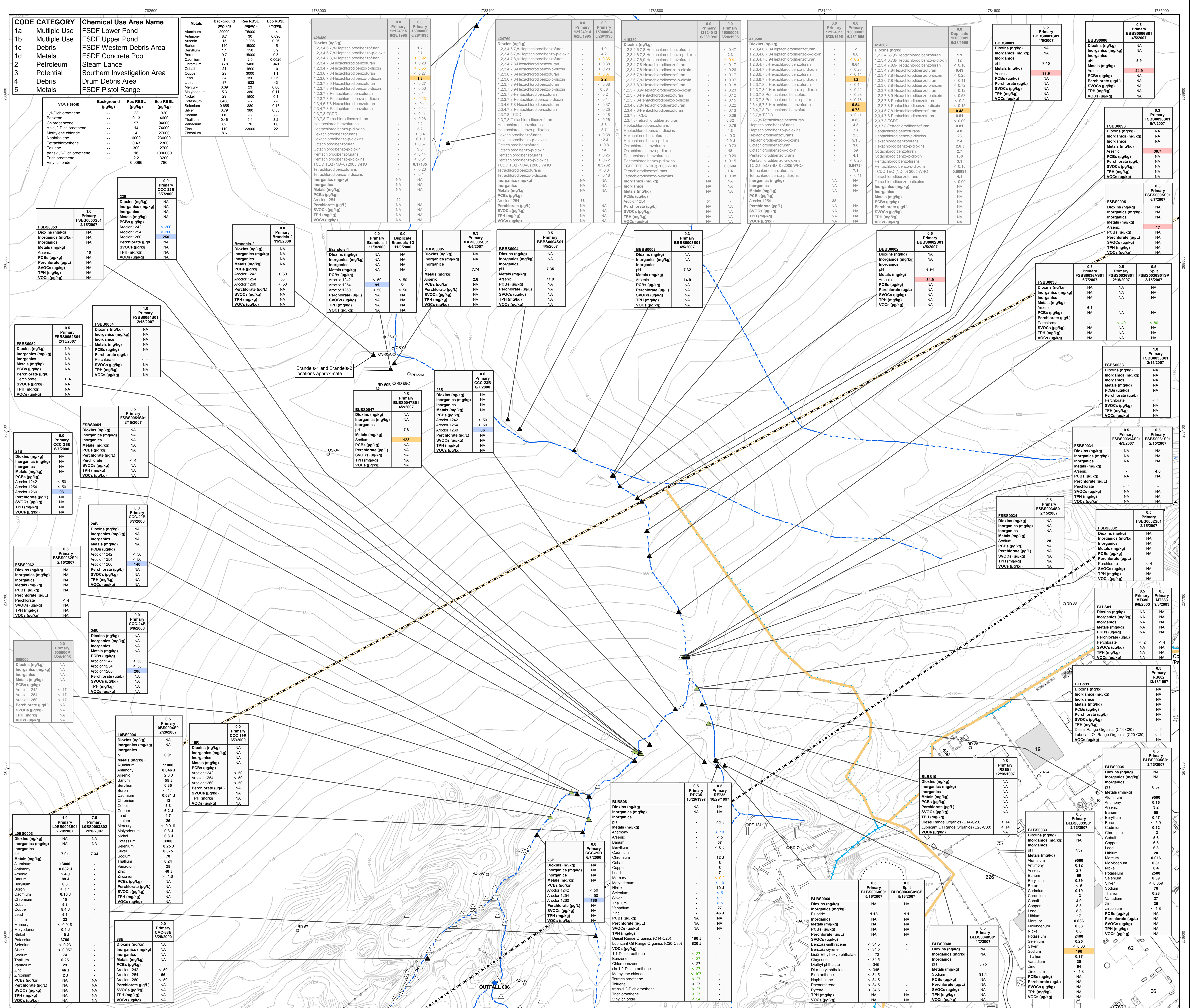
Scale Bar

Scale Bar

Scale Bar

Scale Bar

Scale Bar



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

Dioxin/Furans	Background (ng/kg)	Res RBSL (ng/kg)	Eco RBSL (ng/kg)
1,2,3,4,6,7,8-Hexachlorodibenzofuran	0.1	600	1100
1,2,3,4,6,7,8-Hexachlorodibenzofuran-2-o-dioxin	13	600	820
1,2,3,4,7,8,9-Hexachlorodibenzofuran	0.19	600	280
1,2,3,4,7,8,9-Hexachlorodibenzofuran-2-o-dioxin	0.73	600	280
1,2,3,4,7,8,9-Hexachlorodibenzofuran-p-dioxin	0.34	69	28
1,2,3,6,7,8-Hexachlorodibenzofuran	0.3	69	28
1,2,3,6,7,8-Hexachlorodibenzofuran-2-o-dioxin	0.95	69	130
1,2,3,7,8,9-Hexachlorodibenzofuran	0.43	69	28
1,2,3,7,8,9-Hexachlorodibenzofuran-p-dioxin	1.1	69	28
1,2,3,7,8,9-Hexachlorodibenzofuran-2-o-dioxin	0.59	2300	2800
1,2,3,7,8,9-Hexachlorodibenzofuran-2,3,7,8-tetrachlorodibenzofuran	0.18	6.9	2.8
1,2,3,7,8,9-Hexachlorodibenzofuran	0.45	69	28
1,2,3,7,8,9-Pentachlorodibenzofuran	0.64	69	6.2
2,3,4,7,8-TCDD	0.5	6.9	2.8
2,3,4,7,8-Tetrachlorodibenzofuran	1.8	1.8	1.8
Hexachlorodibenzofurans	--	--	--
Hexachlorodibenzofuran-p-dioxins	--	--	--
Hexachlorodibenzofurans	--	--	--
Hexachlorodibenzofuran-p-dioxins	--	--	--
Octachlorodibenzofuran	8.1	23000	27000
Octachlorodibenzofuran-2-o-dioxin	140	23000	37000
Pentachlorodibenzofurans	--	--	--
Pentachlorodibenzofuran-p-dioxins	--	--	--
Tetrachlorodibenzofurans	--	--	--
Tetrachlorodibenzofuran-2-o-dioxin	--	--	--
TCDD (WHO) (WHO 1995)	0.87	6.9	--

Inorganics	Background	Res RBSL	Eco RBSL
Fluoride (mg/kg)	6.7	4600	--
pH	--	--	--

Note: (mg/kg) = milligrams per kilogram
(ng/kg) = nanograms per kilogram
(µg/kg) = micrograms per kilogram
(µg/L) = micrograms per liter

Data Box Information

	1.00	Depth in Feet	
--	------	---------------	--

12.05	Detect with sample concentration shown
0.06	Non-Detect with lab detection limit shown
J	Analyte positively identified; Associated numerical

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

* Multiple Use * Metal Landfill

- | Category | On13 / FCB3 | Depth3 |
|----------|-------------|--------|
| 1 | 1 | 1 |
| 2 | 1 | 1 |
| 3 | 1 | 1 |
| 4 | 1 | 1 |
| 5 | 1 | 1 |
| 6 | 1 | 1 |
| 7 | 1 | 1 |
| 8 | 1 | 1 |
| 9 | 1 | 1 |
| 10 | 1 | 1 |
| 11 | 1 | 1 |
| 12 | 1 | 1 |
| 13 | 1 | 1 |
| 14 | 1 | 1 |
| 15 | 1 | 1 |
| 16 | 1 | 1 |
| 17 | 1 | 1 |
| 18 | 1 | 1 |
| 19 | 1 | 1 |
| 20 | 1 | 1 |
| 21 | 1 | 1 |
| 22 | 1 | 1 |
| 23 | 1 | 1 |
| 24 | 1 | 1 |
| 25 | 1 | 1 |
| 26 | 1 | 1 |
| 27 | 1 | 1 |
| 28 | 1 | 1 |
| 29 | 1 | 1 |
| 30 | 1 | 1 |
| 31 | 1 | 1 |
| 32 | 1 | 1 |
| 33 | 1 | 1 |
| 34 | 1 | 1 |
| 35 | 1 | 1 |
| 36 | 1 | 1 |
| 37 | 1 | 1 |
| 38 | 1 | 1 |
| 39 | 1 | 1 |
| 40 | 1 | 1 |
| 41 | 1 | 1 |
| 42 | 1 | 1 |
| 43 | 1 | 1 |
| 44 | 1 | 1 |
| 45 | 1 | 1 |
| 46 | 1 | 1 |
| 47 | 1 | 1 |
| 48 | 1 | 1 |
| 49 | 1 | 1 |
| 50 | 1 | 1 |
| 51 | 1 | 1 |
| 52 | 1 | 1 |
| 53 | 1 | 1 |
| 54 | 1 | 1 |
| 55 | 1 | 1 |
| 56 | 1 | 1 |
| 57 | 1 | 1 |
| 58 | 1 | 1 |
| 59 | 1 | 1 |
| 60 | 1 | 1 |
| 61 | 1 | 1 |
| 62 | 1 | 1 |
| 63 | 1 | 1 |
| 64 | 1 | 1 |
| 65 | 1 | 1 |
| 66 | 1 | 1 |
| 67 | 1 | 1 |
| 68 | 1 | 1 |
| 69 | 1 | 1 |
| 70 | 1 | 1 |
| 71 | 1 | 1 |
| 72 | 1 | 1 |
| 73 | 1 | 1 |
| 74 | 1 | 1 |
| 75 | 1 | 1 |
| 76 | 1 | 1 |
| 77 | 1 | 1 |
| 78 | 1 | 1 |
| 79 | 1 | 1 |
| 80 | 1 | 1 |
| 81 | 1 | 1 |
| 82 | 1 | 1 |
| 83 | 1 | 1 |
| 84 | 1 | 1 |
| 85 | 1 | 1 |
| 86 | 1 | 1 |
| 87 | 1 | 1 |
| 88 | 1 | 1 |
| 89 | 1 | 1 |
| 90 | 1 | 1 |
| 91 | 1 | 1 |
| 92 | 1 | 1 |
| 93 | 1 | 1 |
| 94 | 1 | 1 |
| 95 | 1 | 1 |
| 96 | 1 | 1 |
| 97 | 1 | 1 |
| 98 | 1 | 1 |
| 99 | 1 | 1 |
| 100 | 1 | 1 |

 Administrative Area Boundary Pine

- Note:** R = Removed Tank

Date: Oct 01, 2007 Document: RFI-Report-Group8_FSDF_Channels_S_E.mxd

_____ Feet 

1 inch equals 60 feet 0 80 160

An aerial photograph showing a coastal area. A red rectangle highlights a specific region in the upper left corner, which appears to be a small inlet or bay. The surrounding area includes land with some buildings and vegetation, and a body of water to the right.

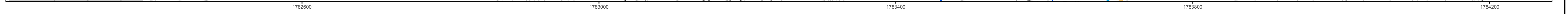
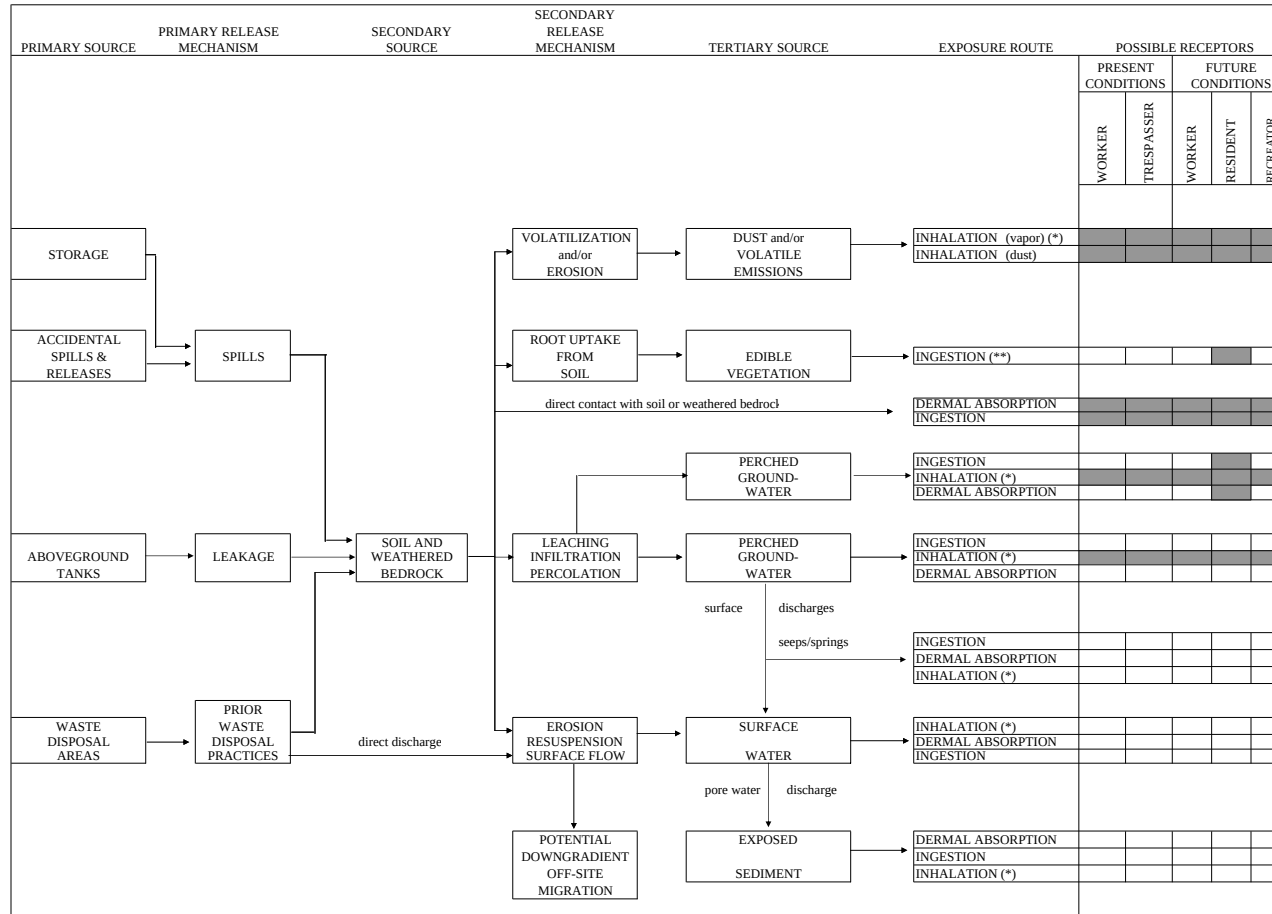


Figure D.4-1

Human Health Risk Assessment Conceptual Site Model
FSDF 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 and worker receptors include both indoor and outdoor air exposure to volatiles; non-residential and non-worker receptors include only outdoor air exposure. For workers, inhalation of volatiles from groundwater beneath the RFI site includes pathways associated with both migration to indoor air and ambient air (domestic groundwater use is an incomplete exposure pathway). For residents, exposures to reporting area Chatsworth formation groundwater includes pathways associated with both migration to indoor air and ambient air, as well as domestic use. Exposure to fugitive dust is limited to non-VOC compounds. For residents, exposures to near surface groundwater includes pathways associated with migration to indoor and outdoor air.

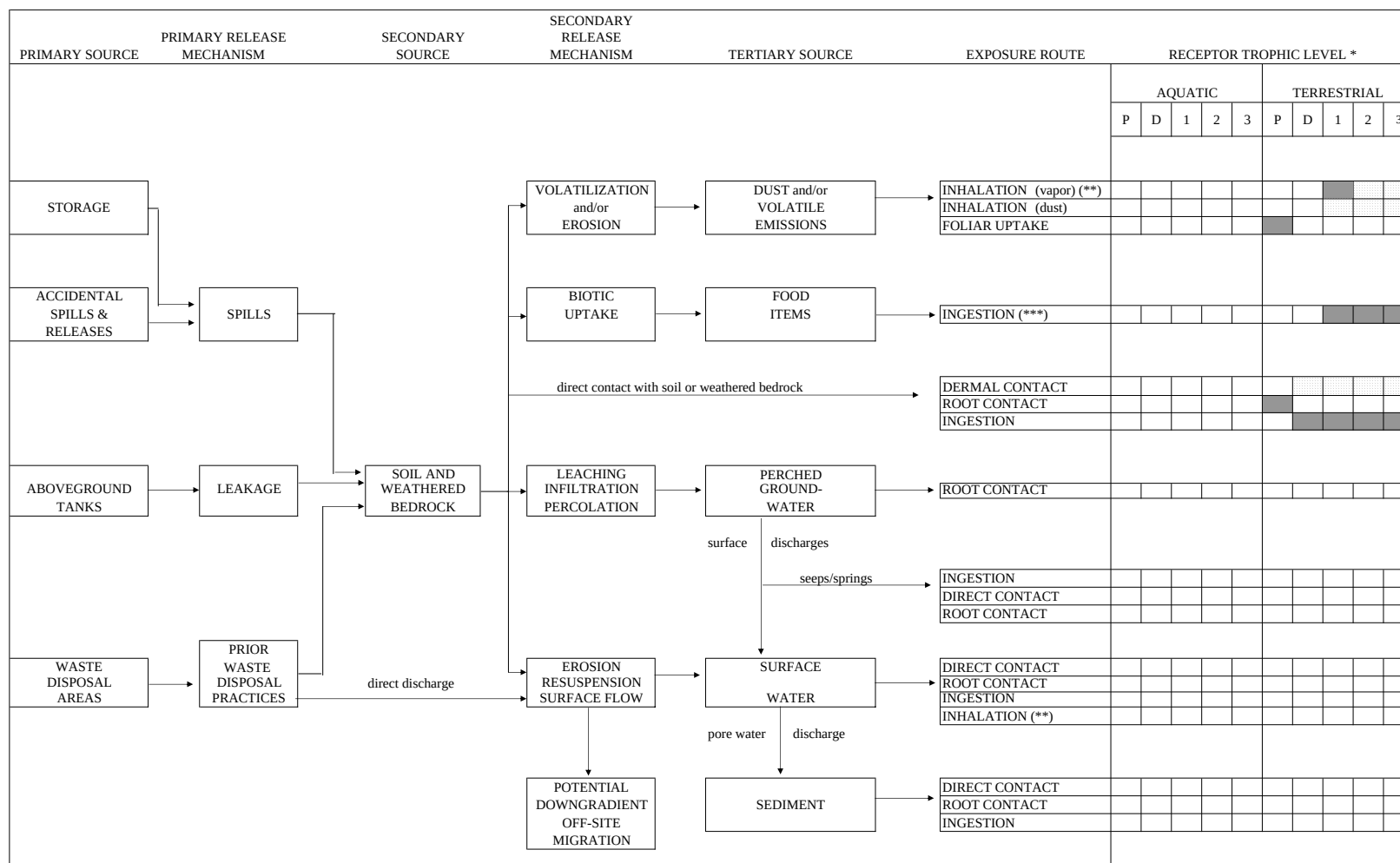
(**) Exposure limited to bioaccumulatable compounds as described in the text.

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

 - incomplete exposure pathways not evaluated in this risk assessment

Figure D.4-2

Ecological Risk Assessment Conceptual Site Model
FSDf RFI Site



NOTES:

(*) Trophic Level: P = primary producers (e.g., plants); D = detritivores (e.g., invertebrates); 1 = 1st consumer (e.g., mule deer); 2 = 2nd consumer (e.g., deer mouse); 3 = 3rd consumer (e.g., red-tailed hawk).

(**) 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

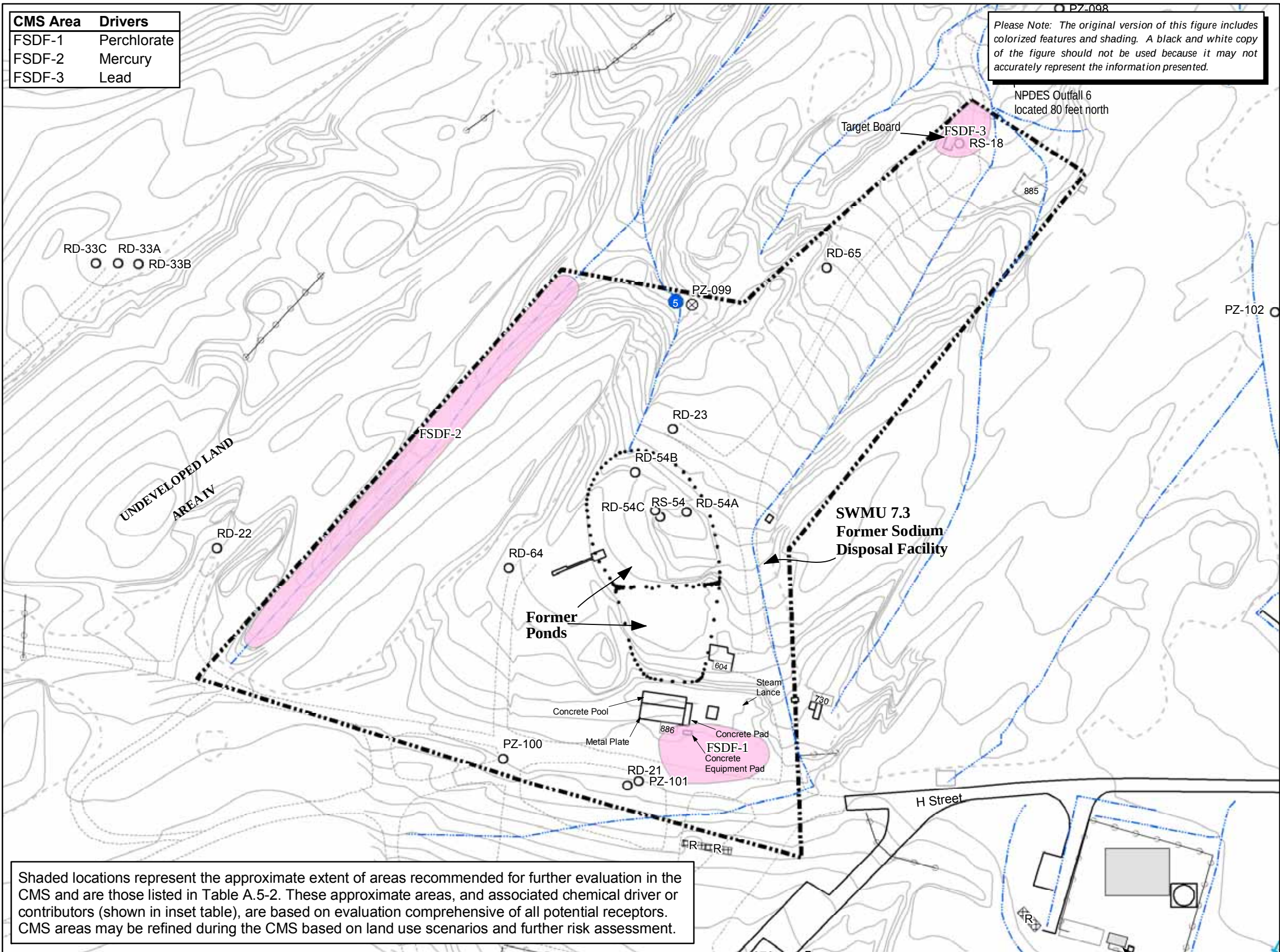


- incomplete exposure pathways not evaluated in this risk assessment



- minor exposure pathway not evaluated in this risk assessment

CMS Area	Drivers
FSD-1	Perchlorate
FSD-2	Mercury
FSD-3	Lead



Base Map Legend

Report Group Boundary

RFI Site Boundary

Existing Building or Structure

Removed Building or Structure

Awning

Other Tanks

Solvent Tank

Petroleum Fuel/Oil Tank

Hydrazine Tank

Dirt Road

A/C Curbing

Fence

Rock Outcrop

Elevation Contour

Surface Water Divide

Drainage

Pond

Possible Pond

Leachfield

Pipe

NPDES Outfall

Well

Abandoned Well

Note: R = Removed Tank

CMS Areas

FSD-1 CMS Area

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

CMS Areas Designations described in Table A.5-2

Surficial Media Site Action Recommendations
Former Sodium Disposal Facility

