GROUP 6 – NORTHEASTERN PORTION OF AREA IV
RCRA FACILITY INVESTIGATION REPORT
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

VOLUME III – RFI SITE REPORTS

APPENDIX A3

SODIUM REACTOR EXPERIMENT (AREA IV AOCs)

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September 2006

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LIST OF ACRONYMS AND ABBREVIATIONS

AEC	Atomic Energy Commission
AOC	Area of Concern
BMP	Best Management Practice
Boeing	The Boeing Company
bgs	below ground surface
B040	Building 040
CFOU	Chatsworth Formation Operable Unit
CMS	Corrective Measures Study
COPC	Contaminant of Potential Concern
CPEC	Contaminant of Potential Environmental Concern
Dioxins/Furans	(a) - *see table below*
DOE	United States Department of Energy
DTSC	Department of Toxic Substances Control
EPC	Exposure Point Concentration
ERA	Ecological risk assessment
ERDA	Energy Research and Development Agency
GWCC	Groundwater Comparison Concentration
HRA	Human health risk assessment
HQ	Hazard Quotient
HI	Hazard Index
HML	Hazardous Materials Laboratory
HSA	Historical Site Assessment
H&A	Haley & Aldrich
ICF	ICF Kaiser Engineers
mCi	millicuries
mg/kg	milligrams per kilogram
MSL	Mean Sea Level
MW	Montgomery Watson
MWH	MWH, Inc
NA	Not Applicable
NCY	New Conservation Yard
ND	Not detected
NFA	No Further Action
ng/kg	nanograms per kilogram
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
NSGW	Near Surface Groundwater
OCY	Old Conservation Yard
Ogden	Ogden Environmental and Energy Services Company, Inc.
OU	Operable Unit
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyls
QA	Quality Assurance
RBSL	Risk Based Screening Level
RCRA	Resource Conservation and Recovery Act

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RME	reasonable maximum exposure
SAIC	Science Applications International Corporation
SAP	Sampling Analysis Plan
Sapere	Sapere Consulting, Inc.
SCE	Southern California Edison
SPA	Storable Propellant Area
SQL	sample quantitation limit
SRAM	Standardized Risk Assessment Methodology Work Plan
SRE	Sodium Reactor Experiment
SSFL	Santa Susana Field Laboratory
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TCE	trichloroethene
TPH	total petroleum hydrocarbons
UCL	upper confidence limit
USEPA	United States Environmental Protection Agency
VCEHD	Ventura County Environmental Health Department
µg/dl	micrograms per deciliter
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
UST	underground storage tank
VOC	volatile organic compound
WPA	work plan addendum

(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
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 Quotients (normalized to 2,3,7,8 TCDD)

SECTION A3.1
INTRODUCTION

This appendix to the Group 6 Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI) Report presents results and recommendations for the investigation conducted at the Sodium Reactor Experiment (SRE) RFI Site (Area IV Areas of Concern [AOCs]) at the Santa Susana Field Laboratory (SSFL). The SRE RFI site is comprised of two AOCs, the SRE complex and the Building 003 Leach Field (SAIC, 1994; MWH, 2004). 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 SRE RFI Site is one of four RFI Sites included in the Group 6 RFI Report area. A RFI Site is an area that includes a Solid Waste Management Unit(s) (SWMU(s)), and or AOC(s) and some adjacent land for the purpose of characterization. The location of SRE RFI Site within the SSFL and Group 6 area is shown on Figure A3.1-1. The other three sites are the New Conservation Yard (NCY – SWMU 7.8), Old Conservation Yard (OCY – SWMU 7.4), and Building 064 Leach field (Area IV AOC). The SRE RFI Site is located near the northern boundary of SSFL Area IV, with undeveloped land located to the north.

The SRE was designed by Atomics International (AI), a division of Rockwell International (Rockwell – a predecessor company of The Boeing Company [Boeing]) as part of a program with the Atomic Energy Commission (AEC) to develop a sodium-cooled, thermal nuclear power reactor for civilian application (Rockwell, 1983). The AEC was a former federal agency which split in 1974 into the Nuclear Regulatory Commission (NRC) and the Energy Research and Development Agency (ERDA). Several years later ERDA was renamed the United States Department of Energy (DOE).

The SSFL RFI was conducted to characterize the presence of SSFL-operation-related chemicals in environmental media, estimate risks to human health and the environment (i.e., the ecosystem), gather data for the next phase of RCRA Corrective Action, the Corrective Measures Study (CMS), and identify areas for additional work. The SRE RFI Site characterization presented in this appendix comprises data for the SSFL Surficial Media Operable Unit (Surficial OU) and Chatsworth Formation Operable Unit (CFOU). The SRE RFI Site characterization presented in this appendix includes investigation data from both Operable Units (OUs) discussed together.

The Surficial OU includes soil, sediment, surface water, air, biota, and near-surface groundwater (NSGW) at the SSFL. NSGW is defined as groundwater occurring within alluvium or weathered bedrock of the Chatsworth formation. Vadose zone bedrock and deeper groundwater that occurs within unweathered Chatsworth formation bedrock is defined as the CFOU. Further details regarding NSGW and CFOU groundwater are presented in Appendix B of this Group 6 RFI Report. A summary of the human health risk assessment (HRA) and ecological risk assessment (ERA) results are presented in Section A3.4 of this appendix. Appendix C presents the details of the risk evaluation of chemicals present in both the Surficial OU and the CFOU. Potential exposures and risks from both OUs are integrated in the HRA and ERA results.

This SRE RFI Site Appendix provides detailed data and evaluation pertaining to the SRE RFI Site, which includes all 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 A3.2 – Site history, chemical use, and existing conditions.
- Section A3.3 – Nature and extent of chemical impacts.
- Section A3.4 – HRA and ERA findings summary.
- Section A3.5 – Corrective Measures Study (CMS) recommendations.
- Section A3.6 – References cited.

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

- Attachment A3-1 – Site-specific regulatory agency documents and correspondence.
- Attachment A3-2 – Subsurface investigation (utility clearance and soil boring and trench logs).
- Attachment A3-3 – Laboratory analytical data, data validation, and data quality reports.

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

- **Figure A3.1-1:** Presents the location of the SRE RFI Site within the SSFL and the Group 6 reporting area.

- **Figure A3.2-1**: Presents a view of the SRE RFI Site, showing known and potential chemical use areas, soil sampling locations, and nearby monitoring wells.
- **Table A3.3-2A and Figures A3.3-1 through A3.3-5**: Present characterization details for all soil sampling at the SRE RFI Site. Soil sampling results are shown on the five maps and correlate with appropriate sections of Table A3.3-2A.
- **Table A3.3-2B:** Presents a summary of groundwater characterization.

Information regarding Group 6 area-wide conditions, transport and fate of chemicals between RFI sites, and other evaluations of area-wide issues are contained in this Group 6 RFI Report, and appendices. Pertinent appendices to this Group 6 RFI Report are:

- **Appendix B:** Presents information regarding groundwater conditions in the Group 6 reporting area, including the SRE 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 C:** Presents risk assessment information including a description of any methodology variances from the Standardized Risk Assessment Methodology (SRAM) Work Plan, risk calculations, result tables, and all transport and fate modeling (except groundwater).
- **Appendix D:** Presents the *Soil Background Report Addendum*. This addendum report provides the results and interpretation of soil and ash samples collected from background sample locations and analyzed for fire-related chemicals after the September 2005 Topanga Fire.

Information presented in this SRE RFI report is also supplemented by background documents that contain information about site and facility background, Surficial OU Program background, and methodologies/procedures. These reports are inclusive of previous documents including the Current Conditions Report (ICF, 1993) and the RCRA Facility Assessment (RFA) Report (SAIC, 1994). Other reports include:

- 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 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.

- Surficial OU SRAM Work Plan, Revision 2 (MWH, 2005b) – This report contains:
  - Procedures for completing HRAs and ERAs.
  - Background soil concentrations and groundwater comparison concentrations.
  - A biological conditions report for the SSFL.

- RFI Work Plan Addendum and Amendments (Ogden, 1996; 2000a and b) – These reports contain:
  - Sampling procedures and rationale.
  - RFI site descriptions and operational history.

- Near-Surface Groundwater Characterization Report (MWH, 2003b) – This report contains:
  - 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.

SECTION A3.2
SITE HISTORY, CHEMICAL USE, AND EXISTING CONDITIONS

The SRE RFI Site is approximately 9 acres and is located in the northeastern portion of Area IV at the SSFL. The site location within the SSFL is shown on Figure A3.1-1. This figure also shows the Group 6 Reporting Area Boundary. Figure A3.2-1 shows the site layout and the relationship between chemical use areas and soil sample locations. The figure also shows the locations of surficial cross sections across the site.

The SRE RFI Site watershed was initially identified as SWMU 7.13 in the RCRA Facility Assessment (RFA) and the Building 003 Leach Field as an Area IV AOC (SAIC, 1994). The SRE "Complex" was later added to the RFI as an Area IV AOC at the request of Boeing in 1998 (DTSC, 1998). Based on site walks, reviews of historical aerial photos and facility maps, and interviews with site personnel conducted during the RFI, the AOC was expanded to the east and north to include the known and potential chemical use areas shown on Figure A3.2-1.

SWMU 7.13, the SRE watershed, was included in the RFA based on radiologic data collected in 1992/1993 (SAIC, 1994). Since the RFI assesses chemical, not radiologic, constituents, SWMU 7.13 is not considered part of the SRE RFI Site. However, this area is included in the overall SRE RFI Site evaluation as described in this report, in consideration of potential transport of chemicals from SRE site operations.

A3.2.1 Site History and Chemical Use

A summary of the site chronology, description of operations, and investigation activities for the SRE RFI Site is presented below. Facility correspondence, demolition and decommissioning reports, investigation reports, waste disposal records, maps, drawings, photographs, and personnel interviews were reviewed and evaluated to compile the site history information presented below as cited in references to this document. Primary sources of information include the RCRA Facility Assessment (RFA) (SAIC, 1994), the Current Conditions Report (ICF, 1993), the RFI Work Plan Addendum (Ogden, 1996), the DOE Historical Site Assessment (Sapere, 2005), the Sodium Reactor Decommissioning Final Report (Rockwell, 1983), the SRE Activity Requirement No. 27 (Rockwell, 1977), and leach field removal records (Boeing, 2001b and 2001d), and interviews with site personnel (Lenox, 2000b; Trippeda, 2006b).

1955 – 1957	Construction of the SRE complex, including the earthen dam for the SRE Pond (Structure 773) began April 1955 and was completed February 1957 (Rockwell, 1983).
1957 – 1964	The SRE operated as a high-temperature, sodium-cooled, graphite moderated nuclear reactor between April 1957 and ceased in February 1964. The main reactor was contained in Building 143. The facility supplied power to a Southern California Edison (SCE) Power Plant east of Building 143. The SRE retention pond down-gradient from Building 143 was used to contain runoff or liquid waste discharge from SRE operations. The earthen retention dam was damaged by storm water flow during winter 1958 and rebuilt, with a 1.5-foot-diameter valved outlet pipe added. A 6-foot-diameter overflow pipe and a sump pump (the sump was located at the confluence of the concrete influent channels) were added in 1959 (Rockwell, 1977) to re-direct water for discharge to surface water ponds inside the SSFL. The water was piped to the Old Conservation Yard area, where it entered a surface drainage that flowed to the Silvernale Reservoir (surface water flow and intrasite relationships are also described in Section 2 of the Group 6 RFI Report).
1959 – 1964	In July 1959, a depletion in coolant flow resulted in overheating and damaging the fuel elements in the reactor core. Mixed fission products were released and contained in the primary sodium system. Recently, it was calculated that 28 curies of Kr-85 and Xe-133 (noble gases) were released to the environment (Sapere, 2005). The reactor in Building 143 was shut down for repair from July 1959 to September 1960. In 1964, liquid waste was released from below ground storage tanks (installed near the edge of the hillside north of Building 143) to the SRE retention pond. It was determined that the water released was contaminated with approximately 58 microcuries (µCi) of irradiated corrosion products, containing cobalt 60 (Rockwell, 1977; Sapere 2005).
1965 – 1967	SRE sodium systems were operated in preparation for the SRE Power Expansion Program from May 1965 until September 1967, at which time the primary sodium system was shut down and the sodium was drained into the primary fill tank (Structure 753, subsurface); the secondary sodium was drained into drums (Rockwell, 1983).
1967 – 1968	A plan for the deactivation of the SRE was approved by the AEC in early 1967, and deactivation activities were completed in 1968 (Rockwell, 1983).
1974 – 1983	Building 143 was decontaminated. Decommissioning planning began in 1974, and demolition of interior features of Buildings 003 and 143 began in 1977 and continued through 1981. A radiological survey of the site identified several areas of residual contamination requiring removal of soil and pond sediment (Rockwell, 1983). Site repair activities and packaging and transport of demolition waste material continued through 1983. Building excavations during decommissioning activities were backfilled with clean soils and concrete rubble removed during the excavation activities, or purchased from an offsite land development project (Rockwell, 1983). There is no record

	whether the pond excavation area was backfilled. During demolition activities at the Former Steam Power Plant, pipe cutting activities released a small amount of mercury to the ground surface and attempts were made to clean it up (Lenox, 2000b). As noted in the decommissioning report, mercury was contained in the annular space of the double-walled piping used in the heat exchanger of the Power Plant (Rockwell, 1983). Also, SRE personnel recollect that solvents were discharged to the ground north of the "box shop" at Building 143, although the specific time frame or amount was not noted (Building 163) (Lenox, 2000b).
1985	The DOE released the SRE facility and surrounding area for unrestricted use (DOE, 1985; Attachment A3-1).
1992 – 1998	Building 163 and the storage yard to the north were used as an accumulation area for 90-day hazardous wastes generated from the SSFL. The hazardous waste accumulation area was located on concrete, in a concrete bermed and covered area. Containers were placed within secondary containment features. No spills were associated or documented during these operations.
1994	The underground storage tank (UST), UT-27, was removed under VCEHD oversight and was approved for closure in 1994 (VCEHD, 1994; Attachment A3-1).
1999	UT-74 was removed under VCEHD oversight and approved for closure in 2001 (VCEHD, 1999, Attachment A3-1).
1999 – 2000	Remaining building structures were removed from site. Some building support structures were left embedded in bedrock east of Building 143 (Venable, 2006). During this period the Building 003 Leach Field and septic tank were removed (Boeing, 2001b). Chemical waste characterization results from this activity indicated elevated concentrations of polychlorinated biphenyls (PCBs) (up to 2,574 µg/kg), and several metal concentrations above background (barium, cadmium, copper, lead, mercury, silver, molybdenum, and zinc). Of these, detected concentrations of silver and mercury were most notable (up to 22.4 mg/kg and 21.5 mg/kg respectively) (Boeing 2001d). Also noteworthy was that hexavalent chromium was detected in the metals extract analysis (STLC, up to 0.58 mg/L). Following demolition activities, site inspection indicated a small area of oil-stained soil area near Building 003.
2001	UT-74 was removed under VCEHD oversight and approved for closure in 2001 (VCEHD, 2001). Also, radiological surveys were completed near the mercury-release area at the Former Steam Power Plant, and along the drainage ditch north and east of Building 143. Low levels of cesium 137 were detected in soil above background but below DOE or DHS release criteria in two small areas along the drainage ditch north and west of Building 143 (Boeing, 2001a). Two small areas were subsequently excavated (approximately 390

	cubic yards of soil were removed). Chemical waste characterization results from this activity indicated concentrations cadmium (up to 6.57 mg/kg), copper (up to 50.4 mg/kg), and zinc (up to 361 mg/kg) were present above background (Boeing, 2001c).

Additional SRE RFI Site information is provided in the following tables:

- Building inventory – Table A3.2-1
- Fuel and solvent storage tank inventory – Table A3.2-2
- Transformer inventory – Table A3.2-3
- Documented chemical use – Table A3.2-4

Chemical use areas at the SRE RFI Site are shown on Figure A3.2-1 and described in detail in Section A3.3. The fourteen chemical use areas at the site include the following (Chemical Use Area numbers):

- The Toluene Process Area and Tetralin Heat Exchanger located north of Building 143 (1).
- The former Sodium Components Cleaning Area located in the southeastern region of the SRE Area (2).
- The former Southern California Edison Steam Power Plant located east of Building 143 (3).
- Three previously removed underground storage tanks (4, 5, and 6).
- The Building 003 Leach Field (7).
- Three transformer areas (8, 9, and 10)
- An area of visible oil staining discovered near the Building 003 excavation (11)
- The lined SRE Pond Influent Channels (12)
- An area near an abandoned industrial dry well (13)
- The SRE Pond (14)

In addition to known areas of chemical use, samples were collected to assess conditions in the drainage downslope from the SRE Pond, the SRE Discharge Pipeline, and the entire area as a potential chemical use area. The SRE Discharge Pipeline begins as an aboveground pipeline in the SRE RFI Site and discharges at the OCY RFI Site, and is evaluated as a part

of the OCY RFI Site investigation. Information on these additional areas is provided in Section A3.3.

A3.2.2 Site Conditions

General Conditions and Topography

The SRE RFI Site is located at the northern extent of Burro Flats within Area IV. This part of the SSFL consists of a broad, generally flat plain with occasional relief associated with rock outcrops. The main, western portion of the SRE RFI Site is a topographically flat, gently northeast-sloping area bordered by steep sandstone outcrops to the northwest and southeast. To the west of this graded area is a steep, northeast-facing slope. Similarly, the southwest portion of the site around former Building 003 is a flat, graded area surrounded by sandstone outcrops that gently slope to the northeast toward SRE Pond. The pond area is a topographic depression in the northeastern portion of the site.

Surface elevations at the SRE RFI Site range from a minimum of 1,815 feet above mean sea level (MSL) at the SRE Pond to a maximum of 1,920 feet MSL at the outcrop along the northern portion of the site. The elevation of the graded, flat portion of the site is approximately 1,845 feet MSL. Two geologic cross-sections, one oriented east-west (SRE Cross Section A-A'), and one oriented north-south (SRE Cross Section B-B') through the middle of the SRE RFI Site are shown on Figures A3.2-2A and A3.2-2B. Cross-section locations can be seen on Figure A3.2-1.

Minor changes in topography have occurred during the course of the RFI fieldwork (1996 to present). The asphalt and concrete surfaces at former Building 040 were removed in 1977; however, no grading activities that would have significantly altered the surface topography have occurred to date. Prior to 2000, surface conditions at SRE included level, paved asphalt areas surrounding the buildings. The SRE RFI Site is currently inactive, vacant, and with the exception of drainage features and the SRE Pond (earthen retention dam, concrete influent channels, sump pumps, and pipeline), all structures associated with the reactor and steam generator operations have been removed. The asphalt surface cover around former Buildings 003 and 143 was removed in 1999 and 2000. Portions of concrete foundations for Building 724 and the cooling towers are still in place. Erosion control measures have been implemented in the area east of Building 143 and along the drainage below the SRE Pond (MWH, 2006).

Geology

The site is situated on the Upper Burro Flats Member of the Chatsworth formation (MWH, 2002). The Upper Chatsworth formation is a series of interbedded sandstone and shale units that generally strike North 70 degrees East and dip 25 degrees Northwest. The Upper Burro Flats Member is comprised of fine to medium-grained sandstone. The "Lot Bed" is a thin shale unit that occurs at the site within the Upper Burro Flats Member west of the former aboveground storage tank earthen berms. Figure 2-5 of the Group 6 RFI Report shows the geologic units represented within the site. The ELV Member occurs between the Upper and Lower Burro Flats Members, and is comprised of thinly interbedded, fine-grained sandstone, siltstone, and shale.

Soils

At the SRE RFI Site, soils consist primarily of the weathered products of Chatsworth formation bedrock, and colluvium with fill soils comprised mostly of silty sand to sandy silt. The SRE Pond contains sediment washed down from the surrounding areas, and consists of sandy silt, silty sand, and organic silt. Based on soil boring logs (Attachment A3-2), thickness of alluvium fill ranges from less than 1-foot to approximately 27 feet (Soil Vapor Probe SRSV11) in the former Southern California Edison complex west of the SRE Pond.

Groundwater

Groundwater occurs at and near the SRE RFI Site in monitoring wells completed within the CFOU. Details of the groundwater system and monitoring network in RFI Group 6 (including the SRE RFI Site) are presented in the Group 6 RFI Report, Appendix B. In that appendix, Figure B-1 shows wells and piezometers that are used to monitor groundwater at and near the SRE RFI Site. The site sits above an elongated regional groundwater high, with groundwater flow away from the site generally to the north and east. The local gradient is steepest north of the site, following the surface topography.

Figure A3.2-1 shows the wells and piezometers that monitor near-surface groundwater (NSGW) at the SRE RFI Site. NSGW occurrence is monitored to the west of the SRE RFI Site by Well RS-25, screened to 13.5 feet below ground surface (bgs). Groundwater occurs in this well at depths ranging from approximately 10 feet bgs to more than 13.5 feet bgs. No other NSGW wells are present at the site.

CFOU groundwater is monitored at the SRE RFI Site by Wells RD-18, RD-85, and RD-86. RD-85 and RD-86 are cased from 0 to 20 feet bgs, and are open borehole from approximately 20 to 90 feet bgs and 20 to 80 feet bgs, respectively. These wells contain groundwater representative of conditions beneath the flat area and downslope towards the SRE Pond and Building 003 Leach Field. Groundwater occurs in these wells at depths ranging from approximately 27 feet bgs to approximately 58.5 feet bgs. Well RD-18 is cased to approximately 30 feet bgs, is an open borehole from approximately 30 to 240 feet bgs, and contains groundwater representative of conditions beneath the eastern portion of the SRE RFI Site near the Former Sodium Components Cleaning Area. Groundwater occurs in this well at depths ranging from approximately 63 feet bgs to approximately 95 feet bgs. Figure B-4 in Appendix B of this Group 6 RFI Report shows CFOU groundwater levels and potentiometric contours.

Seeps and Springs

There are no seeps or springs present at the SRE RFI Site.

Surface Water

Surface water flow at the SRE site is shown on Figure 2-7B of the Group 6 RFI Report. Surface water from the former developed portions of the SRE RFI Site is monitored at National Pollutant Discharge Elimination System (NPDES) Outfall 004. Surface water at the site generally flows from west to east (Figure A3.2-1). Surface water from the flat western area flows to the SRE Pond (Chemical Use Area 14) by: two concrete lined surface channels; a natural unlined swale running along the edge of the sandstone outcrop north of the SRE Complex; and surface sheet flow along the concrete, asphalt, and gravel roadways at the site. A local surface water divide is present at the Sodium Component Cleaning Area (Chemical Use Area 2) in the eastern portion of the site. Surface water flowing from the Sodium Cleaning Pad (Area 723) flows northward as sheet flow and in an unlined drainage into the SRE Pond. Surface water runoff from the area near former Building 724 flows eastward in a natural, unlined swale incised into the sandstone bedrock, bypassing the SRE Pond (Chemical Use Area 14) and draining into the downslope drainage. Surface water flow continues northeastward along this drainage off site to the north, ultimately discharging into Arroyo Simi (see this Group 6 RFI Report, Section 2).

Biology

Biological conditions at the SRE RFI Site, including vegetation types and sensitive species, are shown on Figure 2-12 in the Group 6 RFI Report. Sage scrub is present throughout the

site. The flat portion of the site consists of ruderal habitat surrounded by sage scrub. The southwestern portion of the site (Near Building 003) consists of developed land surrounded by sage scrub. The central portion of the site leading down from the flat area to the SRE Pond is occupied by coast live oak woodland species. The upper-most dry portion of the SRE Pond is occupied by southern willow scrub and mule fat scrub; freshwater marsh plants occupy the lower wetter portion of the pond. Sage scrub chapparal begins at the eastern end of the SRE Pond and continues as the dominant plant species eastward down into the downstream drainage.

During the September/October 2005 Topanga Fire, much of the vegetation at the SRE RFI Site was burned and significant ash deposited, especially in drainages. In areas with limited vegetation (e.g., rock outcrops) effects of the fire were minimal. Areas with more vegetation (e.g., trees and chaparral), including the surface water drainage, were impacted significantly by burning and deposition of ash.

At the time of this report, the plant community at the SRE RFI Site is in a transitional state, where early post-fire plant species are growing. It is expected that the plant community will continue to grow and transition until a more stable plant community is established. This final community may or may not be the same as was present at the time of the fire, due to the aggressiveness of some non-native species, i.e., grasslands.

SECTION A3.3
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 SRE RFI Site. The presentation includes sampling objectives, scope, key decision points related to characterization activities, and findings.

Transport and fate evaluations are discussed in:

- Group 6 RFI Report, Section 5 – Potential migration via surface water flow.
- Group 6 RFI Report, Appendix B, Groundwater – Potential migration from soil to groundwater, groundwater migration.
- Group 6 RFI Report, Appendix C, Risk Assessment – Potential volatile organic compound (VOC) migration from groundwater to soil, soil to indoor air.

A3.3.1 Sampling Objectives

The purpose of collecting soil and sediment samples was to characterize the extent of potential chemical impacts at the SRE RFI Site. The process of selecting sampling locations, depths, and analytical methods considered the following objectives:

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

To achieve these objectives, soil sampling was conducted as described in the RFI Work Plan Addendum (Ogden, 1996), or as directed by DTSC during the RFI field program. Additional sampling was also performed to achieve the objectives outlined above, considering:

- 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 below). Based on detected RFI Site chemicals, chemical distribution, and site conditions, additional groundwater sampling and analysis was also conducted to complete characterization of individual RFI Sites and provide data sufficient for risk assessment. Groundwater sampling was conducted as described in the Sampling Analysis Plans (GRC, 1995a and b) and the *Shallow Zone Groundwater Investigation Work Plan* (Ogden, 2000b).

A3.3.2 Scope

A total of 160 soil matrix samples were collected between May 1990 and May 2006 to assess potential impact associated with the chemical use areas at the SRE RFI Site. Sampling locations and analytical suites were based on DTSC-approved work plans (ICF, 1993; Ogden 1996), sampling results from previous investigations, additional facility information from site inspections, personnel interviews (Lenox 2000b; Trippeda 2006b; Venable 2006), waste disposal characterization data (Boeing 2001c and d), historical and/or aerial photographs, and DTSC site inspections and requests. Sampling schedules are presented in Tables A3.3-1A through A3.3-1D.

CFOU groundwater has been sampled and analyzed at the SRE RFI Site according to agency-approved work plans (GRC 1995a and b; Ogden, 2000b; H&A, 2004). Three monitoring wells were used to characterize groundwater specifically at the SRE RFI Site (RD-18, RD-85, and RD-86). As described in the risk assessment, groundwater-monitoring

data from the entire Group 6 area is used to characterize some potential exposure routes to human receptors. Groundwater characterization data for the SRE RFI Site are presented with the entire Group 6 groundwater dataset in Appendix B of this Group 6 RFI Report.

Based on quality assurance (QA) review conducted on soil, soil vapor, sediment, and piezometer sampling results, data have been deemed usable and meet RFI program requirements as defined by DTSC-approved Quality Assurance Project Plans. 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. Overall data quality is described in the RFI Program Report (MWH, 2004). Site-specific data quality summaries for the NCY RFI site are described by media in the sections below.

As an ongoing, additional QA measure, DTSC Hazardous Materials Laboratory (HML) is performing an independent data validation of 5 to 10 percent of the surficial media analyses performed for the RFI. This regulatory review includes evaluation of original electronic instrument raw data. To date, the HML review has found that the data collected for the RFI meet the project requirements (MWH, 2004).

Other sampled environmental matrices, i.e. routine groundwater and/or surface water, as appropriate, have their own QA data reviews. These data are generally considered useable for the RFI if they meet their respective program requirements, although there are additional evaluations performed to assess historical trends and select representative data for use in the RFI.

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

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

A3.3.3 Key Decision Points

DTSC has been an integral part of the decision-making process during the SSFL RFI program. The SRE RFI Site was added to the RFI program in 1998, as requested by Boeing and approved by DTSC (DTSC, 1998, Attachment A3-1). All SRE RFI Site chemical use areas and potential chemical use areas were evaluated for sampling by DTSC in site visits throughout the RFI process. DTSC also provided ongoing review during the SSFL RFI field sampling, selected additional step-out sample locations, reviewed field sampling protocols, and collected split samples.

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) The Tetralin Heat Exchanger was targeted for VOC and polychlorinated biphenyl (PCB) sampling, because tetralin and toluene were used as coolants. In addition, PCBs may have been present.

3) The Sodium Component Cleaning Area was targeted to assess potential metals and potential hydrocarbons associated with the Hot Oil Bath and Steam Cleaning operations at the site.

4) A sample was re-collected adjacent to the Sodium Component Cleaning Area Steam Pad and analyzed for silver to address a high bias as discussed in the RFI Program Report (MWH, 2004). NOTE: Silver analyzed by Ceimic Laboratories between June and December 2000 was biased high due to instrumentation issues. Data were qualified as estimated and are considered to have been reported at concentrations above true values.

5) The former Steam Power Plant and the drainage leading to the SRE Pond were targeted for mercury sampling after facility information indicated that mercury had been spilled during power plant demolition activities (Lenox, 2000b).

6) Facility construction in bedrock and demolition activities used explosives at the site (SRE Video, DOE Public Meeting, September 2004). Energetic chemicals were not targeted for RFI sampling because explosives for this type of activity are typically used in small quantities and are consumed during detonation.

7) Soil matrix samples were not collected at the former sites of underground storage tanks during the RFI, because samples were collected under the Ventura County Environmental Health Department (VCEHD) oversight, from beneath the tanks during tank removal activities did not indicate presence of chemicals of concern. The USTs were subsequently screened with soil vapor samples at representative locations to verify that VOCs, if present, were present at lower concentrations than the reporting limits achieved by the previous soil matrix samples.

8) Samples were collected and analyzed for PCBs at each of the Transformer Areas to assess potential PCB impacts.

9) The oil stain area at Building 003 was added for sampling after it was discovered during a post Building 003 demolition site walk. Samples were analyzed for constituents potentially associated with petroleum hydrocarbons.

10) The SRE Pond influent channels were investigated to characterize potential up slope sources for chemicals of concern present in the SRE Pond.

11) The former Industrial Dry Well was targeted for soil vapor VOC sampling after its location was identified following review of site reports (Rockwell, 1977; GRC, 1992). Additional soil sampling in this area was not included because the well likely had been constructed in bedrock.

12) Extensive sampling within the SRE Pond has been conducted to characterize and assess the area. When the need for further CMS evaluation became evident based on these data, further RFI characterization sampling was not conducted unless deemed necessary for transport and fate analysis.

13) Samples were collected and analyzed from the drainage down slope from the SRE Pond to assess extent of chemicals of concern detected in the pond that may have migrated downstream.

14) The SRE discharge pipeline was inspected during the RFI by DTSC and additional sampling not requested since a) the pipeline appeared to be in good condition, and b) samples were collected at the discharge point at the OCY site.

15) Samples were collected and analyzed for dioxins, TPH, and PCBs in areas where historical samples were not analyzed for these constituents to address data needs identified during review of sampling results.

16) Samples were collected in locations of historical non-detects, because historical analytical detection limits were greater than current background concentrations or Risk Based Screening Levels (RBSLs). The recollected samples were analyzed to detection limits less than or equal to current background concentrations or RBSLs.

17) Building 003 Leach Field sampling was conducted targeting standard RFI analytical suites (MWH, 2004), and additional dioxin sampling was based on detected PAHs in those results to assess if site operations produced dioxins. Waste characterization

data for the leach field/septic tank removal were obtained after RFI sampling was completed; any uncertainty regarding potential PCBs concentrations will be addressed in CMS.

18) A drainage ditch near and upstream of the mercury release area (chemical use Area 3c) was the site of sampling and soil removal to address elevated cesium 137. Waste characterization data from the two excavations showed elevated concentrations (compared to background) of copper cadmium, lead and zinc. Since this drainage is contiguous with the mercury release area, it has been included in this CMS area (3-1), so that uncertainty associated with these results can be addressed in the CMS characterization.

A3.3.4 Soil Matrix and Soil Vapor Findings

All soil sampling results and characterization findings are presented in Table A3.3-2A. The purpose of the table is to:

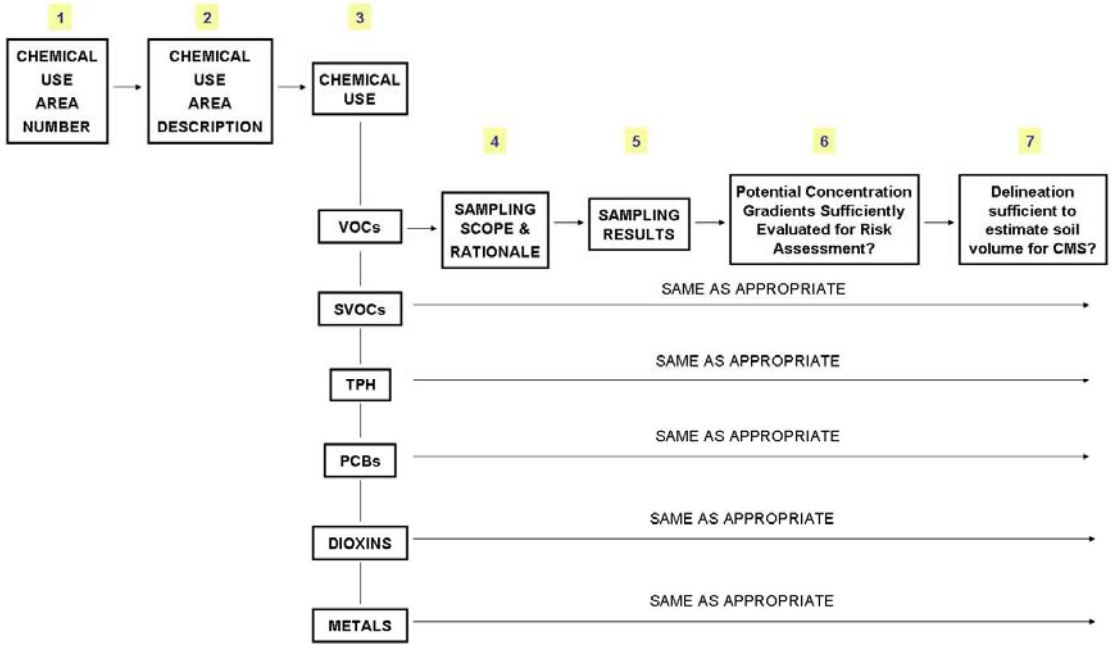
1. Present sampling results, including nature and extent.
2. Demonstrate that soil characterization is sufficient for the purposes of risk assessment.
3. Indicate soil volumes requiring further evaluation during the CMS are defined sufficiently to allow comparison of alternatives.

To achieve Goals 1 and 2, risk assessment results and CMS recommendations have been used to evaluate the characterization completeness. Risk assessment results were also used to guide delineation of areas recommended for further consideration in the CMS. This approach is further discussed below.

Data quality summaries for the SRE RFI Site are provided in Tables A3.3-3A through A3.3-3G.

A3.3.4.1 Soil Data Presentation

Relevant site information, sampling rationale, analytical results, and evaluation of results are presented in Table A3.3-2A. A flow chart illustrating the table structure is presented below.



Flow diagram illustrating Table A3.3-2A process

Reference numbers at the top of the illustration correspond to Table A3.3-2A columns and text descriptions provided below. Sampling results have been organized by row for each chemical use area category and chemical group subcategory:

1 Chemical use area map number (Figures A3.2-1, A3.3-1 through A3.3-5).

2 Includes relevant site history, site characteristics, and activities related to chemical use.

3 Chemical group (dioxins, metals, etc.).

4 Sampling rationale and scope for each chemical group.

5 Sampling results provide sample identification numbers and other descriptions that direct the reader's attention to key locations on data maps (Figures A3.3-1 through A3.3-5). Sample results are compared to established SSFL background concentrations (metals and dioxins only) and/or SSFL SRAM-based screening level[i]. These screening levels are also displayed on Figures A3.3-1 through A3.3-5.

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

6 Summary of sampling results and determination if characterization of chemical gradients in each group is sufficient for risk assessment:

- If risk assessment results indicated recommendation for further consideration in the CMS, additional data were generally not collected within a chemical use area unless further definition of CMS volumes was needed (see 7 below).

- If maximum concentrations do not pose risks that require further CMS consideration, then determine if characterization is sufficient to define gradients or to indicate a gradient does not exist.

7 Determination if nature and extent of chemicals is defined sufficiently to estimate soil volumes (within a factor of 10) identified for further consideration in the CMS (if needed).

A3.3.4.2 Soil Data Summary

As detailed in Table A3.3-2A, 14 potential chemical use areas (including the SRE Pond and Influent Channels) were investigated at the SRE RFI Site. Additionally, the flat western and southwestern portions of the site were screened by soil vapor sampling to assess the potential for stored solvents to have impacted these areas. A summary of the chemical use areas and important points for each is provided below.

Chemical Use Area 1 – Toluene Process Unit and Tetralin Heat Exchanger

VOCs and PCBs were analyzed in soils within the former area. One low concentration VOC (1,1,2-trichlorotrifluoroethane) was found in the soil vapor sample. PCBs were not detected.

Chemical Use Area 2 – Former Sodium Components Cleaning Area

The area was screened for TPH, PCBs, and metals. Mercury was detected above background in three samples up to 0.72 milligrams per kilogram (mg/kg), but was delineated by samples that contained mercury at concentrations less than background concentrations both upslope and downslope, and by nearby bedrock outcrops. Neither TPH nor PCBs were detected.

The Steam Cleaning Pad (Area 723) was only screened for metals. An initial sample contained silver above background concentrations; however, a collocated sample was recently collected and silver was not detected.

Chemical Use Area 3 – Former Southern California Edison Steam Power Plant

This area was screened for VOCs, TPHs, PCBs, and metals in the flat area (or the former Steam Plant area). The soil at the former transformer pad within the flat area was screened for PCBs. The only metals analyzed within this area were mercury and hexavalent chromium. Mercury was detected at concentrations greater than background throughout the flat area, downslope, and in the drainage. Hexavalent chromium was not detected. The highest concentrations of mercury (up to 35.5 mg/kg) were detected near the center of the former Steam Power Plant, where a mercury-filled double walled pipe was cut during decommissioning activities and mercury contacted the ground. Concentrations decrease away from the location of the known source, and with depth. One low concentration was found in the soil vapor sample 2.2 micrograms per liter (µg/L) of 1,1,2-trichlorofluoroethane. TPH and PCBs were not detected.

The former cooling tower area was screened for metals, including hexavalent chromium. Aluminum and boron were detected just slightly above background, while all other metals were less than background concentrations. Hexavalent chromium was detected up to 0.21 mg/kg in a duplicate sample, but was not detected in the primary sample.

Chemical Use Areas 4, 5, and 6 – USTs UT-27, UT-71, and UT-74

All three UST areas were analyzed for VOCs in soil matrix and/or soil vapor; UT-71 and UT-74 were also analyzed for TPHs; and UT-71 was also analyzed for lead, methyl-tert-butylether, and benzene, toluene, ethylbenzene, and xylenes. All analytes were either not-detected or were detected at concentrations less than RBSLs at all three chemical use areas.

Chemical Use Area 7 – Building 003 Leach Field

The area was screened for VOCs, SVOCs, TPHs, dioxins, and metals. Trenches were dug and collected samples were analyzed for SVOCs, TPH, and metals to assess the extent of the Building 003 Leach Field. SVOC compounds were detected from two locations. Benzo(a)pyrene was detected up to 15,000 micrograms per kilogram (µg/kg). Six metals were detected above background, with the greatest concentrations in the center of the leach field. These concentrations decreased laterally outward. VOCs, TPHs, and dioxins were either not detected, or were detected at concentrations less than their respective RBSLs. PCBs were not analyzed in samples collected from the leach field area.

Chemical Use Areas 8, 9, and 10 – Transformer Area 683 and 693 and the Transformer Area South of Building 003

The three transformer chemical use areas were screened for PCBs. PCBs were not detected in Transformer Area 683. PCBs were detected in Transformer Area 693 (Aroclor 1260) and the Transformer Area South of Building 003 (Aroclor 1254), in both a composite sample and the corresponding individual samples that comprised the composited sample. Lateral step-out samples indicated a decreasing trend away from each transformer area. The shallow depth to bedrock prevented deeper samples from being collected.

Chemical Use Area 11 – Oil Stain at Building 003

The area was screened for VOCs, TPH, and PCBs at the surface stain and adjacent to the stain at Building 003. Four VOCs were detected in soil vapor and soil matrix samples: 1,1,2-trichlorotrifluoroethane, 1-chlorohexane, 2-hexanone, and methylene chloride. TPH and PCBs were detected at concentrations less than their respective RBSLs.

Chemical Use Area 12 – SRE Pond Influent Channels

The area was screened for VOCs, SVOCs, TPH, and metals in surface sediment in the lined channels and in adjacent soils. The analytes were either not detected or were detected at concentrations less than their respective RBSLs.

Chemical Use Area 13 – Former Industrial Dry Well

The area was screened for VOCs and none were detected.

Chemical Use Area 14 – SRE Pond

The area was screened for VOCs, SVOCs, TPH, PCBs, dioxins, and metals in sediment samples from the pond. The dioxin Toxic Equivalency Quotients (TEQ) and the other dioxin congeners were detected above background concentrations. A list of the different dioxin congeners are provided in the acronym list. Ten metals (cadmium, copper, lead, mercury, zinc, barium, beryllium, chromium, silver, and vanadium) were detected above background concentrations throughout the SRE Pond. VOCs, SVOCs, TPH, and PCBs were either not detected, or were detected at a few locations at concentrations less than their respective RBSLs.

Sediment samples in the natural unlined drainage down slope from the SRE Pond were screened for VOCs, SVOCs, TPH, PCBs, dioxins, and metals. Dioxin TEQs were greater than background concentrations and RBSLs in both samples taken. Other dioxin congeners

were detected above background similarly to the dioxin TEQ. VOCs, SVOCs, TPH, PCBs, and metals were either not detected, detected below background or RBSLs, and/or detected at limited locations.

The potential contribution of the Topanga Fire to dioxins and metals concentrations in soil have been considered for the characterization of the nature and extent of chemical impacts at the SRE RFI Site. For SRE, 21 post-fire soil samples were analyzed for metals and five samples were analyzed for dioxins. No post-fire samples were identified as affecting CMS recommendations. However, dioxin sample SRBS65 was collected upstream of the pond and had dioxin TEQs consistent with post fire soil and ash samples. The results from this sample should be considered further in the CMS.

A3.3.5 Groundwater Findings

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

A3.3.5.1 Groundwater Data Presentation

Groundwater sampling results and characterization findings are summarized in Table A3.3-2B. The purpose of the table is to:

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

Similar to Table A3.3-2A, Table A3.3-2B describes groundwater data by chemical group (metals, VOCs, SVOCs, etc.). Table A3.3-2B is organized as follows:

- Column 1 – Analytical Group

- Column 2 – Site Soil Impacts
- Column 3 – Samples Collected and Analytes Monitored
- Column 4 – Constituents Detected in Groundwater Above Comparison Criteria
- Column 5 – Groundwater Concentrations Site-related
- Column 6 – Groundwater Characterized Sufficiently for Risk Assessment

A detailed compilation of groundwater data is provided in Appendix B of this Group 6 RFI Report. The Groundwater Appendix contains a description of hydrogeologic conditions (occurrence, water levels, recharge, yield, etc.), groundwater quality, and transport and fate. These data include:

- Laboratory analytical results
- Hydrographs
- Time-series plots
- 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 B.

A3.3.5.2 Groundwater Data Summary

A total of four metals (cobalt, copper, selenium, and thallium) were detected above Groundwater Comparison Concentrations (GWCCs) in samples collected from SRE RFI Site monitoring wells and piezometers. Two of these (copper and thallium) are considered potentially site related (Appendix B of this Group 6 RFI Report). Cobalt and selenium concentrations were only slightly above GWCCs. Copper and thallium were three to four times greater than GWCCs, and were detected up to four times background in soil matrix samples collected from the Building 003 Leach Field and the SRE Pond, which both serve as local groundwater recharge areas.

SVOCs were not detected in groundwater.

VOCs were detected in groundwater, including TCE (up to 10µg/L), 1,2-dichloroethane (up to 0.9 µg/L), and cis-1,2-dichloroethene (up to 51 µg/L). TCE and 1,2-dichloroethene were detected in historical soil matrix samples collected at the SRE Pond, which serves as a local groundwater recharge area.

PCBs were not analyzed in samples collected from the SRE RFI Site wells. Due to limited potential of migration from soil to groundwater due to the large size of the chemical compounds and their limited moblility, PCBs were analyzed in one well and one piezometer adjacent to the highest PCB concentrations detected in Group 6 soils (RD-14 and PZ-114 at the OCY RFI Site). PCBs were not detected in either groundwater sample (see Appendix B).

Dioxins were not analyzed in samples collected from the SRE RFI Site wells. Due to limited potential of migration from soil to groundwater due to the large size of the chemical compounds and their limited moblility, dioxins were analyzed in one well and one piezometer adjacent to dioxin detects in Group 6 Soils (RD-14 and PZ-056 – see Appendix B). Dioxins were not detected in RD-14, but were detected in a sample collected from PZ-056. These detected concentrations in NSGW are considered related to naturally occurring dioxins in the underlying shales, and are likely related to particulate material in the sample as described further in Table A3.3-2B, and Appendix B.

A3.3.6 Surface Water Findings

Storm water runoff from the upper portion of the SRE RFI Site is monitored at the upper end of the SRE Pond at NPDES Outfall 004. NPDES monitoring at this outfall has been conducted since 1992. The presence of storm water at Outfall 004 varies depending on the duration, frequency, and intensity of storms. Surface water flow is generally present for short periods of time immediately following rain events during the winter months. Analytical suites for the samples are those identified in the NPDES permit; and have varied over time. In addition, one surface water sample was collected (BB19003W) in 1992 in the drainage north of the site as part of an off site sampling study (McLaren/Hart, 1993). This sample was analyzed for metals, VOCs, and SVOCs. These analytes were not detected.

A review of surface water sample results collected through 2005 from NPDES monitoring location Outfall 004 indicates four different analytes have exceeded NPDES permit limits. These analytes are: dioxins, copper, mercury, and pH (Boeing, 2005; Boeing 2006a, b and c). For the NPDES program, dioxins are reported as TCDD TEQ; this term refers to the total

equivalence of the seventeen 2,3,7,8 substituted dioxin and furan congeners (Boeing, 2006c). It is calculated in the same manner as the soil TEQs reported for the RFI.

Dioxin TEQ concentrations exceeded the permit limit a total of 10 times, one time pre-Topanga Fire and nine times post-Topanga Fire. The first time that the dioxins exceeded the NPDES permit limit was in October 2004, following the Piru Fire in 2003 that approached the northern portion of the SSFL and resulted in significant ash deposition in the northern portion of the site. After this exceedance, dioxins were less than the permit limit in surface water samples collected during storm events during October 2004 through April 2005. A total of 11 samples were collected during this period, all with results less than the permit limit. However, after the Topanga Fire in September 2005, dioxin results in surface water at Outfall 004 increased and exceeded permit limits. From October 2005 to May 2006, dioxin concentrations exceeded permit limits nine times. Concentrations generally decreased during this period, but still varied considerably over four orders of magnitude during the first storm season after the Topanga Fire (2005/2006) (Boeing, 2006b).

Copper concentrations exceeded the NPDES permit limit once in October 2004. Since this single exceedance, 23 surface water samples (from October 2004 to May 2006) have not contained copper at concentrations that exceeded permit limits. Thus, because of the isolated nature of this occurrence, this single copper exceedance does not appear to be the result of site operations.

Prior to 2001, surface water samples collected at Outfall 004 contained mercury. Because of this, the soil investigation was expanded and the mercury soil source identified (Figure A3.3-5). The area was covered with a tarp in the summer of 2001. Following tarping, only two surface water samples at Outfall 004 have slightly exceeded the NPDES permit limit for mercury. However, one of these samples were taken after the Topanga Fire, in which the tarp was damaged, exposing the area to potential fire impacts.

In April 2003, the pH measured in Outfall 004 surface water was less than the permit limit range. The pH has been within the permit-limit range since this occurrence.

As described in NPDES discharge monitoring reports submitted to the Regional Water Quality Control Board (RWQCB) and DTSC, metals and dioxins are naturally-occurring constituents in storm water runoff. Detections usually result from these constituents being contained within or sorbed to soil particles (Flow Science, 2006). Elevated concentrations of

dioxins present in NPDES surface water samples at this outfall location are considered to be related to the contribution of ash from fires that occurred within or nearby to the SRE site. Soil dioxin sample data from upstream of the NPDES monitoring location, collected beneath visible ash from the Topanga Fire, was at or below background levels (Figure A3.3-3), and there are no historical operations at SRE that would have generated dioxins. Post fire soil and ash data collected from undeveloped burn areas are provided for comparison in Appendix D of the Group 6 RFI Report.

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SECTION A3.4

RISK ASSESSMENT FINDINGS SUMMARY

The following sections summarize the findings of the HRA and ERA performed for the SRE RFI Site within the Group 6 RFI Report area. Details regarding how the HRA and ERA were conducted are presented in the SRAM (MWH, 2005) and in Appendix C of this Group 6 RFI Report.

A3.4.1 Key Decision Points

Site-specific key decision points for the HRA and ERA are listed below and described in Appendix C. These are decisions 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:

1) Due to low yield (less than 200 gallons/day), the SRE RFI Site NSGW was not considered for domestic use. CFOU groundwater was considered for domestic use.

2) Exposure Point Concentration (EPC) calculations were based on collected characterization data, as follows:

   - All groundwater EPCs were based on maximum levels detected at the SRE RFI Site (for indirect pathway) or detected within the Group 6 area (direct pathway).

   - A review of time series plots for chemical constituents, groundwater gradients, and source areas indicates maximum concentrations detected during the last consecutive 3 years conservatively represent potential future conditions for the purpose of estimating future risks.

   - Soil EPCs were based on maximum concentrations (either detected 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 SRE RFI Site. Risks for these receptors using home range adjusted exposures were calculated for the purpose of comparing to the RFI Site only risks. Large home range receptor cumulative risk across SSFL will be presented later in a Site-Wide Summary Large Home Range Receptor Risk Assessment Report.

A3.4.2 Human Heath 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 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 A3.4-1
- Human Health Risk Estimates – Tables A3.4-2A and A3.4-2B
- Human Health Risk Assessment Uncertainty Analysis – Table A3.4-3
- Generalized Conceptual Site Model of HRA Exposures – Figure A3.4-1

A summary of the HRA findings is presented below. For comparison purposes, estimated potential human health risks are generally considered acceptable for non-cancer Hazard Index (HI) values less than 1 and cancer risks between 10^{-4} and 10^{-6} (USEPA, 1993). Also, blood lead concentrations less than 10 micrograms per deciliter (µg/dl) are generally considered to be acceptable for making remedial decisions (DTSC, 1992). These criteria were used to make evaluation recommendations for the CMS.

<u>Exposure to Surficial Media Plus Indirect Groundwater Exposure</u>

The Reasonable Maxiumum 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, and included:

- Estimated cancer risks for all receptors ranged up to 4×10^{-4}; HIs ranged up to 1.3 (child resident). The chemicals contributing to these potential risks were PAHs, PCBs, methylene chloride, and dioxins in soil.

- Estimated blood lead levels associated with soil exposures were less than 10 µg/dl for all receptors. Estimated blood lead levels for the child resident ranged up to 4.3 µg/dl.

<u>Exposure through Direct Groundwater Use as Drinking Water</u>

The risks presented in this section were based on direct use of Chatsworth formation groundwater as a drinking water source, and included:

- Estimated cancer risks for all receptors ranged up to 3 x 10^{-6}; HIs ranged up to 8.2 (child resident). The chemical contributing to these potential risks was TCE in groundwater.

Total Exposure From All Potential Exposures

The RME risks presented in this section were based on both exposure to all relevant surficial media plus both indirect and direct exposures to chemicals in groundwater, and included:

- Estimated cancer risks for all receptors ranged up to 4 x 10^{-4}; HIs ranged up to 10 (child resident). The chemicals contributing to these potential risks were PAHs, PCBs, methylene chloride, and dioxins in soil, and TCE in groundwater.

The major issues related to uncertainty and conservatism in these risk estimates are presented in Table A3.4-3.

A3.4.3 Ecological Risk Assessment Findings

The ecological receptors representing the site are the deer mouse, the thrush, the hawk, the bobcat, the mule deer, the heron, and a generic aquatic receptor. Supporting information for the ERA is presented in the following tables and figure:

- Chemicals of Potential Ecological Concern (CPEC) – Table A3.4-4
- Risk Estimates for Ecological Receptors – Table A3.4-5
- Ecological Risk Assessment Uncertainty Analysis – Table A3.4-6
- Graphical ERS conceptual site model – Figure A3.4-2

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

- Estimated HIs for all receptors ranged from 7.3 to 654 at the SRE RFI Site. The thrush and hawk have estimated HIs in excess of 100 while the deer mouse, bobcat, and mule deer are below 100. The aquatic receptors have estimated HIs ranging up to 212 for the great blue heron. HIs are primarily associated with:

  - Metals (cadmium, copper, lead, mercury, and zinc), Aroclor-1260, dioxins, methylene chloride, and phenanthrene for the terrestrial ecological receptors.

  - Metals (aluminum, antimony, lead, cadmium, zinc, beryllium, and silver) and SVOCs for the aquatic ecological receptors.

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

- The major items related to uncertainty and conservatism in these risk estimates are presented in Table A3.4-6.

SECTION A3.5
SITE ACTION RECOMMENDATIONS

This section presents a summary of RFI reporting requirements as they apply to the SRE RFI Site. Section A3.5.1 describes RFI reporting requirements, particularly identification of areas for further work, or 'site action' recommendations. The process and criteria used for making site action recommendations is described in Section A3.5.2, and site action recommendations for the SRE RFI Site are summarized in Section A3.7.3.

A3.5.1 RFI REPORTING REQUIREMENTS

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

The SRE 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 A3.3-2A and A3.3-2B). Section A3.3 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 B of the Group 6 RFI Site report, and other potential transport pathways in Appendix C of the Group 6 RFI Site report.
3. Identifying potential receptors and estimating potential risks at the SRE RFI site (Section A3.5 and Appendix C).
4. Identifying SRE RFI Site areas requiring further work (this Section)

A3.5.2 BASIS FOR SITE ACTION RECOMMENDATIONS

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

- further evaluation in the CMS (CMS Areas),
- no further action (NFA),
- interim corrective measures to stabilize source areas and control contaminant migration (Stabilization Areas).

Site action recommendations are based on the characterization and risk assessment findings. 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 and estimates human health and ecological risks based on specified land use scenarios, and identifies chemicals that drive or contribute to those risks.

The three site action recommendations listed above result from two evaluations described below. CMS or NFA Area recommendations are based on an integrated evaluation of characterization and risk assessment results. 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 in detail in Section 7.1 of the Group 6 RFI Report.

- The first step in making site action recommendations, 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) is used to conservatively estimate the areal extent that is recommended for site action.

- The second step, when estimated RFI site risks are greater than 1×10^{-6} (cancer risks) or HI values greater than 1 (noncancer and ecological risks), each RFI site's risks are reviewed on a chemical-by-chemical basis to identify risk-drivers and significant risk

contributors to cumulative, total risk for each receptor (residential, industrial, recreational, and ecological).

- The third step is an evaluation of characterization findings from the entire RFI site to spatially identify areas where higher concentrations of risk drivers and contributors are detected. The identified areas are termed in this report 'CMS Areas' and represent locations recommended for further evaluation during the CMS. Areas recommended for further evaluation during the CMS are comprehensive of all potential receptors or land use scenarios.

- The fourth step identifies any uncertainties in SRE RFI Site characterization and risk assessments that affect findings. For example, some chemicals are assumed to be present in soil based on TPH extrapolation factors (e.g., benzene and PAHs) and contribute to total risk for the RFI site above acceptable levels. Since this assumption is often highly conservative, its use as a basis for CMS recommendations may be further evaluated in the CMS.

Site action recommendations are tabulated by chemical use area and chemical risk drivers/contributors are identified for each potential receptor in Table A3.5-1. CMS Areas are also depicted graphically in Figure A3.5-1 to illustrate location and approximate areal extent.

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 is evaluated 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:

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

Each criterion is considered important, and a weight-of-evidence evaluation is used to make a recommendation for source area stabilization measures. Source area stabilization measures to prevent migration to surface water use best management practices (BMPs) such as installation of straw bales, fiber rolls, silt fencing, or covering areas with plastic tarp. 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, 2006).

A3.5.3 RECOMMENDATIONS FOR SRE RFI SITE

SRE RFI Site action recommendations are listed in Table A3.5-1 and presented on Figure A3.5-1. Table A3.5-1 lists CMS or NFA recommendations and includes identification of chemical risk drivers and contributors for each exposure scenario. Source area stabilization recommendations are also identified for some CMS Areas as noted. CMS Areas shown on Figure A3.5-1 are approximate and represent evaluations inclusive of all potential receptors. As noted above, recommendations reported in this document will be reviewed upon completion of the site-wide groundwater report and large-home range receptor evaluations, and updates to this report prepared as needed.

SRE RFI Site areas recommended for further evaluation in the CMS and for surficial soil source stabilization measures are summarized below.

Seven CMS Areas, including transformer areas (PCBs), a metals release area near the Steam Power Plant (mercury), the Building 003 Leach Field (PAHs, metals), and oil stain area (methylene chloride, PAHs), and the SRE Pond and down-drainage areas (methylene chloride, PAHs, PCBs, dioxins, metals).

Two Stabilization Areas, including the metals release area near the Steam Power Plant (mercury), and down-drainage from the SRE Pond (PAHs, dioxins, metals). Source stabilization measures are currently present at each of these areas (MWH, 2006).

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TABLES

Table A3.2-1

Building Inventory at the SRE RFI Site

Building	Current Use	Former Use	Status	DTSC Site Visit Date
Building 003	None	Engineering Test Building	Removed – 1999	1997, 1999
Building 014*	None	Sodium Storage Building	Removed 2003	1997, 1999
Building 033*	None	Skid Shack associated with Building 053	Removed 1970s	Removed prior to site visit
Building 041	None	SRE Equipment Storage	Removed – 1998	Building Removed Prior to Inspection
Building 043*	None	Skid Shack associated with Building 053	Removed 1970s	Removed prior to site visit
Building 053*	None	Fire Department Service Building	Removed 1970s	Removed prior to site visit
Building 063*	None	Electronics Shop, Maintenance Service Building	Removed – 1970s	Building Removed Prior to Inspection
Building 143	None	SRE Reactor Building ETEC Component Storage	Removed – 1999	1997, 1999
Building 153	None	Sodium Service Building	Removed – 1970s	Building Removed Prior to Inspection
Building 163	None	Packaging Shop, Accumulation area for 90-day hazardous wastes	Removed – 1999	1997, 1999
Building 183	None	Fire Pump House	Removed – 1999	Building Removed Prior to Inspection
Building 184	None	SRE Battery Room and Diesel Generator Canopy	Removed – 1970s	Building Removed Prior to Inspection
Building 185	None	Steam Generator Building	Building Removed – 1970s Concrete Pad Removed – 1998	Building Removed Prior to Inspection
Building 273*	None	Protective Clothing Storage Radioactive Laundry	Removed – 1976	Building Removed Prior to Inspection
Building 283*	None	Protective Clothing Storage Radioactive Laundry	Removed – approximately 1976	Building Removed Prior to Inspection
Building 316*	None	Maintenance Skid Shack	Removed – 1976	Building Removed Prior to Inspection
Building 505	None	Storage Area/Shed	Removed – 1980s	Building Removed Prior to Inspection
Structure 653	None	Interim Radioactive Waste Vault	Removed – 1970s	Building Removed Prior to Inspection

Table A3.2-1

Building Inventory at the SRE RFI Site

Building	Current Use	Former Use	Status	DTSC Site Visit Date
Area 684	None	Steam Generator Pad	Removed – 1970s	Pad Removed Prior to Inspection
Building 688	None	Auxiliary Skid Shack	Removed – 1960s	Building Removed Prior to Inspection
Building 689	None	Interim Storage of Contaminated Items	Removed – 1970s	Building Removed Prior to Inspection
Structure 695	None	Cold Trap Vault	Removed – 1970s	Structure Removed Prior to Inspection
Structure 703	None	Cooling Water Tower	Destroyed by Fire - 1978	Structure Destroyed Prior to Inspection
Building 714	None	Research and Development Shop Work Area	Removed – 1970s	Building Removed Prior to Inspection
Area 723	None	Sodium Cleaning Pad	Removed – 1998	Pad Removed Prior to Inspection
Building 724	None	Contaminated Sodium Cleaning Building	Removed – 1998	Building Removed Prior to Inspection
Area 733	None	Sodium Cleaning Pad	Removed – 1980s	Pad Removed Prior to Inspection
Structure 743	None	Tetralin Heat Exchanger	Removed – 1970s	Structure Removed Prior to Inspection
Structure 753	None	Primary Sodium Fill Tank Vault	Removed – 1980s	Structure Removed Prior to Inspection
Building 763*	None	Substation	Removed	Building Removed Prior to Inspection
Area 894	None	Concrete Pad associated with Building 143	Removed – 1999	1997, 1999
Area 895	None	Concrete Pad associated with Building 143	Removed - 1999	1997, 1999

Notes:
* Indicates that the Building/Structure/Area is not found within the SRE RFI Site boundary, but to the southeast of the site.

Sources: ICF 1993, Ogden 1996, GRC 1989, Sapere 2005

Table A3.2-2

Fuel and Solvent Storage Tank Inventory at the SRE RFI Site

Tank Designator[(a)]	Location	Tank Size (gallons)	Contents	Operational Status	Regulatory Status
Aboveground Tanks					
No aboveground tanks were observed at the SRE RFI Site.					
Underground Tanks					
UT-27	Building 143	1,000	Diesel / Fuel Oil	Removed – 1988	Closed[(b)] VCEHD 1994
UT-71	Building 183	1,500	Gasoline	Removed – 1998	Closed [(b)] VCEHD 1999
UT-74	Building 003	1,500	Diesel	Removed - 2001	Closed[(b)] VCEHD 2001

(a) Only fuel and solvent tanks listed on this table; all tanks, including those for inert or non-hazardous materials (e.g., gases, water, alcohol), are shown on site figures.
(b) VCEHD Closure letter provided in Attachment A3-1.
NA = Not Applicable
RWQCB = Regional Water Quality Control Board
VCEHD = Ventura County Environmental Health Division

Table A3.2-3

Transformer Inventory at the SRE RFI Site

Area or Pole Number	Location	Status	Date Oil Sampled for PCBs	PCB Sampling Results[a]	Visual Inspection Findings[b]
Area 825	SW of Building 003	1 Transformer - Removed	November 1983	Unknown	Concrete pad; no visible stains or leaks
Area 693 Substation #1	East of Building 003	6 Transformers - Removed	November 1983	(c)	Removed prior to field inspection
Area 683	East of Building 143	3 Transformers - Removed	November 1983	Not reported/ documented	Concrete pad; no visible stains or leaks
Former SCE transformer area	North of Building 163	1 Transformer - Removed	Not sampled	NA	Removed prior to field inspection

Notes:
(a) Results are for Aroclor 1260 in oils collected from within transformer housing.
(b) Visual inspection conducted by AMEC (June 2000) and MWH (August 2002).
(c) PCBs were detected at 13 ppm in 1 of the 6 transformers from Area 693; which transformer contained PCB oils was not reported.

Acronyms:
NA = not applicable
PCB = polychlorinated biphenyl
RCRA = Resource Conservation and Recovery Act
RFI = RCRA Facility Investigation
SRE = Sodium Reactor Experiment
SW = southwest

Sources: Site field inspections and facility records.

Table A3.2-4

Chemicals Used at the SRE RFI Site

Toluene	Lubricant Oils
Transformer Oils (PCBs)	Gasoline
Diesel	Kerosene
Metallic Sodium	Mercury

Note: A portion of the SRE RFI site was used as a 90-day hazardous waste accumulation area until 1999.

Sources: ICF 1993, Ogden 1996, GRC 1990, Sapere 2005

Table A3.3-1A (Page 1 of 1)

RFI Sampling Summary
SRE RFI Site

Sample Type	Total Number of Samples	Total QC Samples	Total Agency Samples	Total Validated Samples
Soil Vapor Samples (Table 7B)	16	2	0	16
Soil Matrix Samples (Table 7C)	151	11	0	148
Surface Water & NPDES Outfall Samples	25	0	0	24

Notes:
1. Detailed sample and analytical program information is contained in Tables A1.3-1B - A1.3-1D as indicated above.
2. Total samples = total primary site investigation samples, includes historical 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 B.

Table A3.3-1B (Page 1 of 1)

RFI Soil Vapor Sampling and Analytical Summary
SRE RFI Site

Sample Identification	EPA Identification	Date Collected	Depth (feet bgs)	Sample Type	VOC	Validated [a]	Rationale [b]	Consultant [c]	Reference Document [d]
SRSV01S01	RV822	8/4/2000	6.5	Primary Sample	X	yes	DTSC	Ogden/AMEC	This Report
SRSV02S01	RV820	8/4/2000	7	Primary Sample	X	yes	DTSC	Ogden/AMEC	This Report
SRSV02S02	RV819	8/4/2000	12	Primary Sample	X	yes	DTSC	Ogden/AMEC	This Report
SRSV02S04	RV971	12/19/2000	22	Primary Sample	X	yes	DTSC	Ogden/AMEC	This Report
SRSV03S01	RV821	8/4/2000	6	Primary Sample	X	yes	DTSC	Ogden/AMEC	This Report
SRSV04S01	RV823	8/4/2000	4	Primary Sample	X	yes	DTSC	Ogden/AMEC	This Report
SRSV06S01	RV824	8/4/2000	2	Primary Sample	X	yes	DTSC	Ogden/AMEC	This Report
SRSV07S01	RV825	8/4/2000	2.5	Primary Sample	X	yes	DTSC	Ogden/AMEC	This Report
SRSV08S01	MV565	2/27/2006	3	Primary Sample	X	yes	DTSC	MWH	This Report
SRSV09S01	MV566	2/27/2006	4	Primary Sample	X	yes	DTSC	MWH	This Report
SRSV10S01	MV567	2/27/2006	4	Primary Sample	X	yes	DTSC	MWH	This Report
SRSV11D03	MV571	2/27/2006	20	Field Duplicate	X	yes	DTSC	MWH	This Report
SRSV11S01	MV568	2/27/2006	5	Primary Sample	X	yes	DTSC	MWH	This Report
SRSV11S02	MV569	2/27/2006	13	Primary Sample	X	yes	DTSC	MWH	This Report
SRSV11S03	MV570	2/27/2006	20	Primary Sample	X	yes	DTSC	MWH	This Report
SRSV11S04	MV572	2/27/2006	27	Primary Sample	X	yes	DTSC	MWH	This Report
SVLF0031	SVLF0031	8/23/1993	1.5	Primary Sample	X	no	CCR	ICF Kaiser	ICF 1993, Vol. I
SVLF0031R	SVLF0031R	8/23/1993	1.5	Field Duplicate	X	no	CCR	ICF Kaiser	ICF 1993, Vol. I

[a] **Validated** indicates analysis reviewed according to RFI protocols.
[b] **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 com
DGA - Indicates samples taken in 2006 as a part of the Data Gaps Analysis to address delineation with stepout samples, elevated detection limit iss
[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 report and the RFI Program repor

Includes co-located duplicate and split samples - does not include other QC samples (e.g., blanks)
Sample Identification = RFI site and sample identifier code
EPA Identification = Laboratory reporting code
bgs = below ground surface
VOC = Volatile Organic Compound, analyzed using either EPA Method 8260 or 8260B, modified for soil vapor

Table A3.3-1C

RFI Soil Matrix Sampling and Analytical Summary
SRE RFI Site

Sample Identification	EPA Identification	Date Collected	Sample Method	Depth (feet bgs)	Sample Type	pH	PCB	Dioxin	VOC	SVOC	TPH	Metals	Lead	Mercury	Methyl Mercury	Silver	Thallium	Hex Chr	Validated [a]	Rationale [b]	Consultant [c]	Reference Document [d]
BB19001	BB19001	4/23/1992			Primary Sample				X	X		X							no	WP	McLaren/Hart	McLaren Hart, 1993 [e]
BB19002	BB19002	4/23/1992			Primary Sample				X	X		X							no	WP	McLaren/Hart	McLaren Hart, 1993 [e]
BB19002-DUP	BB19002-DUP	4/23/1992			Field Duplicate							X							no	WP	McLaren/Hart	McLaren Hart, 1993 [e]
BB19003	BB19003	4/23/1992			Primary Sample				X	X		X							no	WP	McLaren/Hart	McLaren Hart, 1993 [e]
BB19003-USEPA	BB19003-USEPA	4/23/1992			Sample Split				X	X		X							no	WP	McLaren/Hart	McLaren Hart, 1993 [e]
BB19004	BB19004	4/23/1992			Primary Sample				X	X		X							no	WP	McLaren/Hart	McLaren Hart, 1993 [e]
PS-5 0-.5	PS-5 0-.5	5/16/1990		0.5	Primary Sample				X	X		X							yes	WP	GRC	GRC, 1990 [f]
PS-5 1-1.5	PS-5 1-1.5	5/16/1990		1.5	Primary Sample				X	X		X							yes	WP	GRC	GRC, 1990 [f]
PS-5 2-2.5	PS-5 2-2.5	5/16/1990		2.5	Primary Sample				X	X		X							yes	WP	GRC	GRC, 1990 [f]
PS-6 0-.5	PS-6 0-.5	5/16/1990		0.5	Primary Sample				X	X		X							yes	WP	GRC	GRC, 1990 [f]
PS-6 1-1.5	PS-6 1-1.5	5/16/1990		1.5	Primary Sample				X	X		X							yes	WP	GRC	GRC, 1990 [f]
PS-6 2-2.5	PS-6 2-2.5	5/16/1990		2.5	Primary Sample				X	X		X							yes	WP	GRC	GRC, 1990 [f]
PS-7 0-.5	PS-7 0-.5	5/17/1990		0.5	Primary Sample				X	X		X							yes	WP	GRC	GRC, 1990 [f]
PS-7 1-1.5	PS-7 1-1.5	5/17/1990		1.5	Primary Sample				X	X		X							yes	WP	GRC	GRC, 1990 [f]
PS-7 2-2.5	PS-7 2-2.5	5/17/1990		2.5	Primary Sample				X	X		X							yes	WP	GRC	GRC, 1990 [f]
PS-7 3-3.5	PS-7 3-3.5	5/17/1990		3.5	Primary Sample				X	X		X							yes	WP	GRC	GRC, 1990 [f]
PS-8 0-.5	PS-8 0-.5	5/17/1990		0.5	Primary Sample				X	X	X	X							yes	WP	GRC	GRC, 1990 [f]
PS-8 1-1.5	PS-8 1-1.5	5/17/1990		1.5	Primary Sample				X	X		X							yes	WP	GRC	GRC, 1990 [f]
PS-8 2-2.5	PS-8 2-2.5	5/17/1990		2.5	Primary Sample				X	X		X							yes	WP	GRC	GRC, 1990 [f]
PS-8 3-3.5	PS-8 3-3.5	5/17/1990		3.5	Primary Sample				X	X		X							yes	WP	GRC	GRC, 1990 [f]
SRBS01S01	RD977	12/2/1997	HA	0.5	Primary Sample				X		X								yes	WP	Ogden/AMEC	This report
SRBS01S01	RD977	12/2/1997	HA	0.5	Primary Sample				X		X								yes	WP	Ogden/AMEC	This report
SRBS01S01	RF977	12/2/1997	HA	0.5	Primary Sample	X				X		X							yes	WP	Ogden/AMEC	This report
SRBS02S01	RD979	12/2/1997	HA	0.5	Primary Sample				X		X								yes	WP	Ogden/AMEC	This report
SRBS02S01	RF979	12/2/1997	HA	0.5	Primary Sample	X				X		X							yes	WP	Ogden/AMEC	This report
SRBS02S02	RD980	12/2/1997	HA	4	Primary Sample				X		X								yes	WP	Ogden/AMEC	This report
SRBS02S02	RF980	12/2/1997	HA	4	Primary Sample	X				X		X							yes	WP	Ogden/AMEC	This report
SRBS03S01	RS584	12/17/1997	HA	0.5	Primary Sample	X						X							yes	WP	Ogden/AMEC	This report
SRBS03S01	RS684	1/29/1998	HA	0.5	Primary Sample													X	yes	WP	Ogden/AMEC	This report
SRBS03S02	RS585	12/17/1997	HA	3.5	Primary Sample	X						X							yes	WP	Ogden/AMEC	This report
SRBS04S01	RS654	1/26/1998	HA	1	Primary Sample				X										yes	WP	Ogden/AMEC	This report
SRBS04S02	RS655	1/26/1998	HA	3	Primary Sample				X										yes	WP	Ogden/AMEC	This report
SRBS05S01	RS656	1/26/1998	HA	3	Primary Sample	X						X							yes	WP	Ogden/AMEC	This report
SRBS05S02	RJ548	7/14/2000	HA	0.5	Primary Sample					X									yes	STEP	Ogden/AMEC	This report
SRBS06S01	RS683	1/29/1998	HA	0.5	Primary Sample	X						X							yes	WP	Ogden/AMEC	This report
SRBS07S01	MJ633	2/14/2006	G	0.5	Primary Sample											X			yes	DGA	Ogden/AMEC	This report
SRBS07S01	RJ511	6/30/2000	HA	0.5	Primary Sample	X						X							yes	DTSC	Ogden/AMEC	This report
SRBS07S02	MJ634	2/14/2006	G	3	Primary Sample											X			yes	DGA	Ogden/AMEC	This report
SRBS08S01	RJ512	6/30/2000	HA	0.5	Primary Sample	X						X							yes	STEP	Ogden/AMEC	This report
SRBS09S01	RJ513	6/30/2000	HA	0.5	Primary Sample	X				X	X	X							yes	STEP	Ogden/AMEC	This report
SRBS09S01	RJ518	7/6/2000	HA	0.5	Primary Sample				X										yes	STEP	Ogden/AMEC	This report
SRBS10S01	RJ516	7/5/2000	HA	0.5	Primary Sample	X			X	X	X	X							yes	STEP	Ogden/AMEC	This report
SRBS10S01	RZ516	7/5/2000	HA	0.5	Primary Sample											X			yes	STEP	Ogden/AMEC	This report
SRBS11S01	RJ517	7/5/2000	HA	0.5	Primary Sample	X			X	X	X	X							yes	STEP	Ogden/AMEC	This report
SRBS12S01	RJ048	9/27/2000	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS13D02	RJ424	5/22/2001	HA	3	Field Duplicate									X					yes	STEP	Ogden/AMEC	This report
SRBS13S01	MM002	8/2/2001	HA	0.5	Primary Sample										X				yes	STEP	MWH	This report

RFI Soil Matrix Sampling and Analytical Summary
SRE RFI Site

Sample Identification	EPA Identification	Date Collected	Sample Method	Depth (feet bgs)	Sample Type	pH	PCB	Dioxin	VOC	SVOC	TPH	Metals	Lead	Mercury	Methyl Mercury	Silver	Thallium	Hex Chr	Validated [a]	Rationale [b]	Consultant [c]	Reference Document [d]
SRBS13S01	RJ049	9/28/2000	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS13S02	RJ423	5/22/2001	HA	3	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS14S01	RJ050	9/28/2000	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS15S01	RJ051	9/28/2000	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS16S01	RJ052	9/28/2000	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS17S01	RJ053	9/28/2000	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS18S01	RJ054	9/28/2000	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS19S01	RJ055	9/28/2000	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS20S01	RJ056	9/28/2000	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS21D01	RJ058	9/28/2000	HA	0.5	Field Duplicate									X					yes	STEP	Ogden/AMEC	This report
SRBS21S01	RJ057	9/28/2000	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS21S01	RZ057	9/28/2000	HA	0.5	Sample Split									X					yes	DTSC	Ogden/AMEC	This report
SRBS22S02	RJ842	11/17/2000	GP	8	Primary Sample				X		X								yes	DTSC	Ogden/AMEC	This report
SRBS22S03	RJ843	11/17/2000	GP	13	Primary Sample				X		X								yes	DTSC	Ogden/AMEC	This report
SRBS23S01	RJ786	11/2/2000	HA	1	Primary Sample		X				X								yes	DTSC	Ogden/AMEC	This report
SRBS24S01	RJ148	3/26/2001	B	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS25S01	RJ149	3/26/2001	B	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS26S01	RJ150	3/26/2001	B	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS27S01	RJ151	3/26/2001	B	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS28S01	RJ203	4/6/2001	HA	6	Primary Sample					X		X							yes	DTSC	Ogden/AMEC	This report
SRBS30S01	RJ152	3/26/2001	B	5	Primary Sample	X			X		X	X							yes	DTSC	Ogden/AMEC	This report
SRBS30S02	RJ398	5/16/2001	HA	7.5	Primary Sample	X			X		X	X							yes	STEP	Ogden/AMEC	This report
SRBS31S01	RJ202	4/6/2001	HA	0.5	Primary Sample						X	X							yes	DTSC	Ogden/AMEC	This report
SRBS32S01	RJ223	4/12/2001	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS33S01	RJ225	4/12/2001	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS34S01	RJ226	4/12/2001	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS35S01	RJ227	4/12/2001	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS37S01	RJ414	5/18/2001	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS38S01	MM003	8/2/2001	HA	0.5	Primary Sample									X	X				yes	STEP	MWH	This report
SRBS38S01	RJ415	5/18/2001	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS39S01	RJ416	5/18/2001	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS40S01	MM001	8/2/2001	HA	0.5	Primary Sample									X	X				yes	STEP	MWH	This report
SRBS40S01	RJ417	5/18/2001	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS41S01	RJ418	5/18/2001	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS41S02	RJ422	5/22/2001	HA	3	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS42S01	RJ419	5/18/2001	HA	0.5	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRBS43S01	MJ010	8/2/2001	HA	0.5	Primary Sample									X					yes	STEP	MWH	This report
SRBS44S01	MJ011	8/2/2001	HA	0.5	Primary Sample									X					yes	STEP	MWH	This report
SRBS45S01	MJ015	8/2/2001	HA	0.5	Primary Sample									X					yes	STEP	MWH	This report
SRBS46S01	MJ018	8/2/2001	HA	0.5	Primary Sample									X					yes	STEP	MWH	This report
SRBS47S01	MJ017	8/2/2001	HA	0.5	Primary Sample									X					yes	STEP	MWH	This report
SRBS48S01	MJ016	8/2/2001	HA	0.5	Primary Sample									X					yes	STEP	MWH	This report
SRBS49S01	MJ020	8/2/2001	HA	0.5	Primary Sample									X					yes	STEP	MWH	This report
SRBS50S01	MJ013	8/2/2001	HA	0.5	Primary Sample									X					yes	STEP	MWH	This report
SRBS51S01	MJ012	8/2/2001	HA	0.5	Primary Sample									X					yes	STEP	MWH	This report
SRBS52S01	MJ014	8/2/2001	HA	0.5	Primary Sample									X					yes	STEP	MWH	This report

RFI Soil Matrix Sampling and Analytical Summary
SRE RFI Site

Sample Identification	EPA Identification	Date Collected	Sample Method	Depth (feet bgs)	Sample Type	pH	PCB	Dioxin	VOC	SVOC	TPH	Metals	Lead	Mercury	Methyl Mercury	Silver	Thallium	Hex Chr	Validated [a]	Rationale [b]	Consultant [c]	Reference Document [d]
SRBS58S01	MJ630	2/14/2006	G	0.5	Primary Sample		X				X	X							yes	DGA	MWH	This report
SRBS59S01	MJ631	2/14/2006	G	0.5	Primary Sample		X				X	X							yes	DGA	MWH	This report
SRBS60S01	MJ635	2/14/2006	G	0.5	Primary Sample		X									X	X		yes	DGA	MWH	This report
SRBS60S02	MJ636	2/14/2006	G	2	Primary Sample		X	X											yes	DGA	MWH	This report
SRBS61S01	MJ637	2/15/2006	HA	4	Primary Sample			X											yes	DGA	MWH	This report
SRBS62S01	MJ638	2/15/2006	G	0.5	Primary Sample							X						X	yes	DGA	MWH	This report
SRBS62S02	MJ639	2/15/2006	HA	3	Primary Sample				X			X						X	yes	DGA	MWH	This report
SRBS63D01	MJ641	2/15/2006	G	0.5	Field Duplicate							X						X	yes	DGA	MWH	This report
SRBS63D02	MJ643	2/15/2006	HA	3	Field Duplicate				X										yes	DGA	MWH	This report
SRBS63S01	MJ640	2/15/2006	G	0.5	Primary Sample							X						X	yes	DGA	MWH	This report
SRBS63S02	MJ642	2/15/2006	HA	3	Primary Sample				X			X						X	yes	DGA	MWH	This report
SRBS64S01	MJ644	2/15/2006	G	0.5	Primary Sample		X									X	X		yes	DGA	MWH	This report
SRBS65S01	MJ645	2/15/2006	G	0.5	Primary Sample			X											yes	DGA	MWH	This report
SRBS67S01	MJ652	2/15/2006	G	0.5	Primary Sample		X												yes	DGA	MWH	This report
SRBS68S01	MJ653	2/15/2006	G	0.5	Primary Sample		X												yes	DGA	MWH	This report
SRBS70S01	MJ661	2/16/2006	HA	1	Primary Sample						X								yes	DGA	MWH	This report
SRBS71S01	MJ662	2/16/2006	HA	1	Primary Sample						X								yes	DGA	MWH	This report
SRBS72S01	MJ663	2/16/2006	HA	1	Primary Sample						X								yes	DGA	MWH	This report
SRBS73S01	MJ664	2/16/2006	G	0.5	Primary Sample		X				X	X							yes	DGA	MWH	This report
SRBS74S01	MJ765	4/11/2006	HA	0.5	Primary Sample		X												yes	DGA	MWH	This report
SRBS77S01	MJ768	4/11/2006	HA	0.5	Primary Sample		X												yes	DGA	MWH	This report
SRBS81S01	MJ770	4/11/2006	HA	0.5	Primary Sample									X					yes	DGA	MWH	This report
SRBS82S01	MJ771	4/11/2006	HA	0.5	Primary Sample									X					yes	DGA	MWH	This report
SRBS83D01	MJ774	4/11/2006	HA	0.5	Field Duplicate									X					yes	DGA	MWH	This report
SRBS83S01	MJ772	4/11/2006	HA	0.5	Primary Sample									X					yes	DGA	MWH	This report
SRBS84S01	MJ773	4/11/2006	HA	0.5	Primary Sample									X					yes	DGA	MWH	This report
SRBS85S01	MJ776	4/12/2006	G	0.5	Primary Sample		X	X											yes	DGA	MWH	This report
SRBS86S01	MJ777	4/12/2006	G	0.5	Primary Sample		X	X											yes	DGA	MWH	This report
SRBS90S01	MJ816	5/5/2006	G	0.5	Primary Sample									X					yes	DGA	MWH	This report
SRSS02S01	RJ507	6/30/2000	HA	0	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRSS03S01	RJ508	6/30/2000	HA	0	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRSS04S01	RJ509	6/30/2000	HA	0	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRSS05S01	RJ510	6/30/2000	HA	0	Primary Sample									X					yes	STEP	Ogden/AMEC	This report
SRTS01S01	RJ627	9/27/2000	TS	1	Primary Sample		X				X	X							yes	DTSC	Ogden/AMEC	This report
SRTS02D01	RJ789	11/2/2000	TS	4	Field Duplicate	X				X	X	X							yes	DTSC	Ogden/AMEC	This report
SRTS02D02	RJ791	11/2/2000	TS	4	Field Duplicate	X				X	X	X							yes	DTSC	Ogden/AMEC	This report
SRTS02S01	RJ788	11/2/2000	TS	4	Primary Sample	X				X	X	X							yes	DTSC	Ogden/AMEC	This report
SRTS02S01	RZ788	11/2/2000	HA	4	Sample Split	X				X	X	X							yes	DTSC	Ogden/AMEC	This report
SRTS02S02	RJ790	11/2/2000	TS	4	Primary Sample	X				X	X	X							yes	DTSC	Ogden/AMEC	This report
SRTS06S01	RJ251	4/18/2001	TS	9	Primary Sample					X	X	X							yes	DTSC	Ogden/AMEC	This report
SRTS07S01	RJ253	4/18/2001	TS	5.5	Primary Sample					X	X	X							yes	DTSC	Ogden/AMEC	This report
SRTS09S01	RJ271	4/25/2001	TS	6	Primary Sample					X	X	X							yes	DTSC	Ogden/AMEC	This report
SRTS10S03	MJ003	8/2/2001	TS	3	Primary Sample									X					yes	STEP	MWH	This report
SRTS11S02	MJ004	8/2/2001	TS	3	Primary Sample									X					yes	STEP	MWH	This report
SRTS12S02	MJ008	8/2/2001	TS	3	Primary Sample									X					yes	STEP	MWH	This report
T-1-UT74	T-1-UT74	3/28/2001	G	0	Primary Sample				X		X								no	VCEHD	Sierra Geoscience, Inc.	UST Closure Tank #UT-74, 2001

RFI Soil Matrix Sampling and Analytical Summary
SRE RFI Site

Sample Identification	EPA Identification	Date Collected	Sample Method	Depth (feet bgs)	Sample Type	pH	PCB	Dioxin	VOC	SVOC	TPH	Metals	Lead	Mercury	Methyl Mercury	Silver	Thallium	Hex Chr	Validated [a]	Rationale [b]	Consultant [c]	Reference Document [d]
T-2-UT74	T-2-UT74	3/28/2001	G	0	Primary Sample				X		X								no	VCEHD	Sierra Geoscience, Inc.	UST Closure Tank #UT-74, 2001
SP-1-UT74	SP-1-UT74	3/28/2001	G	0	Primary Sample				X		X								no	VCEHD	Sierra Geoscience, Inc.	UST Closure Tank #UT-74, 2001
P-1-UT71	P-1-UT71	12/8/1998	G	0	Primary Sample				X		X		X						no	VCEHD	Sierra Geoscience, Inc.	UST Closure Tank #UT-71, 1999
T-1-UT71	T-1-UT71	12/8/1998	G	0	Primary Sample				X		X		X						no	VCEHD	Sierra Geoscience, Inc.	UST Closure Tank #UT-71, 1999
T-2-UT71	T-2-UT71	12/8/1998	G	0	Primary Sample				X		X		X						no	VCEHD	Sierra Geoscience, Inc.	UST Closure Tank #UT-71, 1999
SP-1-UT71	SP-1-UT71	12/8/1998	G	0	Primary Sample				X		X		X						no	VCEHD	Sierra Geoscience, Inc.	UST Closure Tank #UT-71, 1999
SP-2-UT71	SP-2-UT71	12/8/1998	G	0	Primary Sample				X		X		X						no	VCEHD	Sierra Geoscience, Inc.	UST Closure Tank #UT-71, 1999
SRBS53S01	MJ248	5/22/2003	HA	0	Primary Sample		X												yes	DTSC	MWH	This report
SRBS54S01	MJ623	2/14/2006	G	0.5	Primary Sample		X												yes	DGA	MWH	This report
SRBS54S02	MJ624	2/14/2006	G	0.5	Primary Sample		X												yes	DGA	MWH	This report
SRBS54S03	MJ625	2/14/2006	G	0.5	Primary Sample		X												yes	DGA	MWH	This report
SRBS54S04	MJ626	2/14/2006	G	0.5	Primary Sample		X												yes	DGA	MWH	This report
SRBS54S05	MJ627	2/14/2006	G	2.5	Primary Sample		X												yes	DGA	MWH	This report
SRBS54S70	MJ622	2/14/2006	COMP	0.5	Primary Sample		X												yes	DGA	MWH	This report
SRBS55S01	MJ628	2/14/2006	G	0.5	Primary Sample		X												yes	STEP	MWH	This report
SRBS56S01	MJ629	2/14/2006	G	0.5	Primary Sample		X												yes	STEP	MWH	This report
SRBS66S70	MJ648	2/15/2006	COMP	0.5	Primary Sample		X												yes	DGA	MWH	This report
SRBS69S70	MJ654	2/15/2006	COMP	0.5	Primary Sample		X												yes	DGA	MWH	This report
SRBS76S01	MJ767	4/11/2006	HA	0.5	Primary Sample		X												yes	STEP	MWH	This report
SRBS78S01	MJ769	4/11/2006	HA	0.5	Primary Sample		X												yes	STEP	MWH	This report
SRSS01S01	RD978	12/2/1997	HA	0	Primary Sample						X								yes	WP	Ogden/AMEC	This report
SRSS01S01	RF978	12/2/1997	G	0	Primary Sample	X				X		X							yes	WP	Ogden/AMEC	This report
SRSU01S01	RJ506	6/30/2000	HA	8.5	Primary Sample	X				X	X	X							yes	DTSC	Ogden/AMEC	This report
SRSU01S01	RJ519	7/6/2000	HA	8.5	Primary Sample				X										yes	DTSC	Ogden/AMEC	This report

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

[b] **DTSC** - Indicates samples collected at direction of DTSC resulting from site review during the RFI field program.

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.

DGA - Indicates samples taken in 2006 as a part of the Data Gaps Analysis to address delineation with stepout samples, elevated detection limit issues, and specific DTSC resquests.

VCEHD - Indicates samples collected at direction of Ventura County Environmental Health Division

[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 6 RFI Report (See References, Section A2.6).

[e] **McLaren Hart , 1993** - Multi-media Report for the Brandeis-Bardin Institute and the Santa Monica Conservancy, Vol. I & II

[f] **GRC, 1990**- Assessment of Pond Sediments in R2, SRE, and Perimeter Ponds

Sample Identification = RFI site and sample identifier code

EPA Identification = Laboratory reporting code

bgs = below ground surface

B = Boring Sample

HA = Hand Auger sample

TS = Trench Sample collected with a slide hammer

GRC- Groundwater Resources Consultants

G = Grab sample

COMP = Composite soil sample

PCB = Polychlorinated biphenyls

VOC = Volatile Organic Compound

SVOC = Semivolatile Organic Compo

TPH = Total Petroleum Hydrocarbons

Hex Chr = Hexavalent chromium

Laboratory Analytical Methods Represented (EPA Method No.)

pH - 9045C

PCB - 8082, 1668

Dioxin - 8290

VOC - 8021, 8240, 8260

SVOC - 8270, 8270SIM, 429M

TPH - 8015

Metals - 6010B/7000

Lead - 7420

Methyl Mercury - 1630M

Silver - 6010, 6020

Thallium - 6020

Hex Chr - 7196A

Surface Water and NPDES Outfall Sampling and Analytical Summary
SRE RFI Site

Sample Identification	Date Collected	VOC	SVOC	PCB	Dioxin	Metals	Perchlorate	Anions	pH	Cyanide	Oil & Grease	Acute Toxicity	General Minerals	Validated [a]	Rationale [b]	Consultant [c]	Reference Document [d]
BB19003W	4/23/1992	X	X			X								no	WP	McLaren/Hart	McLaren Hart, 1993 [e]
Outfall 004	10/17/2004				X	X	X	X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	10/27/2004				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	12/5/2004				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	12/27/2004				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	1/3/2005				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	1/10/2005				X	X		X			X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	1/28/2005				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	2/11/2005				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	2/18/2005	X	X	X	X	X	X	X	X	X	X	X	X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	3/4/2005				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	3/19/2005				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	4/28/2005				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	10/18/2005				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	11/9/2005				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	1/1/2006				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	1/14/2006				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	2/18/2006	X	X	X	X	X	X	X	X	X	X	X	X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	3/1/2006				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	3/11/2006				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	3/21/2006				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	3/28/2006				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	4/4/2006				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	4/14/2006				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports
Outfall 004	5/22/2006				X	X		X	X		X		X	yes	NPDES Monitoring	MWH	NPDES Monitoring Reports

[a] **Validated** indicates at least one analysis has been validated following NPDES protocols.

[b] **WP -** Indicates samples collected based on DTSC-approved Work Plan scope.
NPDES - National Pollutant Discharge Elimination System Permit

[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 6 RFI Report (See References, Section A2.6).

[e] **McLaren Hart , 1993 -** Multi-media Report for the Brandeis-Bardin Institute and the Santa Monica Conservancy, Vol. I & II

Sample Identification = Sample name or Outfall Location Number
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PCB = Polychlorinated biphenyls
General Minerals = Total Dissolved Solids, Total Suspended Solids, and Temperature

Laboratory Analytical Methods Represented (EPA Method No.)

VOC - 624
SVOC - 625
PCB - 608
Dioxin - 1613
Metals - 6010B/7000
Perchlorate - 314.0
Anions - 300.0
pH - 150.1
Cyanide - 335.2
Oil & Grease - 413.1
Acute Toxicity - EPA600/4-90/027F
General Minerals - SM2540C, 160.2

Table A3.3-2A (Page 1 of 18)

Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	**Sampling Results** Chemical concentrations detected above background and/or risk screening levels?[2]	**Potential concentration gradients sufficiently evaluated for risk assessment?** [3,4]	**Is delineation sufficient to estimate soil volume in CMS?**[5] [see Figure A3.5-1 for CMS areas]
1	**Toluene Process Unit, and Tetralin Heat Exchanger** Facility drawings show a structure at this location from 1959 to 1973. Dates of use for each structure are not known. Both features have been removed. Asphalt/concrete surface likely at heat exchanger area.	**VOCs**: Toluene	Collect and analyze a soil vapor probe SRSV07 (at 2.5 feet bgs).	VOC results are shown on Figure A3.3-1. Freon-113 was detected at 3.5 µg/l. This compound was detected (<5 µg/kg) in several locations throughout the SRE area (see chem. use area 16). No other VOC compounds were detected in soil vapor: no further delineation needed. Bedrock depth (approximately 1 to 3 feet bgs) based on refusal during boring activities.	YES Detected VOCs limited at targeted location.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.
		PCBs: Oils potentially containing PCBs	Collect and analyze soil samples within perimeter of former structure and in downslope area (SRBS67, SRBS68 both at 0.5 feet bgs).	PCB results are shown on Figure A3.3-2. No PCBs were detected at either targeted location within the perimeter of the former structure: no further delineation needed.	YES No PCBs detected at targeted locations.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

Table A3.3-2A (Page 2 of 18)

Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
2	**Sodium Component Cleaning Area** Includes former Building 724 and Area 723 Building 724 housed a 10 feet x 22 feet x 12 feet high steel enclosure in which radioactive sodium components from SRE operations were cleaned in a hot oil bath, a concrete pit containing an oil heater and oil supply tank, and a concrete sump designed to hold effluent. Surface water from Building 724 drains north-eastward along two drainages incised into the bedrock outcrop, and flows the natural drainage downslope from the SRE Pond. Area 723 was a 25 feet x 28 feet concrete pad on which sodium components were steam cleaned. Surface water from the pad drained north directly to the SRE pond. Surface water drains northward from Area 756 into the SRE Pond. All features have been removed except for portions of concrete in the Building 724 foundation.	**TPH**: Petroleum hydrocarbons associated with the hot oil bath	**Building 724**: Collect and analyze two surface (0.5 feet bgs) soil samples within Building 724 perimeter- one near the former oil heater/tank and one near the concrete sump/trench (SRBS58, SRBS59) at 0.5 feet bgs, also collect and analyze one downslope soil sample (SRBS73) at 0.5 feet bgs.	TPH results are shown on Figure A3.3-2. Lubricant oil range hydrocarbons were detected in two samples (6.3 mg/kg and 11 mg/kg) collected from locations expected to be most affected by site activities: no further delineation needed. Shallow bedrock (approximately 0.5 feet bgs) exists beneath both locations.	YES Detected TPH low at targeted locations.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.
		PCBs: Oils potentially containing PCBs	**Building 724**: Collect three surface (0.5 feet bgs) soil samples as described above, and analyze to screen for PCBs.	PCB results are shown on Figure A3.3-2. No PCBs were detected in soil samples collected from locations expected to be most affected by site activities: no further delineation needed. Shallow bedrock (approximately 0.5 feet bgs) exists beneath both locations.	YES No PCBs detected within targeted locations.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.
		Metals: Metallic wastes	**Building 724**: Collect and analyze three surface (0.5 feet bgs) soil samples as described above. Based on initial results, collect five stepout samples upslope and downslope of SRBS73 (SRBS81 through SRBS84, SRBS90); analyze for mercury. **Area 723:** Collect and analyze one sample adjacent to former Pad 723 (SRBS07) and two in downslope areas (SRBS06, SRBS08 at 0.5 feet bgs in both). Recollect and analyze sample for silver at SRBS07 (0.5 ft.) adjacent to pad to evaluate previous elevated result that was biased high (MWH, 2004). Also collect and analyze deeper sample (at 3 feet bgs) in boring.	Metals results are shown on Figures A3.3-4A and A3.3-4B. **Building 724**: Mercury was detected above background (0.09 mg/kg) at 0.37 mg/kg in downslope sample location SRBS73, and in two up slope stepout samples (SRBS82, SRBS90) up to 0.72 mg/kg. Mercury in samples collected down drainage (SRBS83 and SRBS84) from SRBS 73 was below background. All other metals were either detected below background, or were not detected. Representative samples along narrow bedrock drainage provide delineation. Bedrock comprising the rill further delineates the side and depth extent; therefore mercury concentrations delineated by stepout samples and bedrock: no further delineation needed. **Area 723**: Silver was previously detected above background (0.79 mg/kg) at 4.81 mg/kg in SRBS07 (biased high). The recollected sample was nondetect for silver (<0.053 mg/kg). All other metals screened for were either detected below background or were not detected. Shallow bedrock (Approximately 3 feet bgs) encountered during sampling further delineates soil extent. Samples at representative locations are less than background: no further delineation needed.	**Building 724:** YES Mercury concentrations decrease with distance away from greatest detected concentration in either direction within the narrow drainage delineated on the sides by bedrock. **Area 723:** YES Metals below background at representative locations.	**Building 724**: YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results. **Area 723**: YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

Table A3.3-2A (Page 3 of 18)

Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
3 (a, b, c)	**Southern California Edison Steam Power Plant Area:** Includes – Steam Generation Area (3a), Cooling Tower (3b), and Mercury Release Area (3c).					
3a	**Southern California Edison Steam Power Plant: Steam Generation Area** Buildings and features within the area supported SRE operations from 1957-1964. Structures included a steam generator building (B185) and pad (Area 684), turbo generator, fire pump house (B183), storage yard (Area 505), outdoor work area/ shop (Area 714), and transformer area. Historical site photos show an aboveground water tank and aboveground pipelines connecting the power plant with Building 143. Radiological surveys were completed north and west of Building 143 and elevated cesium 137 was detected in soil. Two small areas were excavated (approximately 390 cubic yards of soil were removed) (Boeing, 2001a and c). Waste characterization results from this activity indicated the presence of cadmium, copper, and lead at concentrations greater than background for each. Samples collected from downslope of these areas (drainage leading to SRE Pond) were analyzed for these metals	**VOCs**: Potential solvent use in power plant cleaning operations	Collect and analyze at soil vapor probes (SRSV01, SRSV10, SRSV11) at 4, 6.5, and 27 feet bgs respectively.	VOC results are shown on Figure A3.3-1. Freon-113 was detected in the sample collected in the southern portion of the site (SRSV01) at a concentration of 2.2 µg/l. This compound was detected (<5 µg/kg) in several locations throughout the SRE area. No other VOCs were detected in soil vapor samples: no further delineation needed.	YES Area recommended for further consideration in CMS based on mercury concentrations and risk assessment results as described in Chemical Use Area 3c below.	YES VOCs limited and associated risks do not drive CMS recommendation.
		TPH: Petroleum hydrocarbon use supporting water cooling system within area	Collect and analyze three shallow soil samples from beneath disturbed surface soil at 3 locations within former SCE Plant flat area (SRBS70 through SRBS72).	TPH sampling results are shown on Figure A3.3-2. Detected hydrocarbon concentrations were less than 5 mg/kg at representative locations: no further delineation needed.	YES Area recommended for further consideration in CMS based on mercury concentrations and risk assessment results as described in Chemical Use Area 3c below.	YES TPH limited and associated risks do not drive CMS recommendation.
		PCBs: Transformer oils potentially containing PCBs	Collect and analyze lateral composite soil sample at 0.5 feet bgs at former transformer pad location (SRBS66 composite). Place component samples on hold to be analyzed individually in the event of a detect in the composite.	PCB results are shown on Figure A3.3-2. PCBs were not detected in the shallow samples at targeted locations, lateral extents of potential PCBs are delineated by location of former transformer pad: no further delineation needed.	YES Area recommended for further consideration in CMS based on mercury concentrations and risk assessment results as described in Chemical Use Area 3c below.	YES PCBs not detected, and associated risks do not drive CMS recommendation.

Table A3.3-2A (Page 4 of 18)

Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
3a	**Southern California Edison Steam Power Plant: Steam Generation Area** Plastic tarping covers the soil in the eastern portion of the flat area and down to the edge of the SRE Pond to control erosion of mercury-impacted soil. All features have been removed.	**Metals:** Potential metals use, facility records indicate use of liquid sodium and liquid mercury in closed systems, no other use of metals is recorded in this area. Liquid mercury was reportedly released as described in Chemical Use Area 3c below.	<u>Drainage</u> Collect and analyze soil samples from the drainage downslope from the site (SRBS01) at 0.5 feet bgs to screen for metals use.	Metals are shown on Figures A3.3-4A and A3.3-4B. <u>Drainage</u> No metals were detected above background (mercury ND<0.2 mg/kg, above background 0.09 mg/kg), additional mercury sampling was conducted as described in Chemical Use Area 3c below: no further delineation for metals needed.	<u>Drainage</u> YES Area recommended for further consideration in CMS based on mercury concentrations and risk assessment results as described in Chemical Use Area 3c below.	YES Metals (excluding mercury) not detected above background and associated risks do not drive CMS recommendation.
3b	**Southern California Edison Steam Power Plant: Cooling Tower**	**VOCs**: Potential solvent use in power plant cleaning operations	Depth to bedrock at the former cooling tower is less than 3-feet, precluding installation of soil vapor probes at the base. Collect and analyze soil matrix samples (at 0.5 and 3 feet bgs) at former cooling tower (SRBS63) and in downslope area (SRBS62).	VOC results are shown on Figure A3.3-1. Acetone was detected up to 32 µg/kg in SRBS63, well below the Residential and Ecological RBSLs (51,000 and 41,000 µg/kg respectively). No other VOCs were detected: no further delineation needed. Shallow bedrock (approximately 3 feet bgs) encountered during sampling delineates vertical extent.	YES VOC concentration limited at targeted locations.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.
		Metals: Potential metals use including potential hexavalent chromium use in cooling tower, facility records do not indicate use or storage of metals.	Collect soil samples (at 0.5 and 3 feet bgs) at base of former cooling tower (SRBS63) and in downslope area (SRBS62); analyze for metals and hexavalent chromium.	Metals are shown on Figure A3.3-4A and A3.3-4B. • Aluminum detected up to 22,000 mg/kg, just over background (20,000 mg/kg) in SRBS63. • Boron detected up to 10 mg/kg, just above background (9.7 mg/kg) in the shallow sample from SRBS62, not detected in the deeper sample. • Hexavalent chromium detected in one duplicate sample collected beneath the former cooling tower (SRBS63D01) at 0.21 mg/kg, well below Residential and Ecological RBSLs (110, 15 mg/kg respectively), not detected downslope, or in deeper sample. • No other metals were detected above background in either sample at either depth. Samples at targeted locations less than, or near background: no further delineation needed.	YES Metals below background or just above background at targeted locations.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

Table A3.3-2A (Page 5 of 18)

Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
3c	**Southern California Edison Steam Power Plant: Mercury Release Area**	**Mercury**: Liquid mercury was reportedly released from a pipe cut by a welding torch during post-closure SRE demolition activities unrelated to typical site operations (Rockwell 1983; Lenox, 2000b).	Collect soil samples within area and downslope drainage to the east at surface, 0.5 feet bgs, and 3 feet bgs (SRSS02 through SRSS05, SRBS01, SRBS12 through SRBS21, SRBS24 through SRBS27, SRBS32 through SRBS35, SRBS37 through SRBS52); analyze for mercury. Collect trench samples within flat area (SRTS10 through SRTS12) at 3 feet bgs; analyze for mercury.	Mercury results are shown on Figure A3.3-5. Mercury was detected above background (0.09mg/kg) throughout the former powerplant site (flat area), downslope in the drainage leading to the SRE pond, and downslope towards the Building 003 Leach Field. • Highest concentrations detected in the flat area near center of release area, up to 35.5 mg/kg (SRBS40). Concentrations decrease to near background levels (0.10 to 0.31 mg/kg) to the south, west, and north (SRBS26, SRBS27, SRBS41 through SRBS44, SRBS48, SRTS12). • Deeper samples(3 feet bgs) in flat area (SRBS13, SRBS41,SRTS10 through SRTS12) contained lower concentrations than corresponding shallow samples. • Concentrations downslope and in the drainage leading to the SRE Pond (SRBS14 through SRBS21, SRBS32 though SRBS35, SRBS45, SRBS47, SRBS50, SRBS51) also decrease (0.04 to 1.1) mg/kg. • Mercury was detected down into the SRE Pond. Sediments and soil at the SRE Pond are described in Chemical Use Area 14 below. Soil thickness is defined within the area by bedrock encountered in soil borings and soil vapor probes.	YES Area is recommended for further consideration in CMS based on Mercury concentrations and Risk Assessment results.	YES The extent of impacted soil is delineated by the known source area, extensive step out sampling, and soil thickness.
		Metals: No documented use in western portion of site leading to asphalt-lined ditch along base of rock outcrop.	Waste characterization data (Boeing, 2001c) from two small excavations near and west of the mercury-release area contained the following metals above background: copper (up to 50.4 mg/kg), cadmium (up to 6.57 mg/kg), lead (up to 59.3 mg/kg), and zinc (up to 361 mg/kg).	Total metals analyzed following 2001 excavations not performed in or near asphalt-lined ditch.	-- Area recommended for further consideration in CMS to evaluate any uncertainty associated with 2001 waste characterization results.	YES The extent of potential impacts (if present) constrained by ditch width and presence of rock outcrop volume of area considered small in overall CMS Area extent.
4	**Underground Storage Tank (UST) UT-27** 1,000 gal capacity steel fuel tank located adjacent to southeast side of former Building 143 (SRE); supplied diesel fuel for emergency backup generator. Removed August 1988 under VCEHD oversight.	**VOCs**: Diesel Fuel	Collect and analyze at soil vapor probe adjacent to former tank (SRSV04) at 4 feet bgs. A VCEHD representative screened for VOCs at the UST excavation stockpile using a Photo Ionization Detector (PID), and made visual observations of the soil. No VOC detects were reported, and no staining was noted in the observed soil. Based on soil vapor results and VCEHD observations, no RFI soil matrix sampling was conducted.	Soil vapor results are shown on Figure A3.3-1. Freon-113 was detected at a concentration of 3.8 µg/l in the sample (SRSV04). This compound was detected (<5 µg/kg) in several locations throughout the SRE area. No other VOC compounds were detected in the sample: no further delineation needed.	YES Detected VOCs limited at targeted location.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

Table A3.3-2A (Page 6 of 18)

Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
5	**Underground Storage Tank (UST) UT-71** 1,500 gallon capacity steel gasoline fuel tank located adjacent to east side of former Building 183 (Fire Pump House). Supplied fuel for pumps. Removed December 1998 under VCEHD oversight.	**VOCs**: Gasoline	Collect and analyze two soil samples below the excavated tank (T-1-UT71, T-2-UT72), and one from beneath the adjacent fuel pipeline (P-1-UT71).	VOC sampling results are shown on Figure A3.3-1. No VOCs were detected in the soil beneath the former tank, or from the soil beneath the former pipeline: no further delineation needed.	YES No VOCs detected at targeted locations.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.
		TPH: Gasoline	Collect and analyze two soil samples below the excavated tank (T-1-UT71, T-2-UT72), one from beneath the adjacent fuel pipeline (P-1-UT71), and two from the excavation stockpile (SP-1-UT71, SP-2-UT71).	TPH results are shown on Figure A3.3-2. No petroleum hydrocarbons were detected in the soil beneath the former tank, or from the soil beneath the former pipeline: no further delineation needed.	YES No TPH detected at targeted locations.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.
		BTEX & MTBE: Gasoline	Collect two soil samples below the excavated tank (T-1-UT71, T-2-UT72), and one from beneath the adjacent fuel pipeline (P-1-UT71); analyze for BTEX compounds (benzene, toluene, ethyl benzene and xylenes) and MTBE (Methyl Tertiary Butyl Ether).	VOC results are shown on Figure A3.3-1. No MTBE or BTEX compounds were detected in the soil beneath the former tank, or from the soil beneath the former pipeline: no further delineation needed.	YES No VOCs detected at targeted locations.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.
		Metals: Gasoline	Collect two soil samples below the excavated tank (T-1-UT71, T-2-UT71), one from beneath the adjacent fuel pipeline (P-1-UT71); analyze all samples for total and organic lead.	Metals results are shown on Figure A3.3-4. No metals were detected above background in the soil beneath the former tank, or from the soil beneath the former pipeline: no further delineation needed.	YES No metals detected above background at targeted locations.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.
6	**Underground Storage Tank (UST) UT-74** 1,500-gallon capacity steel tank adjacent to northeast corner of Building 003. Supplied diesel fuel for an emergency backup generator. Removed March 2001 under VCEHD oversight.	**VOCs**: Diesel Fuel	Collect and analyze two soil samples below the excavated tank (T-1-UT74, T-2-UT74).	VOC results are shown on Figure A3.3-1. No VOCs were detected in the soil beneath the former tank: no further delineation needed.	YES No VOCs detected at targeted locations.	YES Area not recommended for further evaluation in CMS based on sampling and risk assessment results.
		TPH: Diesel Fuel	Collect two soil samples below the excavated tank (T-1-UT74, T-2-UT74); analyze all samples for TPH (diesel range only).	TPH results are shown on Figure A3.3-2. No hydrocarbons were detected in the soil beneath the former tank: no further delineation needed.	YES No TPH detected at targeted locations.	YES Area not recommended for further evaluation in CMS based on sampling and risk assessment results.

Table A3.3-2A (Page 7 of 18)

Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
7	**Building 003 Leach Field** 2,700 gallon capacity septic tank. The sanitary leach field measured 600 linear feet. Use of septic systems and sanitary leach fields were discontinued in 1961 following the installation of the sanitary sewer system. The Septic tank and leach piping were removed in September 2000.	**VOCs**: No documented use of VOCs	Building 003 leach field screened for presence of VOCs. Collect and analyze soil vapor probe within leach field (SVLF003-1).	VOC results are shown on Figure A3.3-1. No VOCs were detected in soil vapor at representative location: no further delineation needed.	YES Area recommended for further evaluation in CMS based on SVOCs and metals as described below.	YES VOCs not detected. Risks associated risks with SVOCs and metals drive CMS recommendation.
		SVOCs: No documented use of SVOCs	Building 003 leach field screened for presence of SVOCs. Excavate trenches to locate leach lines. Within select trenches, collect and analyze soil samples beneath leach gravels (approx. 4 feet bgs).	SVOC results are shown on Figure A3.3-2. SVOCs were detected in the northwestern part of the leach field, adjacent to the SRE Pond Influent channels. SVOC compounds detected at the highest concentrations within the Building 003 Leach Field in two locations (SRTS02, SRTS06) • Fluoranthene had the highest detected concentration in the Building 003 Leach Field, up to 25,000 µg/kg (less than Res and Eco RBSLs, SRTS02S02 at 4 feet bgs). • Benzo(a)pyrene was detected at concentrations up to 15,000 µg/kg (greater than Res and Eco RBSLs SRTS02S02 at 4 feet bgs). • Lateral extent of impacted soil is delineated by the edges of the leach field. Vertical extent is delineated by bedrock encountered during trenching activities (4 – 9 feet bgs). • Downgradient extent is limited by the SRE Pond, which is recommended for CMS (See discussion in Chemical Use Area 14).	YES Area is recommended for consideration in CMS based on SVOC concentrations and risk assessment results.	YES Potentially impacted soil is delineated laterally by the extent of the leach field, and vertically by the depth to bedrock.
		TPH: No documented use of TPH	Building 003 leach field screened for presence of TPH. Excavate trenches to locate leach lines. Within select trenches, collect and analyze soil samples (SRTS01through SRTS03, SRTS05 through SRTS09, SRTS02D01, SRTS02D02) beneath leach gravels (approx. 4 feet bgs).	TPH results are shown on Figure A3.3-2. TPH detected in SRTS02S02 up to 358 mg/kg (18 mg/kg diesel and 340 mg/kg lubricant oil range). Gasoline-range hydrocarbons detected in SRTS02S01 at 10 mg/kg (at 4 feet bgs). No other hydrocarbons were detected in any of the other trench samples in the leach field: no further delineation needed.	YES Area recommended for further evaluation in CMS based on SVOCs and metals as described above and below.	YES TPH low and associated risks do not drive CMS recommendation.
		PCBs: No documented use of PCBs, but PCBs were detected in septic tank waste characterization data.	Waste characterization results from this removal activity indicated elevated PCBs (up to 2,574 µg/kg). Samples were not analyzed for PCBs in the soils beneath leach field.	Samples were not analyzed for PCBs in the leach field.	- - PCBs not characterized, but area recommended for further evaluation in CMS based on SVOCs and metals as described above and below.	YES Potentially impacted soil is delineated laterally by the extents of the leach field, and vertically by the depth to bedrock.

Table A3.3-2A (Page 8 of 18)

Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
7	**Building 003 Leach Field (continued)**	**Dioxins**: Not used at site but can be present in burned materials and ash	To screen for potential combustion products, collect soil sample SRBS61S01 (at 4 feet bgs) collocated with previous elevated SVOC detects (SRTS02S02), analyze for dioxins.	Dioxin results are shown on Figure A3.3-3. Dioxins were not detected above background at representative locations: no further delineation needed.	YES Area recommended for further evaluation in CMS based on SVOCs and metals as described above and below.	YES Dioxin concentrations low and associated risks do not drive CMS recommendation.
		Metals: No documented use of metals	Waste characterization results from this removal activity indicated several metals above background including silver (up to 22.4 mg/kg) and mercury (up to 21.5 mg/kg) (Boeing, 2001d). STLC extract analyses performed for waste characterization indicate the presence of hexavalent chromium (up to 0.58 mg/L); however total soils analysis (TTLC) did not detect hexavalent chromium. Building 003 leach field screened for the presence of metals. Excavate trenches to locate leach lines. Within select trenches, collect and analyze soil samples beneath leach gravels (approx. 4 feet bgs). Note: Selenium and antimony were only analyzed in 4 samples (SRTS01, SRTS06, SRTS07, SRTS09).	Metals results are shown on Figure A3.3-4. Concentrations of six metals exceeded background, Eco RBSL, and/ or Res RBSL in five locations (SRTS02S01, SRTS02S02, SRTS06, SRTS07, SRTS09): • Silver (up to 11.4 mg/kg), mercury (up to 0.81 mg/kg), manganese (at 526 mg/kg), copper (at 31 mg/kg), selenium (up to 0.96 mg/kg), and thallium (up to 4 mg/kg). • Manganese and copper were detected just above background in one sample and (495 and 31 mg/kg, respectively). • Highest metals concentrations were generally near the center of the leach field (SRTS02S01, SRTS02S02, SRTS06) and generally decrease laterally. The maximum thallium concentration was at SRTS07, at the north (downslope) edge of the leach field. • pH Range = 5.06-6.3 Bedrock was encountered in the leach field at depths ranging from 4 to 9 feet bgs. Impacted soil extent is defined by the extent of the leach field.	YES Area is recommended for further consideration in CMS based on SVOC and metals concentrations, and risk assessment results.	YES Impacted soil is delineated laterally and vertically by known extent of the leach field. Downslope, the leach field is adjacent to the SRE Pond Chemical Use Area (Chem use area 14), also recommended for CMS.
8	**Transformer Area 683** Area 683 adjacent to east portion of Building 143 included one concrete pad-mounted transformer surrounded by asphalt All features have been removed	**PCBs**: Oils potentially containing PCBs	Collect and analyze soil samples at 0.5 feet bgs from three locations in the rectangular soil surface within the perimeter of the former transformer pad; combine samples in the lab to form a composite sample (SRBS69). Place component samples on hold to be analyzed individually in the event of a detect in the composite.	PCB results are shown on Figure A3.3-2. No PCBs were detected from targeted locations at the former transformer area: no further delineation needed.	YES PCBs not detected at targeted locations.	YES Area is not recommended for further evaluation in CMS based on sampling and risk assessment results.

Table A3.3-2A (Page 9 of 18)

Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
9	**Transformer Area 693** 40 foot by 10 foot pad included two power poles containing 6 transformers, surrounded by asphalt. Substation #1 on facility drawings All features have been removed	**PCBs**: Oils potentially containing PCBs	Collect and analyze soil samples from the rectangular soil surface at four locations within the perimeter of the former transformer pad; combine samples in the lab to form a composite sample (SRBS54S70 at 0.5 feet bgs). Based on composite results analyze the shallow (SRBS54S01 through SRBS54S04) and deep component samples (SRBS54S05). Collect shallow stepout samples (SRBS77, SRBS78, SRBS80). [Note: refusal at SRBS70, SRBS80].	PCB results are shown on Figure A3.3-2. Aroclor 1260 was detected at 6,300 µg/kg in shallow composite sample (SRBS54S70) and 7,800 µg/kg in one of the four individual samples (SRBS54S04) making up the composite. PCBs in the shallow samples were above RBSLs. Refusal was encountered in three borings. SRBS54S05, collected at 2.5 feet bgs beneath SRBS54S01 (6,900 µg/kg Aroclor 1260) contained Aroclor 1260 at 140 µg/kg. Three shallow stepout samples were planned to further characterize the area. Refusal at the concrete surface was encountered at two sample locations (SRBS78, SRBS80) to the north and north-west. One sample (SRBS77) was collected and analyzed; no PCBs were detected. Samples SRBS54S01 through SRBS54S03 encountered refusal on shallow bedrock between 0.5 feet and 1 foot bgs.	YES Area is recommended for further consideration in CMS based on PCB concentrations and risk assessment results.	YES Extent of impacted soil is delineated by bedrock outcrop, sample refusal, and analytical results.
10	**Transformer Area South of Building 003** Pad included 3 transformers All features have been removed	**PCBs**: Oils potentially containing PCBs	Collect and analyze soil sample at surface within perimeter of former transformer pad (SRBS53). Based on results collect stepout soil samples around pad (SRBS55 through SRBS57, SRBS74 through SRBS76, SRBS79) to assess extent of impacted soil.	PCB results are shown on Table A3.3-2. Aroclor 1254 detected above Ecological RBSL, but below residential RBSL (79 µg/kg and 350 µg/kg, respectively) in SRBS53 (120 µg/kg). Aroclor 1254 was detected above Eco or Res RBSLs in the lateral stepout samples immediately north and south of the pad (SRBS55, SRBS56), up to 430 µg/kg No PCBs were detected in the intermediate distance stepout sample to the north-west (SRBS74). Shallow bedrock was encountered in four of the five extended stepout borings (SRBS57, SRBS75, SRBS76, SRBS79).	YES Area is recommended for further consideration in CMS based on PCB concentrations and risk assessment results.	YES Soil impacts are delineated by limited lateral and vertical extent of soil around former pad, and the local topography the pad is situated in a topographic depression.

Table A3.3-2A (Page 10 of 18)

Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
11	**Oil Stain at Building 003** Oil staining was observed on dirt surface at Building 003 site after demolition, during a DTSC site walk, but was not observed in historical air photos. (USEPA, 1997).	**VOCs**: None documented	Building 003 screened for VOCs based on observed oil stain. Collect and analyze soil vapor near stain (SRSV03). Collect and analyze soil samples at 8 and 13 feet bgs in location of surface stain (SRBS22).	VOC results are shown on Figure A3.3-1. In the soil vapor sample, Freon-113 was detected in SRSV03 at 6 feet bgs (2.3 µg/l). This compound was detected (<5 µg/kg) in several locations throughout the SRE area. No other VOCs were detected in soil vapor. No further delineation needed. In soil matrix sample, three VOCs were detected: • Methylene chloride was detected at 8 and 13 feet bgs (up to 7 µg/kg), above Res RBSL (4 µg/kg). • 1-Chlorohexane was detected at 1 µg/kg (at 8 and 13 feet bgs). 2-Hexanone was detected at 3 µg/kg. Bedrock was encountered at 7 feet bgs at SRSV03, and at 13 feet bgs in SRBS22.	YES Area is recommended for further evaluation in CMS based on methylene chloride concentration and risk assessment results.	YES Lateral extent of soil is delineated by the known visible extent of stained soil. Vertical extent of impacted soil is delineated by bedrock.
		TPH: None documented	Building 003 screened for TPH based on observed oil stain. Collect and analyze shallow and deep soil samples in location of surface stain SRBS22 (8 and 13 feet bgs) , SRBS23 (1 foot bgs).	TPH results are shown on Figure A3.3-2. TPH was detected in both samples: • Gasoline- and diesel- range hydrocarbons were not detected in either sample. • Kerosene-range hydrocarbons were detected in SRBS23 at 40 mg/kg. • Lubricant-range hydrocarbons were detected in both samples, up to 470 mg/kg (in SRBS23). Combined concentrations of kerosene-, diesel-, and lubricant-oil range hydrocarbons are less than 510 mg/kg (below RBSLs). Soil thickness is defined by depth to bedrock as described above.	YES Area is recommended for further evaluation in CMS based on methylene chloride and TPH (as PAH) concentrations, and risk assessment results.	YES Lateral extent of soil is delineated by the known visible extent of stained soil. Vertical extent of impacted soil is delineated by bedrock.
		PCBs: None documented	Building 003 screened for PCBs based on observed oil stain. Collect and analyze soil sample in location of surface stain (SRBS23) at 1 foot bgs.	PCB results are shown on Figure A3.3-2. Aroclor 1254 detected at 60 µg/kg, no other PCBs were detected at targeted location: no further delineation needed. Soil thickness is defined by depth to bedrock as described above.	YES Area is recommended for further evaluation in CMS based on methylene chloride and TPH (as PAH) concentrations, and risk assessment results.	YES PCBs low and associated risks do not drive CMS recommendation.
12	**SRE Pond Influent Channels** Two concrete lined influent channels drained the 2 main flat portions of the site and joined at the west end of SRE pond. The channels are still present.	**VOCs**: None	Screen for VOCs to characterize potential migration into pond. Collect and analyze at two soil vapor probes adjacent to lined channels (SRSV08, SRSV09 collected at 3 and 4 feet bgs respectively).	VOC results are shown on Figure A3.3-1. No VOCs were detected in soil vapor at representative locations: no further delineation needed.	YES No VOCs were detected at representative locations. Area lies within an area recommended for CMS (Building 003 Leach Field)	YES VOCs not detected, and associated risks do not drive CMS recommendation.

Table A3.3-2A (Page 11 of 18)

Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
12	**SRE Pond Influent Channels (Continued)**	**SVOCs**: None	Screen for TPH to characterize potential migration into pond. <u>Channel Sediment</u> Collect and analyze surface sediment within lined channel to characterize potential migration into pond (SRSS01). <u>Adjacent Soil</u> Collect soil samples adjacent to and beneath lined channel at 0.5 and 3 feet bgs (SRBS05, SRBS29); analyze shallow sample (0.5 feet bgs).	SVOCs results are shown on Figure A3.3-2. <u>Channel Sediment</u> No SVOCs were detected in SRSS01. <u>Adjacent Soil</u> PAHs were detected up to 9µg/kg; benzo(a)pyrene detected up to 4 µg/kg in SRBS05. None were detected above RBSLs. SRBS29 encountered refusal on shallow bedrock at 3 feet bgs. Low concentrations of PAHs in one of two samples at representative locations: no further delineation needed.	YES <u>Channel Sediment</u> SVOCs not detected. Lined channel sediment recommended for CMS based on metals (Table A3.3-5). <u>Adjacent Soil</u> SVOCs limited at representative locations. Area lies within an area recommended for CMS (Building 003 Leach Field).	YES <u>Channel Sediment</u> Risks associated with metals drive CMS recommendation. <u>Adjacent Soil</u> SVOCs limited and associated risks do not drive CMS recommendation.
		TPH: None	Screen for TPH to characterize potential migration into pond. Collect and analyze surface sediment within lined channel (SRSS01).	TPH results are shown on Figure A3.3-2. <u>Channel Sediment</u> No petroleum hydrocarbons were detected, sediment lies in lined channel: no further delineation needed.	YES <u>Channel Sediment</u> Lined channel sediment recommended for CMS based on metals (Table A3.3-5).	YES <u>Channel Sediment</u> TPH not detected. Risks associated with metals drive CMS recommendation.
		Metals: None	<u>Channel Sediment</u> Collect and analyze surface sediment within lined channel (SRSS01) to characterize potential migration into pond. <u>Adjacent Soil</u> Collect soil samples adjacent to and beneath lined channel (SRBS05, SRBS29) at 0.5 and 3 feet bgs; analyze deeper sample(3 feet bgs) for metals and pH.	Metals results are shown on Figure A3.3-4A and A3.3-4B. <u>Channel Sediment</u> Cadmium (2 mg/kg), lead (56 mg/kg), and zinc (840 mg/kg) were detected above background and Eco RBSLs. Sediment is contained on either side in lined channel, and at the downslope end by the SRE Pond (Chem use area 14). No further delineation needed. <u>Adjacent Soil</u> No metals were detected above background in SRBS05. SRBS29 encountered refusal on shallow bedrock at 3 feet bgs. No further delineation needed.	YES <u>Channel Sediment</u> Lined channel sediment recommended for CMS based on metals (Table A3.3-5). <u>Adjacent Soil</u> Metals were below background at representative locations.	YES <u>Channel Sediment</u> Extent of affected soils defined by walls of lined channel, and by SRE Pond. <u>Adjacent Soil</u> Metals below background. Area lies within an area recommended for CMS based on mercury (Building 003 Leach Field)

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Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
13	**Former Industrial Dry Well** A septic sewer system received sanitary waste from Building 143 and 003. An industrial waste system paralleled this sewer system, but terminates in a dry well adjacent to the leach field. Any overflow from the dry well is into the concrete channel leading to the sump and pond. Cooling water algicides may have been transported to the dry well. (Rockwell, 1977). Shallow bedrock (less than 5 feet bgs) is present at the site, and the dry well was presumably cased into the Chatsworth formation bedrock.	**VOCs**: No documented release of VOCs in industrial drywell	VOCs screened for based on potential impacts from industrial wastewater received from other areas. Collect and analyze soil vapor (SRSV09) at 4 feet bgs adjacent to the former industrial dry well.	VOC results are shown on Figure A3.3-1. No VOCs were detected in soil vapor probe at targeted location: no further delineation needed.	YES No VOCs were detected in soil vapor at targeted location. Area contained within area recommended for further evaluation in CMS based on mercury in soil (Chem Use Area 3).	YES VOCs were not detected.
		Metals: Hexavalent chromium potentially used as cooling water algicide	Based on shallow bedrock in area (<5 feet in soil vapor probe), the industrial dry well was likely installed into Chatsworth formation bedrock. Due to downward infiltration of water, discernable impacts to surrounding soil unlikely. Impacts assessed via hexavalent chromium data in nearby Chatsworth formation monitoring well RD-86 (Table A3.3-2B).	Hexavalent chromium (potentially used as a cooling water algicide) was not detected in RD-86.	YES Area contained within area recommended for further evaluation in CMS based on mercury in soil (Chem Use Area 3). ~~Uncertainty regarding hexavalent chromium may be evaluated in CMS.~~	YES Potential impacts localized and area contained within portion of Chemical Use Area 3.

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Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
14	**SRE Pond** Includes Standpipe/ Overflow Drain Pond constructed in 1957 to support SRE activities. Earthen dam on eastern end (Structure 773) equipped with drainage control valve. Sump, pump and discharge pipeline installed in 1958 to divert effluent southeast toward OCY RFI site [See OCY RFI Site Report, Appendix A2]. Erosion control measures implemented along drainage blow dam to stabilize souls following the Topanga Fire and to limit potential contaminant migration.	**VOCs**: **SRE Pond** None; however, the pond received surface water runoff from the following Chemical Use Areas: ♦ Concrete channels (#12); ♦ Natural drainage from SCE Power Plant and mercury release area and cooling tower (#3); ♦ Building 003 Leach Field (#7); and ♦ Concrete Pad in Area 723 (#2). **Drainage Downslope of SRE Pond** None; however, the drainage receives surface water runoff from other Chemical Use Areas potentially impacted by VOCs.	**SRE Pond** Sampling rationale based on potential detects in upgradient Chemical Use Areas. <u>1990 Samples (Historical)</u> Collect and analyze sediment samples in 1 foot intervals down to bedrock (PS- 5 through PS-8). <u>Post 1997 Samples (RFI)</u> Collect and analyze sediment samples within the base of sump/standpipe (SRSU01) at 8.5 feet bgs, downslope of base of sump/standpipe (SRBS30) at 5 and 7.5 feet bgs, and within the pond (SRBS02, SRBS04, SRBS62) at 0.5 feet bgs to 4 feet bgs. **Drainage Downslope of SRE Pond** <u>1992 Samples (Historical)</u> Collect and analyze surface sediment samples from the unlined drainage downslope from SRE Pond (BB19001 through BB19004). These samples (historical) were collected as a part of a previous investigation to the RFI. <u>Post 2000 Samples (RFI)</u> Collect surface sediment samples from the unlined drainage downslope from SRE Pond (SRBS09 through SRBS11) to assess conditions downstream from the SRE Pond; analyze for VOCs.	VOC results are shown on Figure A3.3-1. **SRE Pond** VOCs were detected in Historical and RFI samples: • Methylene Chloride was detected above Eco RBSLs at PS-8 (4,200 and 3,700 µg/kg at 2 and 3 feet bgs respectively) in the pond during Historical sampling. Methylene chloride was detected again in RFI sampling at 13 µg/kg above Res RBSL (4 µg/kg) in sump sample (SRSU01). Xylenes were detected up to 520 µg/kg in Historical pond samples, and up to 0.6 µg/kg in pond samples during RFI sampling. • PCE (up to 330 µg/kg), Toluene (up to 3,600 µg/kg), TCE (up to 1,000 µg/kg), 1,1,1-Trichloroethane (up to 400 µg/kg), 1,1-Dichloroethane (up to 130 µg/kg), and 1,2-Dichloroethene (up to 120 µg/kg) were detected above Ecological and/or Residential RBSLs in PS-7and/or PS-8 (historical samples), but were not detected in co-located RFI samples (SRBS04). • Acetone was detected up to 36 µg/kg in pond samples collected during RFI sampling. **Drainage Downslope of SRE Pond** <u>Historical</u> Styrene (up to 4 µg/kg), Acetone (up to 30 µg/kg), and methylene chloride (up to 4 µg/kg) were detected. <u>RFI</u> • Acetone (up to 5,200 µg/kg), methylene chloride (up to 13 µg/kg), 2-butanone (up to 37 µg/kg) were detected in the drainage; and decreased down drainage to non detect. Drainage sediments are approximately 1 foot thick over bedrock. Impacts are limited laterally by width of drainage, approximately 10 feet at the upper end and 5 feet downslope near the SSFL Administrative boundary.	**SRE Pond** YES Area recommended for CMS based on VOC, PAH, metals, and dioxins concentrations and risk assessment results. **Drainage Downslope of SRE Pond** YES Area recommended for further evaluation in CMS based on VOC, dioxin, and metals concentrations, PAH, and TPH (as PAHs) , and risk assessment results.	**SRE Pond** YES Extent of impacted area is defined by topography (pond perimeter) and bedrock. **Drainage Downslope of SRE Pond** YES Downstream extent characterized by decreasing concentration trend (to non detect). Lateral extents are delineated by the channel edges, vertical extents are delineated by depth to bedrock.

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Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
14	**SRE Pond (continued)**	**SVOCs**: **SRE Pond** None; however, the pond received surface water runoff from other Chemical Use Areas potentially impacted by SVOCs. **Drainage Downslope of SRE Pond** None; however, the drainage receives surface water runoff from other Chemical Use Areas potentially impacted by SVOCs.	**SRE Pond** <u>1990 Samples (Historical)</u> Collect and analyze pond sediment samples in 1 foot intervals down to bedrock (PS-5 through PS-8). These samples (historical) were collected as a part of a previous investigation to the RFI. <u>Post 1997 Samples (RFI)</u> Collect and analyze sediment samples within the base of sump/standpipe (SRSU01) and within the pond (SRBS02) at 0.5 feet bgs to 4 feet bgs; analyze for SVOCs to evaluate elevated detects beneath upgradient Building 003 Leach Field (Chemical Use Area # 7). **Drainage Downslope of SRE Pond** <u>1992 Samples (Historical)</u> Collect and analyze surface sediment samples from the unlined drainage downslope from SRE Pond (BB19001 through BB19004). <u>Post 2000 Samples (RFI)</u> Collect and analyze surface sediment samples from the unlined drainage downslope of SRE Pond (SRBS09 through SRBS11) to assess conditions downstream from the SRE Pond.	SVOC results are shown on Figure A3.3-2. **SRE Pond** <u>Historical</u> Fluoranthene had the highest detected concentration in the Historical samples, up to 800 µg/kg, all other SVOCs were either detected at lower concentrations, or were not detected. Benzo(a)Pyrene was detected at 240 µg/kg at 0.5 feet bgs above Res RBSL (6 µg/kg), but below Eco RBSL (4,700 µg/kg) in PS-7. <u>RFI</u> No SVOCs were detected. Lateral extents of potentially impacted soil are delineated by the known pond perimeter (topography). Vertical extent is limited to soil above bedrock (3.5 to 9 feet bgs) which was encountered during soil sampling activities. **Drainage Downslope of SRE Pond** • PAHs were detected up to 54 µg/kg (phenanthrene); benzo(a)pyrene was detected at 4 µg/kg. PAHs decreased down drainage to less than 5 µg/kg. • 4-methylphenol and two phthalates were detected in one of four historical samples up to 2,200 µg/kg. Common laboratory contaminants were not detected in RFI samples. • No SVOCs were detected above RBSLs. Drainage sediments are approximately 1 foot thick over bedrock. Impacts are limited laterally by width of drainage, approximately 10 feet at the upper end and 5 feet downslope near the SSFL Administrative boundary.	**SRE Pond** YES Area recommended for CMS based on VOC, SVOC, metals, and dioxins concentrations and risk assessment results. **Drainage Downslope of SRE Pond** YES Area recommended for further evaluation in CMS based on VOC, dioxin, and metals concentrations, potential SVOC (as TPH) and measured concentrations, and risk assessment results.	**SRE Pond** YES Extent of impacted area is defined by topography (pond perimeter) and bedrock. **Drainage Downslope of SRE Pond** YES Downstream extent characterized by decreasing concentration trend (to non detect). Lateral extents are delineated by the channel edges, vertical extents are delineated by depth to bedrock.

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Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
14	**SRE Pond (continued)**	**TPH**: **SRE Pond** None; however, the pond received surface water runoff from other Chemical Use Areas potentially impacted by hydrocarbons. **Drainage Downslope of SRE Pond** None; however, the drainage receives surface water runoff from other Chemical Use Areas potentially impacted by hydrocarbons.	**SRE Pond** Post 1997 Samples (RFI) Collect and analyze sediment sample at influent (west) side of pond (SRBS02, SRBS30) from 0.5 to 7.5 feet bgs and within the base of the sump/standpipe (SRSU01) at 8.5 feet bgs; analyze for TPH to evaluate detects in upgradient chemical use areas. **Drainage Downslope of SRE Pond** Post 2000 Samples (RFI) Collect and analyze surface sediment samples from the unlined drainage downslope from SRE Pond (SRBS09 through SRBS11, SRBS31) to assess conditions downstream from the SRE Pond.	TPH results are shown on Figure A3.3-2. **SRE Pond** No hydrocarbons were detected. No further delineation needed. **Drainage Downslope of SRE Pond** RFI • Gasoline-, kerosene-, and diesel-range hydrocarbons were not detected in any samples. • Lubricant-oil range hydrocarbons were detected up to 420 mg/kg, decreasing down to 6 mg/kg downstream. • Combined kerosene-, diesel-, and lubricant-oil range hydrocarbon. Drainage sediments are approximately 1 foot thick over bedrock. Impacts are limited laterally by width of drainage, approximately 10 feet at the upper end and 5 feet downslope near the SSFL Administrative boundary.	**SRE Pond** YES Area recommended for CMS based on VOC, SVOC, metals, and dioxins concentrations and risk assessment results as described above and below. **Drainage Downslope of SRE Pond** **YES** Area recommended for further evaluation in CMS based on VOC, dioxin, and metals concentrations, potential SVOC (as TPH) and measured concentrations, and risk assessment results.	**SRE Pond** YES TPH not detected and associated risks do not drive CMS recommendation. **Drainage Downslope of SRE Pond** YES Downstream extent characterized by decreasing concentration trend. Lateral extents are delineated by the channel edges, vertical extents are delineated by depth to bedrock.
		PCBs: **SRE Pond** None; however, the pond received surface water runoff from other Chemical Use Areas potentially impacted by PCBs. **Drainage Downslope of SRE Pond** None; however, the drainage receives surface water runoff from other Chemical Use Areas potentially impacted by PCBs.	**SRE Pond** Post 1997 Samples (RFI) Collect and analyze sediment samples (SRBS60, SRBS64) at 0.5 feet bgs; analyze based on elevated detects in upgradient transformer areas. **Drainage Downslope of SRE Pond** Post 2000 Samples (RFI) Collect and analyze sediment samples (SRBS85, SRBS86) at 0.5 feet bgs to assess conditions downstream from the SRE Pond.	PCB results are shown on Figure A3.3-2. **SRE Pond** RFI Aroclor 1254 (110 µg/kg) and Aroclor 1260 (180 µg/kg) were detected in SRBS60, above the Ecological RBSL (79 µg/kg). No other PCBs were detected. Sediment thickness is defined by bedrock encountered (3.5 – 9 feet bgs) during historical and RFI sampling activities. **Drainage Downslope of SRE Pond** No PCBs were detected.	**SRE Pond** YES Area recommended for further consideration in CMS based on SVOC, dioxins, and metals results. **Drainage Downslope of SRE Pond** YES Area recommended for further evaluation in CMS based on VOC, dioxin, and metals concentrations, potential SVOC (as TPH) and measured concentrations, and risk assessment results.	**SRE Pond** YES PCBs limited and associated risks do not drive CMS recommendation. **Drainage Downslope of SRE Pond** PCBs not detected.

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Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
14	**SRE Pond (continued)**	**Dioxins**: **SRE Pond** None; however, the pond received surface water runoff from other areas. **Drainage Downslope of SRE Pond** None; however, the drainage receives surface water runoff from other areas.	**SRE Pond** Post 1997 Samples (RFI) Collect sediment sample (SRBS60) at 0.5 feet bgs; analyze for dioxins based on detects in sediment within SRE Pond Discharge Area [See OCY RFI Site Report, Appendix A2]. **Drainage Downslope of SRE Pond** Post 2000 Samples (RFI) Collect and analyze sediment samples (SRBS85, SRBS86) at 0.5 feet bgs to assess conditions downstream from the SRE Pond. Samples were collected from the bank sediments within drainage to avoid recently deposited burned material associated with the September/October 2005 Topanga Fire.	Dioxin results are shown on Figure A3.3-3. **SRE Pond** RFI Dioxin TEQ (26 ng/kg) was above background, and Residential and Ecological RBSLs (0.98, 6.9, 3.4 ng/kg respectively). Dioxin congener 1,2,3,4,6,7,8-HpCDD (1,320 ng/kg) was detected above Residential and Ecological RBSLs (690 and 1,000 ng/kg respectively). Sediment thickness is defined by bedrock encountered (3.5 to 9 feet bgs) during historical and RFI sampling activities. Lateral extents of potentially impacted soil are delineated by the known pond perimeter (topography). **Drainage Downslope of SRE Pond** • Dioxin TEQs 6.5 ng/kg at SRBS85 and 12 ng/kg at SRBS86, above background (0.98 ng/kg), Eco RBSLs (3.4 ng/kg), and (SRBS86) Res RBSLs (6.9 ng/kg) • Similarly, dioxin congeners were detected above background. • Dioxins potentially related to concentration of dioxins in drainages from fire related soures. Drainage sediments are approximately 1 foot thick over bedrock, lateral extent is delineated by width of drainage, approximately 10 feet at the upper end and 5 feet downslope near the SSFL Administrative boundary.	**SRE Pond** YES Area recommended for further consideration in CMS based on VOC, SVOC, dioxins, and metals results. **Drainage Downslope of SRE Pond** YES Area recommended for further evaluation in CMS based on VOC, dioxin, and metals concentrations, potential SVOC (as TPH) and measured concentrations, and risk assessment results.	**SRE Pond** YES Extent of impacted area is defined by topography (pond perimeter) and bedrock. **Drainage Downslope of SRE Pond** YES Lateral extents are delineated by the channel edges, vertical extents are delineated by depth to bedrock (1 foot bgs). Assume length of drainage to administrative boundary.

Table A3.3-2A (Page 17 of 18)

Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
14	**SRE Pond (continued)**	**SRE Pond** **Metals**: None; however, the pond received surface water runoff from other Chemical Use Areas potentially impacted by metals. **Drainage Downslope of SRE Pond** None; however, the drainage receives surface water runoff from other Chemical Use Areas potentially impacted by metals.	**SRE Pond** <u>1990 Samples (Historical)</u> Collect and analyze sediment samples in 1 foot intervals down to bedrock (PS-5 through PS-8). These samples (historical) were collected as a part of a previous investigation to the RFI. <u>Post 1997 Samples (RFI)</u> Collect and analyze sediment samples within (SRSU01 to 8.5 feet bgs), downslope of base of sump/ standpipe(SRBS30) at 5 and 7.5 feet bgs, and within the SRE Pond (SRBS02, SRBS03) at 0.5 feet bgs to 4 feet bgs. Collect and analyze sediment samples near center of pond (SRBS60, SRBS64) at 0.5 feet bgs; analyze for mercury, selenium, silver and thallium to address high detection limit issues in historical samples. **Drainage Downslope of SRE Pond** <u>1992 Samples (Historical)</u> Collect and analyze surface sediment samples from the unlined drainage downslope from SRE Pond (BB19001 through BB19004). <u>Post 2000 Samples (RFI)</u> Collect and analyze surface sediment samples from the unlined drainage downslope from SRE Pond (SRBS09 through SRBS11, SRBS31, SRBS85 through SRBS89) to assess conditions downstream from the SRE Pond.	Metals results are shown on Figure A3.3-4A and A3.3-4B. **SRE Pond** Concentrations for ten metals were above background in three samples (SRSU01, SRBS02, SRBS03). • The five metals detected above background in historical samples were also above background in RFI samples. Cadmium (1mg/kg historical, 2 mg/kg RFI), copper (up to 53.3 mg/kg historical, 130 mg/kg), and zinc (up to 110 mg/kg historical, up to 490 mg/kg) concentrations were higher in RFI samples. • Five additional metals concentrations exceed background: barium (200 mg/kg), beryllium (1.4 mg/kg), chromium (41 mg/kg), silver (6 mg/kg), and vanadium (77 mg/kg). All of these exceeded Res or Eco RBSLs, except beryllium and chromium. • Selenium, Silver and Thallium were either detected below background, or were not detected in the samples analyzed to address the high detection limit issue for these metals in the historical samples. • Most detects occur in shallowest samples, with concentrations generally decreasing with depth. Sediment thickness is defined by bedrock encountered (3.5 – 9 feet bgs) during historical and RFI sampling activities. Lateral extents of potentially impacted soil are delineated by the known pond perimeter (topography). **Drainage Downslope of SRE Pond** Concentrations for these five metals exceeded background among four samples (SRBS09 through SRBS11, SRBS31): • mercury (up to 0.25 mg/kg), copper (at 36.9 mg/kg), manganese (at 907 mg/kg), selenium (at 0.77 mg/kg), and zinc (up to 378 mg/kg). All of these metals were above EcoRBSLs, except mercury. • The highest concentrations were mostly found nearest to the pond (SRBS10, SRBS11). • Concentrations for these five metals generally decrease downstream to background levels away from the pond. Drainage sediments are approximately 1 foot thick over bedrock, lateral extent is delineated by width of drainage, approximately 10 feet at the upper end and 5 feet downslope near the SSFL Administrative boundary.	**SRE Pond** YES Area recommended for further consideration in CMS based on VOC, SVOC, dioxins, and metals results. **Drainage Downslope of SRE Pond** YES Area recommended for further evaluation in CMS based on VOC, dioxin, and metals concentrations, potential SVOC (as TPH) and measured concentrations, and risk assessment results.	**SRE Pond** YES Extent of impacted area is defined by topography (pond perimeter) and bedrock. **Drainage Downslope of SRE Pond** YES Downstream extent characterized by decreasing concentration trend. Lateral extents are delineated by the channel edges, vertical extents are delineated by depth to bedrock (1 foot bgs).

Table A3.3-2A (Page 18 of 18)

Description of Chemical Use Areas at the SRE 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 A3.2-1 for sampling locations]	Sampling Results Chemical concentrations detected above background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment? [3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A3.5-1 for CMS areas]
15	**SRE Pond Discharge Pipeline** (Does not appear on map) Pipeline installed to divert SRE pond water to the south of a local surface water divide. The 4-inch diameter pipeline discharged at OCY RFI site, approx. 800 feet to the east. Most of pipeline removed in 2002 during adjacent OCY RFI site demolition activities.	Aboveground pipeline begins in SRE RFI site, and discharges at the OCY RFI Site (SWMU 7.4). The aboveground pipeline was inspected during the RFI, but not sampled since the pipeline appeared to be in good repair, and samples were collected from the natural drainage into which the pipeline discharged (at the OCY RFI site). This pipeline is evaluated as part of the OCY RFI Site investigation. [See Table A2.3-2A in OCY RFI Report (OCY Chemical Use Area 4)].				
16	**Entire Site as Potential Storage Area** (Does not appear on map) Flat areas within SRE site potentially used for storage of equipment/containers.	**VOCs**: None documented	Install soil vapor probes peripheral to former Buildings 003, 143, and 163 (SRSV01,03, 05, 06, 07) up to 27 feet bgs; analyze for VOCs.	VOC results are shown on Figure A3.3-1. Freon-113 was detected in four soil vapor probes (SRSV01,03,06,07) in concentrations ranging from 2 to 3.9 µg/l. No other VOCs were detected in any of the samples collected. Bedrock outcrops are present throughout the site, delineating breaks in potential migration pathways. Ubiquitous distribution of low Freon-113 concentrations do not indicate localized source, or extensive impacts: no further delineation needed.	YES Freon-113 was detected at low concentrations in the central region of the SRE site. Sample distribution adequate to assess impacts. No gradient indicated.	YES VOC results and associated risks do not warrant recommendation for CMS evaluation; however, individual chemical use areas within the SRE site have been recommended for CMS evaluation as described in the individual chemical use area sections above.

Sources: Boeing, 2001c and 2001d; ICF, 1993; SAIC, 1994; Lenox, 2000b; Ogden ,1996; Trippeda, 2006b; Rockwell, 1977; Rockwell, 1994; AESE, 1995; GRC, 1990; McLaren/Hart, 1993; and facility records

ACRONYMS

bgs = below ground surface
CMS = Corrective Measures Study
DL = Laboratory Detection Limit
EcoRBSL = Ecological risk based screening level
mg/kg = milligrams per kilogram
ng/kg = nanograms per kilogram
OCY = Old Conservation Yard
PAH = Polynuclear aromatic hydrocarbon
PCB = Polychlorinated biphenyls
Res RBSL = Residential risk based screening level
RFI = Resource Conservation and Recovery Act (RCRA) Facility Investigation
SRE = Sodium Reactor Experiment
SVOC = Semi volatile organic compounds
TEQ = 2,3,7,8-TCDD Toxicity Equivalency Quotient
TPH = Total petroleum hydrocarbons
µg/kg = micrograms per kilogram
VCEHD = Ventura County Environmental Health Department
VOC = Volatile organic compounds

Notes:

*NDMA was not analyzed as a part of all SVOC analyses in all samples. Some samples did not include NDMA analysis; however NDMA was analyzed in representative locations throughout the site.

[1] 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 Table 3-2A. For example, site records and physical evidence did not suggest burning activities in the New Conservation Yard. Therefore, dioxins were not analyzed in samples from this chemical use area and are not listed.

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

[3] Concentration gradients must be defined such that risk assessment reflects maximum analyte concentration OR concentration sufficiently high to result in risk requiring recommendation for evaluation during CMS. Such data may be deemed unnecessary if other constituent concentrations are sufficient to require a CMS recommendation, provided the CMS areas for both constituents are roughly similar.

[4] Chemicals listed as basis for CMS recommendation include both chemical drivers (above 1 x 10^{-6} risk and HI of 1.0) and significant chemical contributors to overall risk.

[5] Potential volumes for CMS evaluation must be known within a factor of ten for comparison of remedy selection.

Table A3.3-2B (Page 1 of 3)
Summary and Evaluation of Groundwater Sampling Results at the SRE RFI Site

Analytical Group	Site Soil Impacts? (Summary of Relevant Impacts) [See Table A3.3-2A for a complete summary of soil impacts]	Monitored in GW? Number of samples/Date Range [See Figure A3.2-1 for monitoring locations]	Constituents Detected in GW? Above Groundwater Comparison Concentrations (GWCCs) or Regulatory Criteria?* [see Appendix B for a summary of groundwater results]	Site Related? (Describe Transport & Fate)	Groundwater Characterized Sufficiently for Risk Assessment?
VOCs	No VOCs were detected in soil vapor samples throughout the RFI site. 1,4 Dioxane was not analyzed in surficial soil. <u>Oil Stain</u> Methylene Chloride was detected at the Oil Stain area adjacent to Building 003. <u>Pond</u> Methylene Chloride was detected in the sump adjacent to the SRE Pond. Seven VOCs (Methylene Chloride, Tetrachloroethene, Toluene, Trichloroethene, 1,1-Dichloroethane, 1,2-Dichloroethene, and Xylenes) were detected in historical samples collected at the SRE Pond. Samples collected during RFI co-located with historical samples did not exceed RBSLs. Trichloroethene was detected in one historical sample at 2.5 feet bgs at 1000 µg/kg in 1990 but were not detected (below 6 µg/kg) in a co-located sample in 1998. <u>SRE Pond Drainage</u> Methylene chloride was detected, with concentrations decreasing to non-detect further downstream from the SRE Pond.	YES. A total of 49 samples were collected and analyzed for VOCs between 1989 and 2005 in RD-18 (45 samples), RD-85 (2 samples), and RD-86 (2 samples). 1,4 dioxane was analyzed in 9 samples from 1993 to 2001 in RD-18.	YES Three VOCs were detected in RD-86 above MCLs. <u>RD-86</u> • 1,2-Dichloroethane was detected in 2004 (0.9 µg/L) above the MCL (0.5 µg/L). • cis-1,2-Dichloroethene was detected in 2004 (51 µg/L) above the MCL (6 µg/L). • Trichloroethene was detected in 2004 (10 µg/L) above the MCL (5 µg/L). 1,4 Dioxane was not detected in groundwater samples.	YES • 1,2-Dichloroethene and Trichloroethene were detected above RBSLs in SRE Pond sediment. • The SRE Pond acts as a local recharge source.	YES CMS recommendation for Group 6 groundwater will be made in Final Sitewide Groundwater Report, if needed. Groundwater risk results suggest CMS recommendation likely for all Group 6 as a whole.
SVOCs	<u>Building 003 Leach Field</u> Multiple SVOC compounds were detected within the Building 003 Leach Field. Benzo(a)pyrene was detected at concentrations exceeding RBSLs. N-nitrosodimethylamine (NDMA) was analyzed in the Building 003 Leach Field, SRE Pond, and the SRE Pond Drainage. NDMA was not detected in any of these samples.	YES A total of eight samples were collected and analyzed for SVOCs between 1993 and 2006 in RD-18 (5 samples) and RD-86 (3 samples). NDMA was analyzed in 5 samples from 1989 to 2006 in RD-18 and RD-86.	NO SVOCs, including NDMA, were not detected in groundwater at the SRE site.	--	YES
TPH	<u>Building 003 Leach Field</u> Gasoline-range hydrocarbons detected in the Building 003 Leach Field.	NO TPH was evaluated in groundwater on a group-wide basis. TRPH was found in low concentrations in groundwater samples at RD-14 (OCY), near most prominent TPH impacts in soil.	-- TRPH was found in low concentrations in groundwater samples at RD-14 (OCY), near most prominent TPH impacts in soil.	--	YES
PCBs	<u>Transformer Area 683</u> Aroclor 1260 was detected at Transformer Area 683. <u>Transformer Area 693</u> Aroclor 1254 was detected at Transformer Area 693. <u>SRE Pond</u> Two Aroclors (Aroclor 1254 and Aroclor 1260) were detected above RBSLs at the SRE Pond.	NO. PCBs are evaluated on a group-wide basis. PCBs were not detected in groundwater samples at RD-14 and PZ-114 (OCY), near most prominent PCB impacts in soil. Furthermore, PCBs are not expected to be readily transported due to large molecules, low solubility, or high retardation factors.	-- PCBs were not detected in groundwater samples at RD-14 and PZ-114 (OCY), near most prominent PCB impacts in soil. Furthermore, PCBs are not expected to be readily transported due to large molecules, low solubility, or high retardation factors.	--	YES

Table A3.3-2B (Page 2 of 3)
Summary and Evaluation of Groundwater Sampling Results at the SRE RFI Site

Analytical Group	Site Soil Impacts? (Summary of Relevant Impacts) [See Table A3.3-2A for a complete summary of soil impacts]	Monitored in GW? Number of samples/Date Range [See Figure A3.2-1 for monitoring locations]	Constituents Detected in GW? Above Groundwater Comparison Concentrations (GWCCs) or Regulatory Criteria?* [see Appendix B for a summary of groundwater results]	Site Related? (Describe Transport & Fate)	Groundwater Characterized Sufficiently for Risk Assessment?
Dioxins	<u>SRE Pond</u> Several Dioxin Congeners were detected above background within the SRE Pond sediment. 1,2,3,4,6,7,8-HpCDD and TCDD TEQ were above background at the SRE Pond. <u>SRE Pond Drainage</u> Several Dioxin Congeners were detected above background downstream from the SRE Pond. TCDD TEQ were detected above background downstream from the SRE Pond, concentrations appear to increase in the sample further downstream from the pond.	NO Dioxins were evaluated in groundwater on a group-wide basis. Dioxins were nondetect in RD-14 (OCY) or were considered low and unrelated to site activities in PZ-056, near most prominent dioxin impacts in soil. Dioxins are not expected to be readily transported due to low solubility.	-- Dioxins were non detect in RD-14 (OCY) or were considered low and naturally occurring in PZ-056 (see Appendix B), near most prominent dioxin impacts in soil. Dioxins are not expected to be readily transported due to low solubility.	--	YES
Metals	<u>Building 724</u> Mercury was detected above background downslope from Building 724. <u>Southern California Edison Steam Power Plant</u> Aluminum was detected just over background at the former steam power plant cooling tower. Mercury was detected above background throughout the former power plant site, downslope in the drainage leading the SRE pond, downslope towards the Building 003 Leach Field, and down the drainage from the power plant area to the SRE Pond. <u>Building 003 Leach Field</u> Six metals (Silver, Mercury, Manganese, Copper, Selenium and Thallium) were detected above background at the Building 003 Leach Field. <u>SRE Pond Influent Channels</u> Three metals (Cadmium, Lead and Zinc) were detected above background in the sediments within the lined channels leading to the SRE Pond. <u>SRE Pond</u> Ten metals (Mercury, Silver, Zinc, Barium, Beryllium, Cadmium, Chromium, Copper, Lead and Vanadium) were detected above background. Most detects occur in shallowest samples, with concentrations generally decreasing with depth. <u>Pond Drainage</u> Five metals (Mercury, Copper, Selenium, Manganese and Zinc) were detected above background with concentrations decreasing downstream from the SRE Pond.	YES A total of 8 samples were collected and analyzed for metals between 1989 and 2006 in RD-18 (5 samples) and RD-86 (3 samples).	YES Four metals were detected above GWCCs in RD-86. • Dissolved Cobalt was detected above GWCC (1.9 µg/L) in 2004 at 3.4 µg/L. • Dissolved Copper was detected above GWCC (4.7 µg/L) in 2004 at 18 µg/L. • Dissolved Selenium was detected slightly above GWCC (1.6 µg/L) in 2005 at 1.9 µg/L. • Dissolved Thallium was detected in 2005 (0.54 µg/L) above GWCC (ND<0.13 µg/L). Note: Hexavalent chromium was not detected in RD-86. Most recent samples (in 2005 and/or 2006) did not contain any metals above GWCCs.	YES • The Building 003 Leach Field and the SRE Pond serve as local recharge areas. • Copper Up to 4 x Background in soil at leach field. • Thallium greater than background in soil at leach field. <u>Not Site Related</u> • Selenium only slightly greater than GWCC and only minor exceedance of soil background. • Cobalt less than background in soil.	YES CMS recommendation for Group 6 groundwater will be made in Final Sitewide Groundwater Report, if needed. Groundwater risk results suggest CMS recommendation likely for all Group 6 as a whole.
Perchlorate	Perchlorate has no known related chemical use, storage, or discharge at site and was not analyzed in surficial media samples at SRE.	YES. A total of seven samples were collected and analyzed for Perchlorate between 1989 and 2006 in RD-18 (6 samples) and RD-86 (1 sample).	No Perchlorate was detected in groundwater.	--	YES

Table A3.3-2B (Page 3 of 3)
Summary and Evaluation of Groundwater Sampling Results at the SRE RFI Site

Analytical Group	Site Soil Impacts? (Summary of Relevant Impacts) [See Table A3.3-2A for a complete summary of soil impacts]	Monitored in GW? Number of samples/Date Range [See Figure A3.2-1 for monitoring locations]	Constituents Detected in GW? Above Groundwater Comparison Concentrations (GWCCs) or Regulatory Criteria?* [see Appendix B for a summary of groundwater results]	Site Related? (Describe Transport & Fate)	Groundwater Characterized Sufficiently for Risk Assessment?
Herbicides	Herbicides have no known related chemical use, storage, or discharge at site and were not analyzed in surficial media samples at SRE.	YES. A total of four samples were collected and analyzed for Herbicides in 1993 in RD-18.	NO No herbicides were detected in groundwater at the site.	--	YES
Pesticides	Pesticides have no known related chemical use, storage, or discharge at site and were not analyzed in surficial media samples at SRE.	YES. A total of four samples were collected and analyzed for Pesticides in 1993 in RD-18.	No Pesticides were detected in groundwater.	--	YES

ACRONYMS

bgs - below ground surface
CMS - Corrective Measures Study
mg/kg - milligrams per kilogram
MCL – Maximum Contaminant Limit
ng/kg - nanograms per kilogram
OCY - Old Conservation Yard
PAH - Polynuclear aromatic hydrocarbon
PCB - Polychlorinated biphenyls
RBSL – Risk based screening level
RFI - Resource Conservation and Recovery Act (RCRA) Facility Investigation
SRE - Sodium Reactor Experiment
SSFL - Santa Susana Field Laboratory
SVOC - Semi volatile organic compounds
TCE – Trichloroethene
TEQ - Toxic Equivalency Quotient
TRPH – Total Recoverable Petroleum Hydrocarbons
TPH – Total Petroleum Hydrocarbons
VOC - Volatile organic compound

Notes:

* Screening levels for groundwater are provided in Table B-5 in Appendix B of the Group 6 RFI report.

Table A3.3-3A
SRE RFI Report
Analytical Data Quality for Soil Vapor VOCs
Page 1 of 1

Constituent	units	Screening Levels [1]		Area IV AOC - SRE RFI Site Data									Data Issue	Issue Resolution[2]
				Site Data Summary (all)					Site Non Detect Data Summary					
		Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > ResRBSL	NDs > EcoRBSL		
1,1,1-Trichloroethane	µg/L	640	NA	16	0	NA	NA	16	1	1	0	NA	--	--
1,1,2-Trichloroethane	µg/L	0.17	NA	16	0	NA	NA	16	1	1	16	NA	--	--
1,1,2-Trichlorotrifluoroethane	µg/L	8800	NA	16	7	2	3.9	9	5	5	0	NA	--	--
1,1-Dichloroethane	µg/L	1.7	NA	16	0	NA	NA	16	1	1	0	NA	--	--
1,1-Dichloroethene	µg/L	58	NA	16	0	NA	NA	16	1	1	0	NA	--	--
1,2-Dichloroethane	µg/L	0.13	NA	16	0	NA	NA	16	1	1	16	NA	--	--
Benzene	µg/L	0.095	NA	16	0	NA	NA	16	1	1	16	NA	--	--
Carbon tetrachloride	µg/L	0.063	NA	16	0	NA	NA	16	1	1	16	NA	--	--
Chloroform	µg/L	0.5	NA	16	0	NA	NA	16	1	1	16	NA	--	--
cis-1,2-Dichloroethene	µg/L	10	NA	16	0	NA	NA	16	1	1	0	NA	--	--
Dichlorodifluoromethane	µg/L	58	NA	16	0	NA	NA	16	1	1	0	NA	--	--
Ethylbenzene	µg/L	290	NA	16	0	NA	NA	16	1	1	0	NA	--	--
m,p-Xylene	µg/L	NA	NA	16	0	NA	NA	16	1	2	NA	NA	--	--
Methylene chloride	µg/L	2.7	NA	16	0	NA	NA	16	1	50	8	NA	Elevated DLs	a, d, and/or e; (d - Methylene chloride had one elevated DL outside of CMS areas in the SRE Pond Influent Channels. No other VOCs were detected in this sample.) (e - All other samples taken at the same time [February 2006] had the same elevated DL of 50 in samples across the site).
o-Xylene	µg/L	29	NA	16	0	NA	NA	16	1	1	0	NA	--	--
Tetrachloroethene	µg/L	0.45	NA	16	0	NA	NA	16	1	1	16	NA	--	--
Toluene	µg/L	110	NA	16	0	NA	NA	16	1	1	0	NA	--	--
trans-1,2-Dichloroethene	µg/L	20	NA	16	0	NA	NA	16	1	1	0	NA	--	--
Trichloroethene	µg/L	1.4	NA	16	0	NA	NA	16	1	1	0	NA	--	--
Trichlorofluoromethane	µg/L	200	NA	16	0	NA	NA	16	1	1	0	NA	--	--
Vinyl chloride	µg/L	0.035	NA	16	0	NA	NA	16	1	2	16	NA	Elevated DLs	a and e

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

[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] The following statements indicate standard DL issue resolutions and important notes throughout the group. Additional detail is provided when the elevated DL does not fall within a CMS area.

(a) Elevated DLs are located within an area recommended for further evaluation in CMS.

(b) Samples were recollected and analyzed with adequate DLs at representative locations; Results do not indicate that elevated DLs in earlier samples are an issue.

(c) Elevated DLs were observed group-wide in areas with no indications of a source.

(d) Site history does not indicate a source; results of other analytes in the same area suggest low concentrations.

(e) 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.

(f) DL concentrations are only slightly above background or screening levels.

ACRONYMS

DL - detection limit

EcoRBSL - ecological screening level

NA - not applicable

ND - not detected

ResRBSL - residential screening level

Table A3.3-3B
SRE RFI Report
Analytical Data Quality for Soil Matrix VOCs
Page 1 of 2

Constituent	units	Screening Levels [1]		Area IV AOC - SRE RFI Site Data									Data Issue	Issue Resolution[2]
				Site Data Summary (all)					Site Non Detect Data Summary					
		Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > ResRBSL	NDs > EcoRBSL		
1,1,1-Trichloroethane	µg/kg	490	2800000	40	2	400	400	38	1.8	50	0	0	--	--
1,1,2-Trichloroethane	µg/kg	1.2	9000	40	0	NA	NA	40	1.8	50	40	0	Elevated DLs	a, d, and/or e; (d - 1,1,2-Trichloroethane had elevated DLs in the samples taken around the former UT-71 and UT-74. These samples were collected during the removal process of the tanks, under VCEHD oversight. PIDs were installed during the removal of the tanks, and high concentrations were not recorded. Based on these sample results, VCEHD approved closure of these tanks. In addition, TPH was not detected (with acceptable DLs) at either tank. Moreover, the former UT-74 was a diesel fuel tank and VOCs are not normally associated with diesel fuel.
1,1,2-Trichlorotrifluoroethane	µg/kg	16000	200000	13	0	NA	NA	13	4.6	24	0	0	--	--
1,1-Dichloroethane	µg/kg	1.6	230000	40	2	90	130	38	1.8	50	38	0	Elevated DLs	a, d, and/or e; (d - 1,1-Dichloroethane had elevated DLs in the samples taken around the former UT-71 and UT-74. These samples were collected during the removal process of the tanks, under VCEHD oversight. PIDs were installed during the removal of the tanks, and high concentrations were not recorded. Based on these sample results, VCEHD approved closure of these tanks. In addition, TPH was not detected (with acceptable DLs) at either tank. Moreover, the former UT-74 was a diesel fuel tank and VOCs are not normally associated with diesel fuel.
1,1-Dichloroethene	µg/kg	23	12000	40	0	NA	NA	40	4.6	50	14	0	Elevated DLs	a and e
1,2,4-Trimethylbenzene	µg/kg	35	690000	18	0	NA	NA	18	1.8	24	0	0	--	--
1,2-Dichloroethane	µg/kg	0.5	76000	40	0			40	1.8	50	40	0	Elevated DLs	a, d, and/or e; (d - 1,2-Dichloroethane had elevated DLs in the samples taken around the former UT-71 and UT-74. These samples were collected during the removal process of the tanks, under VCEHD oversight. PIDs were installed during the removal of the tanks, and high concentrations were not recorded. Based on these sample results, VCEHD approved closure of these tanks. In addition, TPH was not detected (with acceptable DLs) at either tank. Moreover, the former UT-74 was a diesel fuel tank and VOCs are not normally associated with diesel fuel.
1,2-Dichloroethene (total)	µg/kg	14	74000	23	2	50	120	21	7	50	12	0	Elevated DLs	a and e
1,3,5-Trimethylbenzene	µg/kg	36	690000	21	0			21	1.8	24	0	0	--	--
1,4-Dichlorobenzene	µg/kg	10	170000	39	0			39	1.8	50	19	0	Elevated DLs	a and e
1-Chlorohexane	µg/kg	NA	NA	3	2	1	1	1	5	5	NA	NA	--	--
2-Butanone	µg/kg	62000	8200000	40	4	5	37	36	5	1000	0	0	--	--
4-Isopropyltoluene	µg/kg	NA	NA	11	0			11	1.8	10	NA	NA	--	--
Acetone	µg/kg	51000	46000	40	11	20	5200	29	9.1	1000	0	0	--	--
Benzene	µg/kg	0.13	4600	40	0	NA	NA	40	1.8	50	40	0	Elevated DLs	a, d, and/or e; (d - Benzene had elevated DLs in the samples taken around the former UT-71 and UT-74. These samples were collected during the removal process of the tanks, under VCEHD oversight. PIDs were installed during the removal of the tanks, and high concentrations were not recorded. Based on these sample results, VCEHD approved closure of these tanks. In addition, TPH was not detected (with acceptable DLs) at either tank. Moreover, the former UT-74 was a diesel fuel tank and VOCs are not normally associated with diesel fuel.
Carbon disulfide	µg/kg			24	0	NA	NA	24	5	50	NA	NA	--	--
Carbon tetrachloride	µg/kg	0.042	1600	40	0	NA	NA	40	4.6	50	40	0	Elevated DLs	a, d, and/or e; (d - Carbon tetrachloridehad elevated DLs in the samples taken around the former UT-71 and UT-74. These samples were collected during the removal process of the tanks, under VCEHD oversight. PIDs were installed during the removal of the tanks, and high concentrations were not recorded. Based on these sample results, VCEHD approved closure of these tanks. In addition, TPH was not detected (with acceptable DLs) at either tank. Moreover, the former UT-74 was a diesel fuel tank and VOCs are not normally associated with diesel fuel.
Chlorobenzene	µg/kg	97	63000	40	0	NA	NA	40	1.8	50	0	0	--	--
Chloroform	µg/kg	0.77	920	40	0	NA	NA	40	1.8	50	40	0	Elevated DLs	a, d, and/or e; (d - Chloroform had elevated DLs in the samples taken around the former UT-71 and UT-74. These samples were collected during the removal process of the tanks, under VCEHD oversight. PIDs were installed during the removal of the tanks, and high concentrations were not recorded. Based on these sample results, VCEHD approved closure of these tanks. In addition, TPH was not detected (with acceptable DLs) at either tank. Moreover, the former UT-74 was a diesel fuel tank and VOCs are not normally associated with diesel fuel.
cis-1,2-Dichloroethene	µg/kg	14	74000	25	0	NA	NA	25	1.8	10	0	0	--	--
Dichlorodifluoromethane	µg/kg	15	69000	21	0	NA	NA	21	4.6	30	5	0	Elevated DLs	
Ethylbenzene	µg/kg	1200	220000	40	1	100	100	39	1.8	50	0	0	--	--

Table A3.3-3B
SRE RFI Report
Analytical Data Quality for Soil Matrix VOCs
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Constituent	units	Screening Levels [1]		Area IV AOC - SRE RFI Site Data									Data Issue	Issue Resolution[2]
				Site Data Summary (all)					Site Non Detect Data Summary					
		Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > ResRBSL	NDs > EcoRBSL		
m,p-Xylene	µg/kg	150	690000	25	1	0.6	0.6	24	1.8	20	0	0	--	--
Methyl tert-butyl ether	µg/kg	NA	NA	11	0	NA	NA	11	4.6	50	NA	NA	--	--
Methylene chloride	µg/kg	4	27000	40	8	4	4200	32	5	300	32	0	Elevated DLs	a, d, and/or e; (d - Methylene chloride had elevated DLs outside of CMS areas in two locations at the former cooling tower. Other VOCs in these samples are not detected above RBSLs. Metals in these samples were also detected below background or just above. Methylene chloride also had elevated DLs in the samples taken around the former UT-71 and UT-74. These samples were collected during the removal process of the tanks, under VCEHD oversight. PIDs were installed during the removal of the tanks, and high concentrations were not recorded. Based on these sample results, VCEHD approved closure of these tanks. In addition, TPH was not detected (with acceptable DLs) at either tank. Moreover, the former UT-74 was a diesel fuel tank and VOCs are not normally associated with diesel fuel.
Naphthalene	µg/kg	6000	240000	11	0	NA	NA	11	4.6	10	0	0	--	--
o-Xylene	µg/kg	190	690000	25	0	NA	NA	25	1.8	10	0	0	--	--
Tetrachloroethene	µg/kg	0.43	2300	40	3	100	330	37	1.8	50	37	0	Elevated DLs	a, d, and/or e; (d - Tetrachloroethene had elevated DLs in the samples taken around the former UT-71 and UT-74. These samples were collected during the removal process of the tanks, under VCEHD oversight. PIDs were installed during the removal of the tanks, and high concentrations were not recorded. Based on these sample results, VCEHD approved closure of these tanks. In addition, TPH was not detected (with acceptable DLs) at either tank. Moreover, the former UT-74 was a diesel fuel tank and VOCs are not normally associated with diesel fuel.
Toluene	µg/kg	300	2700	40	3	420	3600	37	1.8	100	0	0	--	--
trans-1,2-Dichloroethene	µg/kg	16	1000000	25	0	NA	NA	25	1.8	10	0	0	--	--
Trichloroethene	µg/kg	2.2	3200	40	4	130	1000	36	1.8	50	34	0	Elevated DLs	a, d, and/or e; (d - Trichloroethene had elevated DLs in the samples taken around the former UT-71 and UT-74. These samples were collected during the removal process of the tanks, under VCEHD oversight. Based on these sample results, VCEHD approved closure of these tanks. In addition, TPH and other VOCs were not detected at either tank. Moreover, the former UT-74 was a diesel fuel tank and VOCs are not normally associated with diesel fuel.
Trichlorofluoromethane	µg/kg	110	320000	25	0	NA	NA	25	4.6	10	0	0	--	--
Vinyl chloride	µg/kg	0.0096	780	40	0	NA	NA	40	1.8	50	40	0	Elevated DLs	a, d, and/or e; (d - Vinyl chloride had elevated DLs in the samples taken around the former UT-71 and UT-74. These samples were collected during the removal process of the tanks, under VCEHD oversight. PIDs were installed during the removal of the tanks, and high concentrations were not recorded. Based on these sample results, VCEHD approved closure of these tanks. In addition, TPH was not detected (with acceptable DLs) at either tank. Moreover, the former UT-74 was a diesel fuel tank and VOCs are not normally associated with diesel fuel.
Xylenes (total)	µg/kg	150	690000	23	4	0.6	520	19	7	50	0	0	--	--

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

[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 1×10^{-6} cancer risk or noncancer Hazard Index.

[2] The following statements indicate standard DL issue resolutions and important notes throughout the group. Additional detail is provided when the elevated DL does not fall within a CMS area.

(a) Elevated DLs are located within an area recommended for further evaluation in CMS.

(b) Samples were recollected and analyzed with adequate DLs at representative locations; Results do not indicate that elevated DLs in earlier samples are an issue.

(c) Elevated DLs were observed group-wide in areas with no indications of a source.

(d) Site history does not indicate a source; results of other analytes in the same area suggest low concentrations.

(e) 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.

(f) DL concentrations are only slightly above background or screening levels.

ACRONYMS

DL - detection limit
EcoRBSL - ecological screening level
NA - not applicable
ND - not detected
ResRBSL - residential screening level
VCEHD - Ventura County Environmental Health Division

Table A3.3-3C
SRE RFI Report
Analytical Data Quality for SVOCs
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Constituent	units	Screening Levels [1]		Area IV AOC - SRE RFI Site Data									Data Issue	Issue Resolution[2]
				Site Data Summary (all)					Site Non Detect Data Summary					
		Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > ResRBSL	NDs > EcoRBSL		
2-Chloronaphthalene	µg/kg	NA	NA	20	0	NA	NA	20	33	460	NA	NA	--	--
2-Methylnaphthalene	µg/kg	NA	NA	33	5	2	40	28	3	460	NA	NA	--	--
4,4'-DDD	µg/kg	NA	NA	4	0	NA	NA	4	330	330	NA	NA	--	--
4,4'-DDE	µg/kg	NA	NA	4	0	NA	NA	4	330	330	NA	NA	--	--
4,4'-DDT	µg/kg	NA	NA	4	0	NA	NA	4	330	330	NA	NA	--	--
Acenaphthene	µg/kg	3400000	2500	37	7	2	900	30	3	460	0	0	--	--
Acenaphthylene	µg/kg	1700000	810000	37	0	NA	NA	37	3	460	0	0	--	--
Anthracene	µg/kg	17000000	2400	37	3	2	4000	34	3	460	0	0	--	--
Benzo(a)anthracene	µg/kg	600	1700	37	9	2	14000	28	3	460	0	0	--	--
Benzo(a)pyrene	µg/kg	6	4700	36	9	4	15000	27	3	460	22	0	Elevated DLs	a and e
Benzo(b)fluoranthene	µg/kg	600	5500	36	10	3	16000	26	3	460	0	0	--	--
Benzo(g,h,i)perylene	µg/kg	NA	6400	36	7	6	4700	29	3	460	NA	0	--	--
Benzo(k)fluoranthene	µg/kg	600	3700	36	8	4	15000	28	3	460	0	0	--	--
bis(2-Ethylhexyl)phthalate	µg/kg	250000	4900	24	1	210	210	23	110	1400	0	0	--	--
Butylbenzylphthalate	µg/kg	11000000	370000	20	1	220	220	19	33	330	0	0	--	--
Chrysene	µg/kg	6000	2400	37	7	5	13000	30	3	460	0	0	--	--
Dibenzo(a,h)anthracene	µg/kg	170	1700	36	6	5	3900	30	3	460	6	0	Elevated DLs	a and e
Diethylphthalate	µg/kg	46000000	7000000	24	0	NA	NA	24	110	1400	0	0	--	--
Di-n-butyl phthalate	µg/kg	5700000	500	24	0	NA	NA	24	110	1400	0	1	Elevated DLs	a and e
Fluoranthene	µg/kg	2300000	130000	37	10	4	25000	27	3	460	0	0	--	--
Fluorene	µg/kg	2300000	1600	37	5	160	920	32	3	460	0	0	--	--
Indeno(1,2,3-cd)pyrene	µg/kg	600	3900	36	8	5	6400	28	3	460	0	0	--	--
Naphthalene	µg/kg	6000	1400000	37	5	3	140	32	3	460	0	0	--	--
Phenanthrene	µg/kg	1700000	1300	37	10	2	11000	27	3	460	0	0	--	--
Phenol	µg/kg	18000000	280000	20	0	NA	NA	20	130	460	0	0	--	--
Pyrene	µg/kg	1700000	79000	37	10	3	21000	27	3	460	0	0	--	--

Notes: ● Results for N-nitrosodimethylamine (NDMA) were rejected in 9 samples at the SRE RFI Site. Rejected samples were located at the Building 003 Leach Field, which is recommended for further evaluation in CMS.

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

[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] The following statements indicate standard DL issue resolutions and important notes throughout the group. Additional detail is provided when the elevated DL does not fall within a CMS area.

(a) Elevated DLs are located within an area recommended for further evaluation in CMS.

(b) Samples were recollected and analyzed with adequate DLs at representative locations; Results do not indicate that elevated DLs in earlier samples are an issue.

(c) Elevated DLs were observed group-wide in areas with no indications of a source.

(d) Site history does not indicate a source; results of other analytes in the same area suggest low concentrations.

(e) 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.

(f) DL concentrations are only slightly above background or screening levels.

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

Table A3.3-3D
SRE RFI Report
Analytical Data Quality for TPH
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Constituent	units	Screening Levels [1]		Area IV AOC - SRE RFI Site Data									Data Issue	Issue Resolution[2]
				Site Data Summary (all)					Site Non Detect Data Summary					
		Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > ResRBSL	NDs > EcoRBSL		
C08-C11 (Gasoline Range)	mg/kg	1.1	NA	29	1	10	10	28	3	99	28	NA	Elevated DLs	a and e
C11-C14 (Kerosene Range)	mg/kg	1400	NA	22	1	40	40	21	3	99	0	NA	--	--
C12-C14 (Kerosene Range)	mg/kg	1400	NA	6	0	NA	NA	6	5.3	12	0	NA	--	--
C12-C22 (Kerosene, Diesel Ranges)	mg/kg	1400	NA	1	1	78	78	0	NA	NA	NA	NA	--	--
C14-C20 (Diesel Range)	mg/kg	1400	NA	22	4	14	18	18	3	99	0	NA	--	--
C15-C20 (Diesel Range)	mg/kg	1400	NA	6	0	NA	NA	6	5.3	12	0	NA	--	--
C20-C30 (Lubricant Oil Range)	mg/kg	1400	NA	22	12	3.4	470	10	4	13	0	NA	--	--
C21-C30 (Lubricant Oil Range)	mg/kg	1400	NA	6	3	5	11	3	5.4	12	0	NA	--	--
C22-C30 (Lubricant Oil Range)	mg/kg	1400	NA	1	1	75	75	0	NA	NA	NA	NA	--	--
Hydrocarbons	mg/kg	1400	NA	1	0	NA	NA	1	5	5	0	NA	--	--

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

[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 recepto for a risk level of 1 x 10^{-6} cancer risk or noncancer Hazard Index.

[2] The following statements indicate standard DL issue resolutions and important notes throughout the group. Additional detail is provided when the elevated DL does not fall within a CMS area.

(a) Elevated DLs are located within an area recommended for further evaluation in CMS.

(b) Samples were recollected and analyzed with adequate DLs at representative locations; Results do not indicate that elevated DLs in earlier samples are an issue.

(c) Elevated DLs were observed group-wide in areas with no indications of a source.

(d) Site history does not indicate a source; results of other analytes in the same area suggest low concentrations.

(e) 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.

(f) DL concentrations are only slightly above background or screening levels.

ACRONYMS

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

Table A3.3-3E
SRE RFI Report
Analytical Data Quality for PCBs
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Constituent	units	Screening Levels [1]		Area IV AOC - SRE RFI Site Data									Data Issue	Issue Resolution[2]
				Site Data Summary (all)					Site Non Detect Data Summary					
		Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > ResRBSL	NDs > EcoRBSL		
Aroclor 1016	µg/kg	3900	1600	26	0	NA	NA	26	35	1100	0	0	--	--
Aroclor 1221	µg/kg	350	1600	26	0	NA	NA	26	52	1100	5	0	Elevated DLs	a and e
Aroclor 1232	µg/kg	350	79	26	0	NA	NA	26	35	1100	5	15	Elevated DLs	a and e
Aroclor 1242	µg/kg	350	80	26	0	NA	NA	26	35	1100	5	15	Elevated DLs	a and e
Aroclor 1248	µg/kg	350	12	26	0	NA	NA	26	35	1100	5	26	Elevated DLs	a and e
Aroclor 1254	µg/kg	350	79	26	5	60	430	21	35	1100	5	13	Elevated DLs	a and e
Aroclor 1260	µg/kg	350	79	26	8	140	7800	18	35	210	0	8	Elevated DLs	a and e

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

[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] The following statements indicate standard DL issue resolutions and important notes throughout the group. Additional detail is provided when the elevated DL does not fall within a CMS area.

(a) Elevated DLs are located within an area recommended for further evaluation in CMS.

(b) Samples were recollected and analyzed with adequate DLs at representative locations; Results do not indicate that elevated DLs in earlier samples are an issue.

(c) Elevated DLs were observed group-wide in areas with no indications of a source.

(d) Site history does not indicate a source; results of other analytes in the same area suggest low concentrations.

(e) 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.

(f) DL concentrations are only slightly above background or screening levels.

ACRONYMS

DL - detection limit

EcoRBSL - ecological screening level

NA - not applicable

ND - not detected

ResRBSL - residential screening level

Table A3.3-3F
SRE RFI Report
Analytical Data Quality for Dioxins
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Constituent	units	Background/ Screening Levels[1]			Area IV AOC - SRE RFI Site Data										Data Issue	Issue Resolution[3]
					Site Data Summary (all)					Site Non Detect Data Summary						
		Background[2]	Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > Background	NDs > ResRBSL	NDs > EcoRBSL		
1,2,3,4,6,7,8-HpCDD	ng/kg	13	690	1000	5	5	1.02	1320	0	NA	NA	NA	NA	NA	--	--
1,2,3,4,6,7,8-HpCDF	ng/kg	2.5	690	340	5	4	11.8	100	1	0.195	0.195	0	0	0	--	--
1,2,3,4,7,8,9-HpCDF	ng/kg	0.19	690	340	5	4	1.1	10	1	0.131	0.131	0	0	0	--	--
1,2,3,4,7,8-HxCDD	ng/kg	0.34	69	34	5	4	1.05	5.25	1	0.207	0.207	0	0	0	--	--
1,2,3,4,7,8-HxCDF	ng/kg	0.73	69	34	5	4	0.747	3.65	1	0.0782	0.0782	0	0	0	--	--
1,2,3,6,7,8-HxCDD	ng/kg	0.95	69	34	5	4	3.22	32.8	1	0.218	0.218	0	0	0	--	--
1,2,3,6,7,8-HxCDF	ng/kg	0.3	69	34	5	4	0.445	3.37	1	0.078	0.078	0	0	0	--	--
1,2,3,7,8,9-HxCDD	ng/kg	1.1	69	35	5	4	1.47	10.6	1	0.206	0.206	0	0	0	--	--
1,2,3,7,8,9-HxCDF	ng/kg	0.43	69	34	5	2	0.175	0.968	3	0.158	0.408	0	0	0	--	--
1,2,3,7,8-PeCDD	ng/kg	0.18	140	3.4	5	4	0.316	2.2	1	0.103	0.103	0	0	0	--	--
1,2,3,7,8-PeCDF	ng/kg	0.59	140	69	5	2	0.388	0.58	3	0.111	0.165	0	0	0	--	--
2,3,4,6,7,8-HxCDF	ng/kg	0.45	69	34	5	4	0.8	6.44	1	0.0924	0.0924	0	0	0	--	--
2,3,4,7,8-PeCDF	ng/kg	0.64	14	6.9	5	4	0.216	1.64	1	0.119	0.119	0	0	0	--	--
2,3,7,8-TCDD	ng/kg	0.5	6.9	3.4	5	2	0.4	0.534	3	0.075	0.187	0	0	0	--	--
2,3,7,8-TCDF	ng/kg	1.8	69	4.4	5	3	0.515	0.789	2	0.0972	0.216	0	0	0	--	--
OCDD	ng/kg	140	69000	140000	5	5	9.73	18600	0	NA	NA	NA	NA	NA	--	--
OCDF	ng/kg	8.1	69000	99000	5	4	32.2	245	1	0.278	0.278	0	0	0	--	--
TCDD TEQ (ND = 0)	ng/kg	0.98	6.9	3.4	5	5	0.011173	26.1542	0	NA	NA	NA	NA	NA	--	--
Total HpCDD	ng/kg	NA	NA	NA	5	5	1.73	2440	0	NA	NA	NA	NA	NA	--	--
Total HpCDF	ng/kg	NA	NA	NA	5	5	0.538	427	0	NA	NA	NA	NA	NA	--	--
Total HxCDD	ng/kg	NA	NA	NA	5	4	20.5	264	1	0.21	0.21	NA	NA	NA	--	--
Total HxCDF	ng/kg	NA	NA	NA	5	4	17.8	192	1	0.0981	0.0981	NA	NA	NA	--	--
Total PeCDD	ng/kg	NA	NA	NA	5	4	1.4	16	1	0.103	0.103	NA	NA	NA	--	--
Total PeCDF	ng/kg	NA	NA	NA	5	5	0.143	41.3	0	NA	NA	NA	NA	NA	--	--
Total TCDD	ng/kg	NA	NA	NA	5	2	0.688	3.12	3	0.075	0.187	NA	NA	NA	--	--
Total TCDF	ng/kg	NA	NA	NA	5	5	0.116	9.32	0	NA	NA	NA	NA	NA	--	--

Notes:

* Risk based screening levels are not listed for metals detected below established background concentrations. Detection limits below background are considered adequate for characterization and COPC evaluation.

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

[1] Background, Residential Screening Levels (ResRBSL) and Ecological Screening Levels (EcoRBSL) are provided as reference points for assessing adequacy of data quality. ResRBSL based on residential receptor for a risk level of 1 x 10^{-6} cancer risk or noncancer Hazard Index of 1, whichever is lowest. EcoRBSL based on HI = 1 for most sensitive ecological receptor.

[2] Reference Soil Background Report (MWH 2005)

[3] The following statements indicate standard DL issue resolutions and important notes throughout the group. Additional detail is provided when the elevated DL does not fall within a CMS area.

(a) Elevated DLs are located within an area recommended for further evaluation in CMS.

(b) Samples were recollected and analyzed with adequate DLs at representative locations; Results do not indicate that elevated DLs in earlier samples are an issue.

(c) Elevated DLs were observed group-wide in areas with no indications of a source.

(d) Site history does not indicate a source; results of other analytes in the same area suggest low concentrations.

(e) 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.

(f) DL concentrations are only slightly above background or screening levels.

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

Table A3.3-3G
SRE RFI Report
Analytical Data Quality for Metals

Constituent	units	Background/ Screening Levels[1]			Area IV AOC - SRE RFI Site Data											Data Issue	Issue Resolution[3]
					Site Data Summary (all)					Site Non Detect Data Summary							
		Background[2]	Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > Background	NDs > ResRBSL	NDs > EcoRBSL		
Aluminum	mg/kg	20000	75000	14	29	28	6450	22000	1	3.7	3.7	0	0	0	--	--
Antimony	mg/kg	8.7	30	0.096	42	13	0.3	0.93	29	0.68	16	8	0	29	Elevated DLs (Pre 2000 Samples)	a, c, d, and/or e; (d - Antimony has one elevated DL outside of CMS areas, in a sample downslope of the Sodium Component Cleaning Pad. No other metals in the same location were above background and metals generally decrease in concentration away from the drainage.)
Arsenic	mg/kg	15	0.095	0.34	55	48	1.2	9	7	6	7	0	7	7	--	--
Barium	mg/kg	140	15000	15	49	48	31.4	200	1	0.24	0.24	0	0	0	--	--
Beryllium	mg/kg	1.1	150	5.7	55	36	0.2	1.4	19	0.03	0.7	0	0	0	--	--
Boron	mg/kg	9.7	15000	6.3	29	6	3.7	10	23	2.9	12	3	0	4	Elevated DLs (Pre 2000 Samples)	a, d, and/or e; (d - Boron has one elevated DL outside of CMS areas, in a sample downslope of the Sodium Component Cleaning Pad. No other metals in the same location were above background and metals generally decrease in concentration away from the drainage.)
Cadmium	mg/kg	1	2.6	0.0031	55	15	0.071	4.6	40	0.02	1	0	0	40	--	--
Chromium	mg/kg	36.8	3400	940	55	54	5.5	41	1	0.38	0.38	0	0	0	--	--
Cobalt	mg/kg	21	1500	10	49	48	2.8	15	1	0.19	0.19	0	0	0	--	--
Copper	mg/kg	29	3000	1.1	55	54	3.4	130	1	0.51	0.51	0	0	0	--	--
Iron	mg/kg	28000	NA	NA	18	17	9950	24700	1	2.8	2.8	0	NA	NA	--	--
Lead	mg/kg	34	150	0.063	58	58	3.4	89.6	0	NA	NA	NA	NA	NA	--	--
Manganese	mg/kg	495	9500	63	18	18	0.4	907	0	NA	NA	NA	NA	NA	--	--
Mercury	mg/kg	0.09	23	0.89	107	65	0.0041	35	42	0.01	0.3	31	0	0	Elevated DLs (Pre 2000 Samples)	a and e
Molybdenum	mg/kg	5.3	380	0.11	49	9	0.32	1.2	40	0.33	16	19	0	40	Elevated DLs (Pre 2000 Samples)	a, c, d, and e; (d - Molybdenum has one elevated DL outside of CMS areas, in a sample downslope of the Sodium Component Cleaning Pad. No other metals in the same location were above background and metals generally decrease in concentration away from the drainage.)
Nickel	mg/kg	29	1500	0.1	55	46	2.6	24	9	0.43	11.7	0	0	9	--	--
Potassium	mg/kg	6400	NA	NA	18	17	817	3890	1	15.6	15.6	0	NA	NA	--	--
Selenium	mg/kg	0.655	380	0.18	53	7	0.31	1	46	0.2	8	34	0	46	Elevated DLs (Pre 2000 Samples)	a, c, d, and/or e; (d - Selenium has one elevated DL outside of CMS areas, in a sample downslope of the Sodium Component Cleaning Pad. No other metals in the same location were above background and metals generally decrease in concentration away from the drainage.)
Silver	mg/kg	0.79	380	0.55	58	8	0.055	11.4	50	0.021	4.5	32	0	32	Elevated DLs (Pre 2000 Samples)	a and e
Sodium	mg/kg	110	NA	NA	18	18	22.6	692	0	NA	NA	NA	NA	NA	--	--
Thallium	mg/kg	0.46	6.1	3.2	55	16	0.13	4	39	0.15	8	31	3	9	Elevated DLs (Pre 2000 Samples)	a, c, d, and/or e; (d - Thallium has one elevated DL outside of CMS areas, in a sample downslope of the Sodium Component Cleaning Pad. No other metals in the same location were above background and metals generally decrease in concentration away from the drainage.)
Vanadium	mg/kg	62	76	1.6	49	48	13.9	77	1	0.27	0.27	0	0	0	--	--
Zinc	mg/kg	110	23000	22	55	54	32.3	1460	1	0.42	0.42	0	0	0	--	--

Notes:

● Results for antimony were rejected in 9 samples and in 3 samples for selenium distribruted throughout the SRE RFI Site.

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

[1] Background, Residential Screening Levels (ResRBSL) and Ecological Screening Levels (EcoRBSL) are provided as reference points for assessing adequacy of data quality. ResRBSL based on residential receptor for a risk level of 1 x 10^{-6} cancer risk or noncancer Hazard Index of 1, whichever is lowest. EcoRBSL based on HI = 1 for most sensitive ecological receptor.

[2] Reference Soil Background Report (MWH 2005)

[3] The following statements indicate standard DL issue resolutions and important notes throughout the group. Additional detail is provided when the elevated DL does not fall within a CMS are

(a) Elevated DLs are located within an area recommended for further evaluation in CMS.

(b) Samples were recollected and analyzed with adequate DLs at representative locations; Results do not indicate that elevated DLs in earlier samples are an issue.

(c) Elevated DLs were observed group-wide in areas with no indications of a source.

(d) Site history does not indicate a source; results of other analytes in the same area suggest low concentrations.

(e) 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.

(f) DL concentrations are only slightly above background or screening levels.

ACRONYMS

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

Table A3.4-1 (1 of 2)

Chemicals of Potential Concern for Human Healt
Sodium Reactor Experiment (SRE) Area

Chemical	Soil (0 to 2 feet bgs)	Soil (0 to 10 feet bgs)	RFI Site Chatsworth Groundwater [(a)] (indirect pathway)	Group 6 RFI Reporting Area [(a)] (direct pathway)	Soil Vapor	Surface Water
Inorganic Compounds						
Aluminum						X
Antimony						X
Arsenic						X
Cadmium	X	X				X
Chromium						X
Copper	X	X		X		X
Fluoride				X		
Lead	X	X				X
Mercury	X	X				X
Methyl mercury	X	X				
Nickel						X
Nitrate				X		
Silver	X	X				
Thallium	X	X		X		X
Vanadium						X
Zinc	X	X				
VOCs						
1,1,1-Trichloroethane		X			X[b]	X
1,1,2-Trichloro-1,2,2-trifluoroethane	X[a]	X[a]			X	
1,1-Dichloroethane		X	X	X	X[b]	
1,2-Dichloroethane			X	X		
1,2-Dichloroethene (total)	X	X			X[b]	
1-Chlorohexane		X				
2-Butanone	X	X				
2-Hexanone		X				
Acetone	X	X	X	X		
Benzene			X	X		
Carbon disulfide			X	X		
Chloromethane			X	X		
cis-1,2-Dichloroethene			X	X		
Ethylbenzene		X			X[b]	
m,p-Xylene		X				
Methylene chloride	X	X	X	X	X[b]	
Tetrachloroethene	X	X			X[b]	
Toluene	X	X	X	X	X[b]	
Trichloroethene	X	X	X	X	X[b]	X
Xylenes (total)	X	X				
SVOCs						
2-Methylnaphthalene		X				
Acenaphthene	X	X				
Acenaphthylene	X	X				
Anthracene	X	X				
Benzo(a)anthracene	X	X				
Benzo(a)pyrene	X	X				
Benzo(b)fluoranthene	X	X				
Benzo(e)pyrene	X[c]	X[c]				
Benzo(g,h,i)perylene	X	X				
Benzo(k)fluoranthene	X	X				
Chrysene	X	X				
Dibenz(a,h)anthracene	X	X				
Dibenzofuran		X				
Fluoranthene	X	X				
Fluorene	X	X				
Indeno(1,2,3-cd)pyrene	X	X				
Naphthalene		X				
Perylene	X[c]	X[c]				

Table A3.4-1 (2 of 2)

Chemicals of Potential Concern for Human Healt
Sodium Reactor Experiment (SRE) Area

Chemical	Soil (0 to 2 feet bgs)	Soil (0 to 10 feet bgs)	RFI Site Chatsworth Groundwater [a] (indirect pathway)	Group 6 RFI Reporting Area [a] (direct pathway)	Soil Vapor	Surface Water
Phenanthrene	X	X				
Pyrene	X	X				
Total Petroleum Hydrocarbons						
C11-C14(Kerosene Range)	X	X				
C14-C20(Diesel Range)	X	X		X		
C20-C30(Lubricant Oil Range)	X	X				
Hydrocarbons		X				
Dioxins						
2,3,7,8-TCDD	X	X				
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-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				

a. Chemical selected as a COPC since it was selected as a COPC in soil vapor.
b. Chemical selected as a COPC since it was selected as a COPC in soil at 0 to 10 feet bgs.
c. Chemical selected as a COPC since total petroleum hydrcarbon fraction C11-C14, C14-20, or C20-C30 was selected as a COPC.
(a) only Chatsworth Formation groundwater is considered in risk assessment since near-surface groundwater is localized (does not occur at SRE RFI Site) or does not meet State Water Resources Control Board yield requirements.
VOC - volatile organic compound
SVOC - semi-volatile organic compound

Table A3.4-2

Human Health Risk Estimates[1]
Sodium Reactor Experiment (SRE) Area

Receptor	Soil/Sediment Media[2]				Groundwater[3]				Surface Water				Total for Site Media			
	Non- Cancer HI Range	CD[4]	Cancer Risk Range	CD	Non- Cancer HI Range	CD	Cancer Risk Range	CD	Non- Cancer HI Range	CD	Cancer Risk Range	CD	Non- Cancer HI Range	CD	Cancer Risk Range	CD
Adult Worker[7]	0.017 - 0.19		2E-06 - 2E-04	a,b	<0.001 - <0.001		3E-09 - 2E-08		- - -		- - -		0.017 - 0.19		2E-06 - 2E-04	a,b
Future Adult Recreator[8]	0.0011 - 0.042		3E-08 - 1E-05	b	<0.001 - <0.001		3E-10 - 1E-09		0.0023 - 0.016		3E-06 - 5E-05	c,d	0.0011 - 0.04		3E-08 - 1E-05	b
Future Child Recreator[8]	0.02 - 0.1		4E-07 - 8E-06	b	<0.001 - <0.001		1E-09 - 6E-09		0.017 - 0.10		4E-06 - 2E-05	c,d	0.02 - 0.12		4E-07 - 8E-06	b
Future Adult Resident[7]	0.033 - 0.17		2E-06 - 2E-04	a,b,e	1.4 - 2.2	f	8E-07 - 3E-06	f	0.0017 - 0.011		4E-07 - 7E-06	c,d	1.4 - 2.3	f	3E-06 - 2E-04	a,b,e,f
without domestic use of groundwater[5]	NA NA		NA NA		<0.001 - <0.001		5E-09 - 4E-08		NA NA		NA NA		0.033 - 0.17		2E-06 - 2E-04	a,b,e
Future Child Resident[7]	0.26 - 1.3		1E-05 - 4E-04	a,b,d,e,g	4.9 - 8.2	f	2E-06 - 3E-06	f	0.016 0.098		2E-06 2E-05	c,d	5.2 - 10	f,h	2E-05 - 4E-04	a,b,d,e,f,g
without domestic use of groundwater	NA NA		NA NA		<0.001 - 0.0013		2E-08 - 3E-08		NA NA		NA NA		0.26 - 1.3		1E-05 - 4E-04	a,b,d,e,g

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/sediment media risk estimates are a sum of all direct and indirect exposure so site soil, sediment and soil vapor.
3. Groundwater media risk estimates are a sum of indirect and direct exposure to site groundwater, except where indicated that direct exposure due to domestic groundwater use is excluded..
4. Chemical risk drivers are those COPCs detected onsite with an HI > 1, risk > $1x10^{-6}$. Only major risk contributors listed if cumulative HI >> 1 or cancer risk >> $1x10^{-6}$.
5. Potential exposure to soil/sediment assumes that the R-2 Ponds may not at some time in the future contain water and that sediments may be dry (i.e. dry sediments are the same as soil with respect exposure pathways). Therefore, risks and HIs presented for Soil/Sediment Media, Near-Surface Groundwater, and Total for Site Media are mutually exclusive of those presented for Surface Water. Total for Site Media risks and HIs include only Sediment/Soil Media and Near-Surface Groundwater.
6. There were no detections made in surface water.
7. The risks presented are based on the wet pond scenario and represent the maximum risk between the two scenarios.
8. The risks presented are based on the dry pond scenario and represent the maximum risk between the two scenarios.

a. PAHs
b. Aroclor-1260
c. Arsenic
d. Dioxins
e. Methylene Chloride
f. Trichloroethene
g. Aroclor-1254
h. Thallium

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

Table A3.4-3 (Page 1 of 1)

Human Health Risk Assessment Uncertainty Analysis
Sodium Reactor Experiment (SRE) Area

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
Exposure Pathways	The SRE Area contains an intermittent pond. Based on the potential for both dry (e.g. fugitive dust) and wet (e.g. surface water) exposures in the same area; both scenarios were evaluated separately.	Low	Conservative
	Domestic use of near surface groundwater was determined to be an incomplete exposure pathway because the estimated production rate is below the minimum criteria of 200 gpd specified in the SRAM.	Low	Realistic, reasonable determination
	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
	Groundwater monitoring data and comparison concentrations (I.e., background), are filtered samples (I.e., dissolved concentrations) as per agency-approved groundwater monitoring work plan. Although dissolved concentrations represent the concentrations that may migrate, the total concentration in groundwater may be greater when there are significant amounts of dissolved solids present (i.e., total concentration.	Moderate	Realistic, reasonable determination
	Future land use of the site is currently undecided but may be commercial or recreational, which have lower risks than residential.	Moderate	Uncertain
COPC Selection	A number of inorganics (e.g., cadmium, copper) 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, and were located in areas of suspected metals impacts.	Moderate	Conservative
EPC Calculations	The extapolation of soil TPH concentrations to individual petroleum constituent (i.e., PAHs) concentrations introduces some uncertainty into the EPC estimates for petroleum constituents. Because several samples collected for SVOCs did not detect PAHs, the uncertainty associated with this procedure is low.	Low	Conservative
	Significant risks from soil matrix COPCs are associated vapor concentrations estimated to be 1/2 the soil vapor DL though the chemical was not detected in soil vapor.	Low	Conservative
	The mean concentration for some chemicals exceeded the selected RME concentrations, therefore the RME concentration was also used as the CTE concentration under some circumstances. The mean could be biased high by higher detection limits.	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 exposure point concentration because samples were collected in areas with the highest likelihood to detect the highest concentrations at the site.	Moderate	Conservative
	PCBs were not characterized in the leach field , however this area is recommended for further evaluation in the CMS due to the presence of other contaminants.	Low	Uncertain
	Metals were not characterized in the drainage area upstream of the mercury release area, however, this	Moderate	Uncertain
	The maximum detected concentration of each COPC detected in groundwater was used as the EPC.	Moderate	Conservative
	Vapor migration into indoor air has been estimated using a model which is being validated for the site. Migration estimates may be changed once the model validation is complete.	Moderate	Uncertain
	The Johnson & Ettinger model used to estimate indoor air concentrations is highly conservative for warm and arid climates since it was developed based on building characteristics in the northeast.	Moderate	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
EPC - exposure point concentration
UCL - upper confidence limit

Summary of Chemicals of Potential Ecological Concern
Sodium Reactor Experiment (SRE) Area

Chemical	Soil/Sediment 0 to 2 feet bgs	Soil/Sediment 0 to 4 feet bgs	Soil/Sediment 0 to 6 feet bgs	Soil Vapor 0 to 6 feet bgs	Surface Water
Inorganic Compounds					
Aluminum					X
Antimony					X
Arsenic					X
Beryllium					X
Cadmium	X	X	X		X
Chromium					X
Copper	X	X	X		X
Lead	X	X	X		X
Mercury	X	X	X		X
Methyl Mercury	X	X	X		
Nickel					X
Selenium					X
Silver	X	X	X		X
Vanadium					X
Zinc	X	X	X		
VOCs					
1,1,1-Trichloroethane		X	X	X[a]	X
1,1,2-Trichloro-1,2,2-trifluoroethane	X	X	X	X	
1,1-Dichloroethane		X	X	X[a]	
1,2-Dichloroethene (total)	X	X	X		
2-Butanone	X	X	X		
Acetone	X	X	X		
Ethylbenzene			X	X[a]	
m,p-Xylene			X[b]	X[a]	
Methylene chloride	X	X	X	X[a]	
Tetrachloroethene	X	X	X	X[a]	
Toluene	X	X	X	X[a]	
Trichloroethene	X	X	X	X[a]	X
Xylenes (total)	X	X	X		
SVOCs					
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
Butyl benzyl phthalate					X
Chrysene	X	X	X		
Dibenz(a,h)anthracene	X	X	X		
Dibenzofuran		X	X		
Diethylphthalate					X
Di-n-butylphthalate					X
Di-n-octyl phthalate					X
Fluoranthene	X	X	X		
Fluorene	X	X	X		
Hexachlorobutadiene					X
Hexachlorocyclopentadiene					X
Indeno(1,2,3-cd)pyrene	X	X	X		
Naphthalene			X		
Pentachlorophenol					X
Perylene	X	X	X		
Phenanthrene	X	X	X		
Pyrene	X	X	X		

Table A3.4-4 (2 of 2)

Summary of Chemicals of Potential Ecological Concern
Sodium Reactor Experiment (SRE) Area

Chemical	Soil/Sediment 0 to 2 feet bgs	Soil/Sediment 0 to 4 feet bgs	Soil/Sediment 0 to 6 feet bgs	Soil Vapor 0 to 6 feet bgs	Surface Water
Pesticides					
4,4'-DDT					X
Chlordane					X
Dieldrin					X
Endosulfan I					X
Endosulfan II					X
Endrin					X
Heptachlor					X
Heptachlor epoxide					X
Toxaphene					X
Total Petroleum Hydrocarbons					
C11-C14(Kerosene Range)	X	X	X		
C14-C20(Diesel Range)		X	X		
C20-C30(Lubricant Oil Range)	X	X	X		
Dioxins					
2,3,7,8-TCDD	X	X	X		
1,2,3,7,8-PeCDD	X	X	X		X
1,2,3,4,7,8-HxCDD	X	X	X		X
1,2,3,6,7,8-HxCDD	X	X	X		X
1,2,3,7,8,9-HxCDD	X	X	X		X
1,2,3,4,6,7,8-HpCDD	X	X	X		X
OCDD	X	X	X		X
2,3,7,8-TCDF	X	X	X		X
1,2,3,7,8-PeCDF	X	X	X		X
2,3,4,7,8-PeCDF	X	X	X		X
1,2,3,4,7,8-HxCDF	X	X	X		X
1,2,3,6,7,8-HxCDF	X	X	X		X
2,3,4,6,7,8-HxCDF	X	X	X		X
1,2,3,7,8,9-HxCDF	X	X	X		X
1,2,3,4,6,7,8-HpCDF	X	X	X		X
1,2,3,4,7,8,9-HpCDF	X	X	X		X
OCDF	X	X	X		X
PCBs					
Aroclor-1016					X
Aroclor-1221					X
Aroclor-1232					X
Aroclor-1242					X
Aroclor-1248					X
Aroclor-1254	X	X	X		X
Aroclor-1260	X	X	X		X
PCB-105	X	X	X		
PCB-114	X	X	X		
PCB-118	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:
VOC - volatile organic compound
SVOC - semi-volatile organic compound
PCB - polychlorinated biphenyl
CPEC - chemical of potential ecological concern
bgs - below ground surface
a. Chemical selected as a CPEC since it was selected as a CPEC in soil at 0 to 6 feet bgs.
b. Risks were quantified from total xylenes and not m,p-xylenes because the exposure point concentrations were greater for total xylenes than for m,p-xylenes.

Table A3.4-5 (Page 1 of 1)

Risk Estimates for Ecological Receptors
Sodium Reactor Experiment (SRE) Area

Receptor	Total for Site Media	
	HI Range[1]	CD[2]
Deer Mouse[3]	13 - 31	Lead, Copper, Aroclor-1260, Cadmium, Methylene Chloride, Zinc, Mercury, 1,2,3,4,6,7,8-HpCDD
without inhalation pathway	11 - 29	Lead, Copper, Aroclor-1260, Cadmium, Zinc, Mercury, 1,2,3,4,6,7,8-HpCDD
Thrush[3]	305 - 654	Lead, Cadmium, Copper, Zinc, Mercury, Aroclor-1260
Hawk[3]	78 - 150	Lead, Zinc, Cadmium, Aroclor-1260
Using Large Home Range Factor[5]	3.7 - 7.1	Lead
Bobcat[4]	0.20 - 19	PAHs
Using Large Home Range Factor[5]	0.0016 - 0.16	None
Mule Deer[3]	7.0 - 18	Cadmium, Lead, 1,2,3,4,6,7,8-HpCDD, Aroclor-1260
Using Large Home Range Factor[5]	0.34 - 0.88	None
Great Blue Heron - Sediment[4]	107 - 212	Lead, Cadmium, and Zinc
Generic Aquatic Receptors - Sediment[4]	13 29	Zinc, Mercury, Cadmium, Pyrene, Chrysene, Copper, Benzo(a)anthracene, Fluoranthene, Lead, Benzo(a)pyrene
Great Blue Heron - Surface Water[4]	6.6 - 7.3	Di-n-butyl phthalate and Lead
Generic Aquatic Receptors - Surface Water[4]	76 - 79	Aroclor-1254, Hexachlorocyclopentadiene, Antimony, Toxaphene, Beryllium, bis(2-ethylhexyl)phthalate, Aluminum, Silver, and Diethylphthalate

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. Chemical risk drivers are listed in order of greatest HQ to lowest HQ > 1.

3. The risks presented are from the dry pond scenario and represent the maximum risk calculated between the two scenarios.

4. The risks presented are from the wet pond scenario and represent the maximum risk calculated between the two scenarios.

5. 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.

6. The risk shown are from the dry scenario, however, since Phenanthrene is a driver for the wet scenario but not the dry scenario it is presented.

CD = Chemical risk driver
CPEC = Chemical of potential ecological concern
HI = Hazard index
HQ = Hazard Quotient
PCDD/PCDF - polychlorinated dibenzo-p-dioxins and dibenzofurans

Table A3.4-6 (1 of 1)

Ecological Risk Assessment Uncertainty Analysis
Sodium Reactor Experiment (SRE) Area

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
Exposure Pathways	The SRE Area contains an intermittent pond. Based on the potential for both dry (e.g. soil ingestion) and wet (e.g. surface water) exposures in the same area; both scenarios were evaluated separately.	Low	Conservative
EPC Calculations	The extrapolation of soil TPH concentrations to individual petroleum constituent (i.e., PAHs) concentrations introduces some uncertainty into the EPC estimates for petroleum constituents. Because several samples collected for SVOCs did not detect PAHs, the uncertainty associated with this procedure is low.	Low	Conservative
	A number of inorganics (e.g., cadmium, copper) 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, were located in suspected areas of metals impacts and in some cases SQLs were above ESLs.	Moderate	Conservative
	Significant risks from soil matrix COPCs are associated vapor concentrations estimated to be 1/2 the soil vapor DL though the chemical was not detected in soil vapor.	Low	Conservative
	Although a chemical may not have been detected in soil, if it was detected in soil vapor is was assumed to be a soil matrix COPC.	Moderate	Conservative
	Estimation of soil vapor concentrations overstates actual burrow concentrations: 1. Model is conservative 2. Air flow in burrows is not accounted for	Moderate	Conservative
Toxicity Reference Value	High degree of uncertainty in extrapolation of dose-response data from laboratory animals to representative receptors.	High	Conservative
	Avian toxicity values are only available for a limited number of chemicals. For the types of chemicals observed at the SRE RFI site, there is likely little difference in the degree of toxicity between mammals and avian species.	Low	Not conservative
	Use of short-term (acute) toxicity data to estimate chronic toxicity values are highly uncertain.	High	Conservative

Notes:
CPEC - chemical of potential ecological concern
PAH - polycyclic aromatic hydrocarbon
UCL - upper confidence limit

Table A3.5-1 (Page 1 of 2)
Surficial Media Site Action Recommendations
SRE RFI Site

Area	Associated Chemical Use Area(s)	CMS Area[1] (Figure 7-1)	Recommended for Further Consideration in CMS Based On:			
			Residential Receptor[2]	Industrial Receptor[2]	Recreational Receptor[2]	Ecological Receptor[2]
Toluene Process Unit, and Tetralin Heat Exchanger	1	--	--	--	--	--
Sodium Component Cleaning Area	2	--	--	--	--	--
SCE Steam Power Plant and downslope area [4]	3a, 3c	SRE 3-1 (stabilization)	--	--	--	Mercury
Underground Storage Tank (UST) UT-27	4	--	--	--	--	--
Underground Storage Tank (UST) UT-71	5	--	--	--	--	--
Underground Storage Tank (UST) UT-74	6	--	--	--	--	--
Building 003 Leach Field	7	SRE 7-1	PAHs	PAHs	PAHs	PAHs Metals (silver, mercury, copper, manganese)
Transformer Area 683	8	--	--	--	--	--
Transformer Area 693	9	SRE 9-1	PCBs	PCBs	PCBs	PCBs
Transformer Area South of Building 003	10	SRE 10-1	PCBs	PCBs[4]	PCBs	PCBs
Oil Stain at Building 003	11	SRE 11-1	methylene chloride, PAH (as TPH)[3]	methylene chloride, PAH (as TPH)[3,4]	methylene chloride, PAH (as TPH)[3,4]	--
SRE Pond Influent Channels (Contained Unit, not used in Risk Assessment)	12	--	Samples collected above liner in drainage not included in risk assessment (i.e.: contained unit). Sediments recommended for removal as part of facility maintenance activities based on concentrations of cadmium, lead, and zinc and the proximity of the area to the CMS Area SRE 7-1.			
Industrial Dry Well	13	--	--	--	--	--
SRE Pond	14	SRE 14-1	Wet: NFA Dry: dioxin, PAHs, methylene chloride	Wet: NFA Dry: dioxin, PAHs, methylene chloride	Wet: NFA Dry: dioxin, PAHs, methylene chloride	Dioxin, PCBs, Metals (silver, barium, mercury, cadmium, copper, vanadium, zinc)
Drainage Downslope of SRE Pond	14	SRE 14-2 (stabilization)	--	--	VOC, PAHs (as TPH)[4]	Dioxin, Metals (copper, manganese, selenium, zinc)
Entire Site as potential Storage Area	15	--	--	--	--	--
Groundwater	--	--	• Indirect groundwater risks << 1 x 10^{-6} and may not affect surficial media CMS decisions • Direct groundwater risks = 3 x 10^{-6} may affect surficial media CMS decisions	• Indirect groundwater risks << 1 x 10^{-6} and may not affect surficial media CMS decisions • No direct groundwater use	• Indirect groundwater risks << 1 x 10^{-6} and may not affect surficial media CMS decisions • No direct groundwater use	• Indirect groundwater HQ << 1, may not affect surficial media CMS decisions • No direct groundwater use

Table A3.5-1 (Page 2 of 2)
Surficial Media Site Action Recommendations
SRE RFI Site

General Notes:

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

(b) PAHs are included in SVOC analytical methods, and are referenced specifically in this table where prominent as risk drivers/contributors apart from other SVOCs (e.g. phthalates, 2,4-dinitrophenol).

Footnotes:

1. CMS Areas are numbered in sequence based on associated Chemical Use Areas (e.g. 14-1, 14-2, for Chemical Use Area 14). Extent of CMS Areas shown on Figures 4-1 through 4-6 and 7-1 are approximate and reflect site action recommendations based on characterization and risk assessment results inclusive for all receptors (See Section 7.2).
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. Detected PAHs do not contribute significantly to risk; CMS recommendation is based on extrapolated PAHs concentrations based on detected diesel-, kerosene-, and lubricant-oil range petroleum hydrocarbons.
4. SRE Chemical Use Area 3b (SCE Cooling Tower) is not recommended for further consideration in the CMS. The drainage ditch near and upstream of the mercury release area (Chemical Use Area 3c) is included in the CMS based on uncertainty regarding elevated metals in waste characterization samples.

ACRONYMS
AOC = Area of Concern
CMS = Corrective Measures Study
NFA = No further action
PAH = Polynuclear aromatic hydrocarbons
PCB = polychlorinated biphenyls
SRE = Sodium Reactor Experiment
SVOC = Semivolatile organic compound
TPH = total petroleum hydrocarbons

FIGURES

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.

1783400 1788400 1793400 1798400

267400

262400

Report Group 6 Area

Sodium Reactor Experiment RFI Site

UNDEVELOPED LAND

NASA PROPERTY AREA I

UNDEVELOPED LAND

UNDEVELOPED LAND

AREA IV

AREA III

AREA II (NASA)

AREA I

Area IV Borrow Pit

SRE

B021 Leach Field

B093 Leach Field

B010 Leach Field

B030 Leach Field

SNAP

HMSA

PDU

B008 Warehouse

SE Drum Storage

Building 56 Landfill

Metals Clarifier

B011 Leach Field

B100

B383 Leach Field

RIHL

EEL

B009 Leach Field

FSDF

STP Pond

B373 Leach Field

ESADA

Pond Dredge

B363 Leach Field

B353 Leach Field

STL-IV

Compound A

CDFF

R-2 Ponds

PLF

Delta

Coca

OCY

NCY

B064 Leach Field

ECL

Silvernale

SPA

WCT

B204

B515 STP

Ash Pile

ABFF

ELV

Alfa

Bravo

Area II Landfill

LOX

CTL-V

Area I Burn Pit

Perimeter Pond

CTL-III

R-1 Pond

Bowl

Canyon

LETF/CTL-I

APTF

Area I Landfill

B-1

IEL

Building 359 Area

Happy Valley

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Elevation Legend

< 950 ft	1550 - 1625 ft
950 - 1025 ft	1625 - 1700 ft
1025 - 1100 ft	1700 - 1775 ft
1100 - 1175 ft	1775 - 1850 ft
1175 - 1250 ft	1850 - 1925 ft
1250 - 1325 ft	1925 - 2000 ft
1325 - 1400 ft	2000 - 2075 ft
1400 - 1475 ft	2075 - 2150 ft
1475 - 1550 ft	> 2150 ft

N

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)
- SWMU 4.5, 4.6 - LOX Plant Former Sump/Clarifier and Drum Disposal Area
- SWMU 4.7 - Component Test Laboratory III (CTL-III) Area
- SWMU 4.8 - Area I Burn Pit
- SWMU 4.9, AOC - Advanced Propulstion Test Facility (APTF) Area
- SWMU 4.12 - Laser Engineering Test Facility (LETF)/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

AREA III
- SWMUs 6.1, 6.3, AOC - Engineering Chemistry Laboratory (ECL) Area
- SWMU 6.4 Compound A Facility
- SWMU 6.5 Systems Test Laboratory IV (STL-IV) Area
- SWMU 6.8 - Silvernale Reservoir
- SWMU 6.9 - Environmental Effects Laboratory (EEL)
- AOC - Sewage Treatment Plant (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 - Boeing Are IV Leach Fields
- AOC - DOE Area IV Leach Fields

Legend
- SSFL Property Boundary
- Administrative Boundary
- Report Group Boundary
- <all other values>
- SRE Boundary
- Building
- Pond
- Drainage
- Dirt Road
- Road
- NPDES Outfall (5)

Sodium Reactor Experiment RFI Site Location Map

SANTA SUSANA FIELD LABORATORY

Date: Sep 28, 2006
Document: RFI-Report-Group6_SR_RFI_Location.mxd

MWH MONTGOMERY WATSON HARZA

FIGURE A3.1-1

Potential Chemical Use Areas and Sample Locations
Sodium Reactor Experiment (AREA IV AOC)

Santa Susana Field Laboratory

MWH MONTGOMERY WATSON HARZA

FIGURE A3.2-1

Soil Sample Location

- ▼ Soil Matrix
- ● Soil Vapor
- 💧 Surface Water

Sample Number
Historical Sample Number
Contained Sample Number

Chemical Use Areas

Solvent	Metal	Screening
Petroleum	Debris	Multiple Use
Oil	Hydrazine	
Transformer	Perchlorate	

SRE Chemical Use Areas

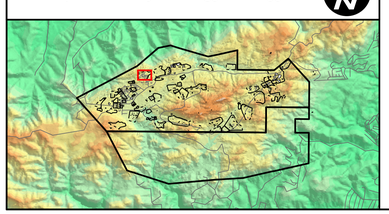
1 Toluene Process Unit, and Tetralin Heat Exchanger
2 Sodium Component Cleaning Area
3a Southern California Edison Steam Power Plant: Steam Generation Area
3b Southern California Edison Steam Power Plant: Cooling Tower
3c Southern California Edison Steam Power Plant: Mercury Release Area
4 Underground Storage Tank (UST) UT-27
5 Underground Storage Tank (UST) UT-71
6 Underground Storage Tank (UST) UT-74
7 Building 003 Leach Field
8 Transformer Area 683
9 Transformer Area 693
10 Transformer Area South of Building 003
11 Oil Stain at Building 003
12 SRE Pond Influent Channels
13 Former Industrial Dry Well
14 SRE Pond

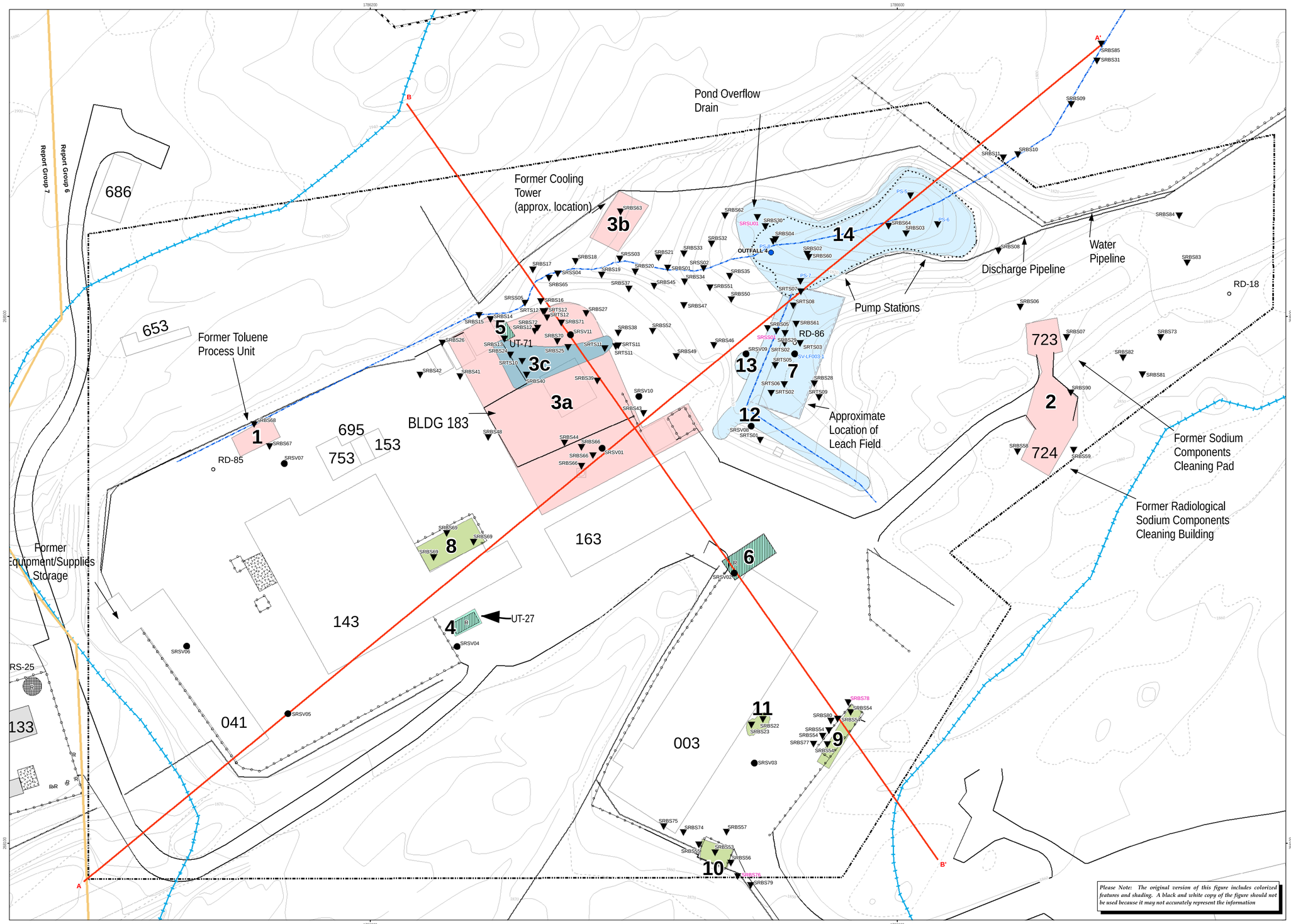
Base Map Legend

- Administrative Area Boundary
- RFI 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
- Trench Locations
- Fence
- Pipe
- Leachfield
- NPDES Outfall
- Well
- Pond
- Possible Pond
- Drainage
- Surface Water Divide
- Elevation Contour
- Rock Outcrop

Date: Sep 29, 2006 Document: RFI-Report-Group6_SR_Chemical_Use.mxd

1 inch equals 30 feet 0 30 60 Feet





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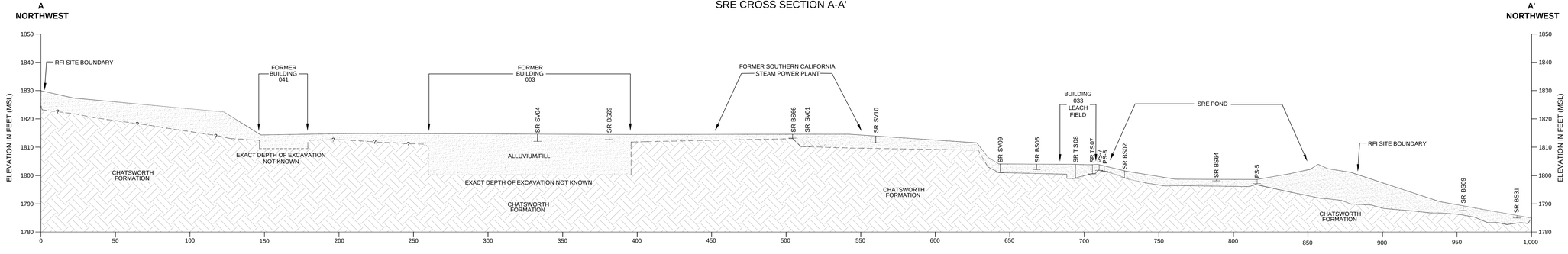
SRE CROSS SECTION A-A'



0 15 30
HORIZONTAL SCALE IN FEET
(2X Vertical Exaggeration)

LEGEND

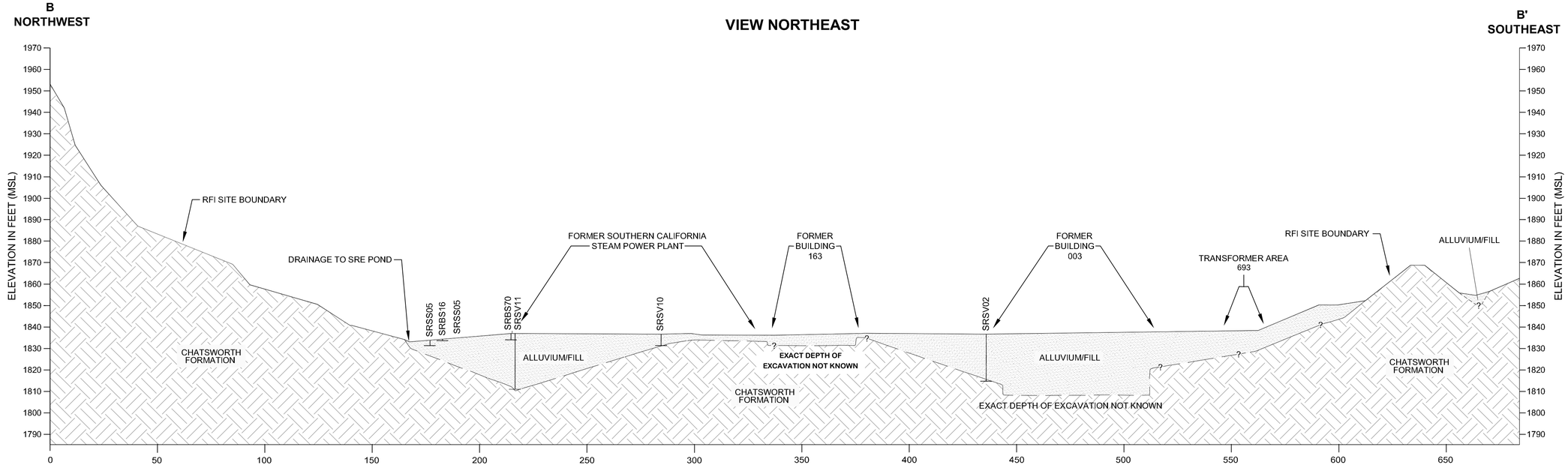
- EXPLORATORY TRENCH LOCATION
- SOIL VAPOR BORING (DASHED WHERE PROJECTED)
- GROUNDWATER WELL
- SOIL BORING (DASHED WHERE PROJECTED)
- (22° NE) PROJECTED DISTANCE IN FEET
- LITHOLOGIC CONTACT (DASHED WHERE APPROXIMATE, QUERIED WHERE UNCERTAIN)
- TAR/ASPHALT

REVISION	DATE

MWH

Surficial Cross-Section A - A'
SRE RFI Site

FIGURE
A3.2-2A



0 15 30
HORIZONTAL SCALE IN FEET

LEGEND

- EXPLORATORY TRENCH LOCATION
- SOIL VAPOR BORING (DASHED WHERE PROJECTED)
- GROUNDWATER WELL
- SOIL BORING (DASHED WHERE PROJECTED)
- (22° NE) PROJECTED DISTANCE IN FEET
- LITHOLOGIC CONTACT (DASHED WHERE APPROXIMATE, QUERIED WHERE UNCERTAIN)
- TAR/ASPHALT

REVISION	DATE

MWH

Surficial Cross-Section B - B'
SRE RFI Site

FIGURE
A3.2-2B

Soil Vapor and Soil Matrix VOC Results
Sodium Reactor Experiment (Area IV AOC)

Santa Susana Field Laboratory

MWH MONTGOMERY WATSON HARZA

FIGURE A3.3-1

Soil Sample Location Symbol Legend

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

Comparison Levels

VOCs	Soil Res RBSL (ug/kg)	Soil Eco RBSL (ug/kg)	Vapor Res RBSL (ug/L)	Vapor Eco RBSL (ug/L)
1,1,1-Trichloroethane	490	2800000	640	- -
1,1,2-Trichlorotrifluoroethane	16000	200000	8800	- -
1,1-Dichloroethane	1.6	230000	1.7	- -
1,2-Dichloroethene (total)	14	74000	- -	- -
1-Chlorohexane	- -	- -	- -	- -
2-Butanone	62000	8200000	1500	- -
2-Hexanone	- -	2600000	- -	- -
Acetone	51000	46000	920	- -
Ethylbenzene	1200	220000	290	- -
m,p-Xylene	150	690000	- -	- -
Methylene chloride	4	27000	2.7	- -
Naphthalene	6000	240000	- -	- -
Styrene	7200	460000	290	- -
Tetrachloroethene	0.43	2300	0.45	- -
Toluene	300	2700	110	- -
Trichloroethene	2.2	3200	1.4	- -
Xylenes (total)	150	690000	- -	- -

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

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

Data Date: 071606

Data Box Information

Sample Location ID — SRBS01 | 1.00 Depth in Feet | S01 Sample Number | MH007 Lab Reporting Code (EPA ID)

(Historical Sample)

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

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

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

Chemical Use Areas

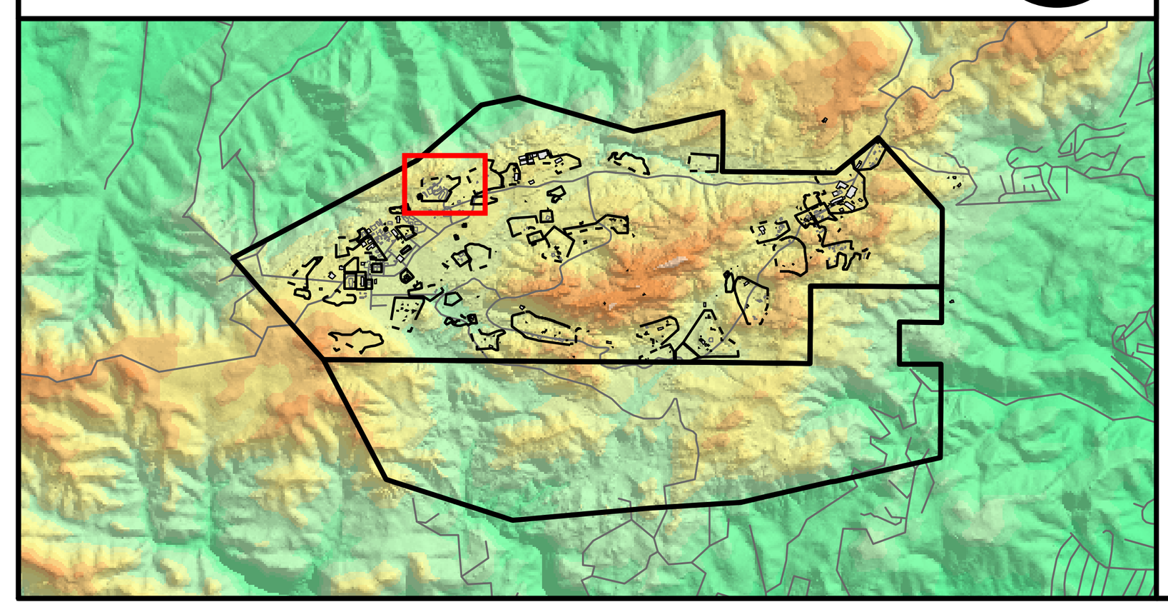
Solvent, Petroleum, Oil, Transformer, Metal, Debris, Hydrazine, Perchlorate, Screening, Multiple Use

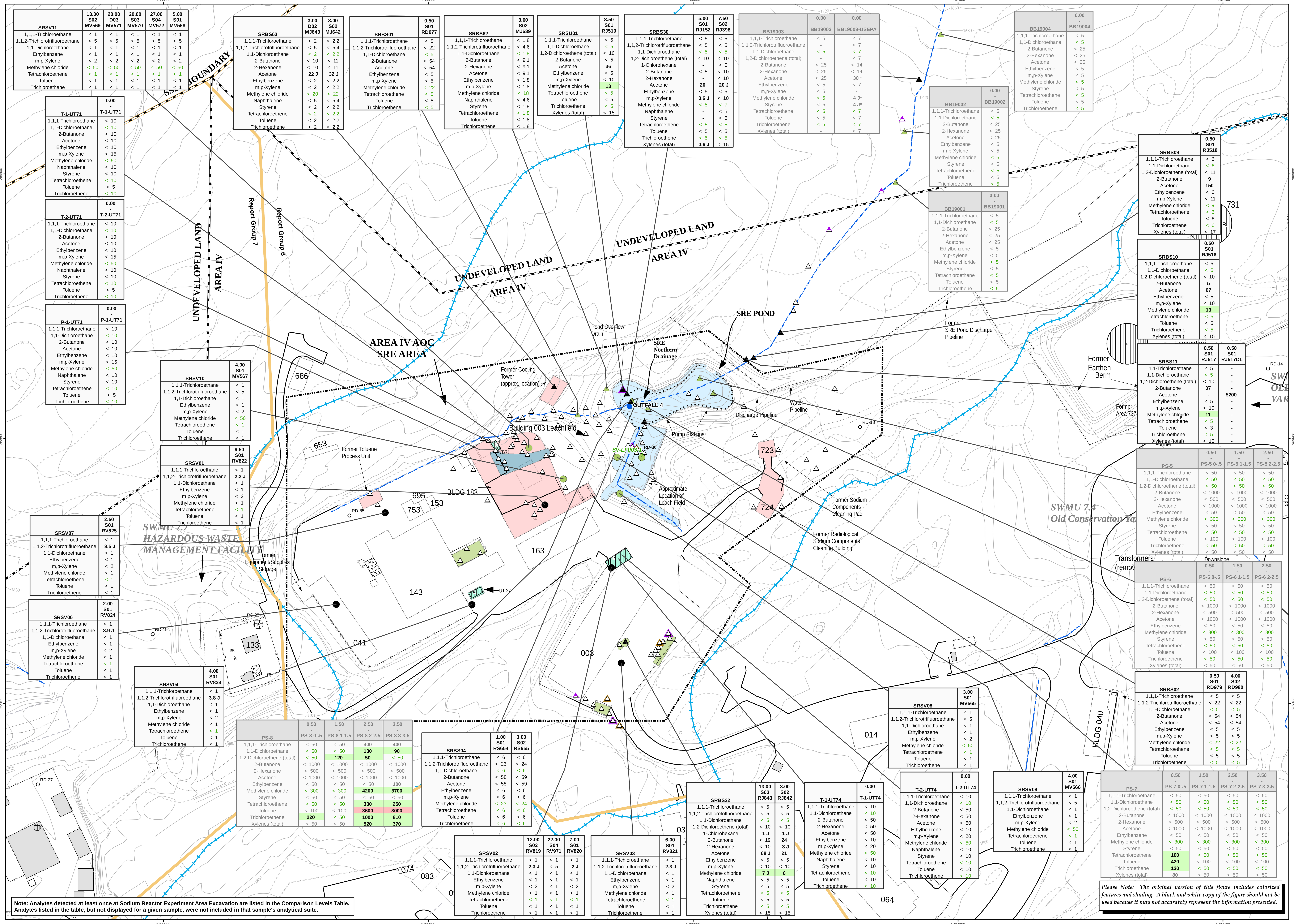
Base Map Legend

Administrative Area Boundary, RFI 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, Trench, Fence, Pipe, Leachfield, NPDES Outfall, Well, Pond, Possible Pond, Drainage, Surface Water Divide, Elevation Contour, Rock Outcrop

Date: Sep 26, 2006 Document: RFI-Report-Group6_SR_VOC.mxd

1 inch equals 60 feet — 0 60 120 Feet





SRSV11	13.00 S02 MV569	20.00 D03 MV571	20.00 S03 MV570	27.00 S04 MV572	5.00 S01 MV568
1,1,1-Trichloroethane	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichlorotrifluoroethane	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	< 1	< 1	< 1	< 1	< 1
m,p-Xylene	< 2	< 2	< 2	< 2	< 2
Methylene chloride	< 50	< 50	< 50	< 50	< 50
Tetrachloroethene	< 1	< 1	< 1	< 1	< 1
Toluene	< 1	< 1	< 1	< 1	< 1
Trichloroethene	< 1	< 1	< 1	< 1	< 1

T-1-UT71	0.00 - T-1-UT71
1,1,1-Trichloroethane	< 10
1,1-Dichloroethane	< 10
2-Butanone	< 10
Acetone	< 10
Ethylbenzene	< 10
m,p-Xylene	< 15
Methylene chloride	< 50
Naphthalene	< 10
Styrene	< 10
Tetrachloroethene	< 10
Toluene	< 5
Trichloroethene	< 10

T-2-UT71	0.00 - T-2-UT71
1,1,1-Trichloroethane	< 10
1,1-Dichloroethane	< 10
2-Butanone	< 10
Acetone	< 10
Ethylbenzene	< 10
m,p-Xylene	< 15
Methylene chloride	< 50
Naphthalene	< 10
Styrene	< 10
Tetrachloroethene	< 10
Toluene	< 5
Trichloroethene	< 10

P-1-UT71	0.00 - P-1-UT71
1,1,1-Trichloroethane	< 10
1,1-Dichloroethane	< 10
2-Butanone	< 10
Acetone	< 10
Ethylbenzene	< 10
m,p-Xylene	< 15
Methylene chloride	< 50
Naphthalene	< 10
Styrene	< 10
Tetrachloroethene	< 10
Toluene	< 5
Trichloroethene	< 10

SRBS63	3.00 D02 MJ643	3.00 S02 MJ642
1,1,1-Trichloroethane	< 2	< 2.2
1,1,2-Trichlorotrifluoroethane	< 5	< 5.4
1,1-Dichloroethane	< 2	< 2.2
2-Butanone	< 10	< 11
2-Hexanone	< 10	< 11
Acetone	22 J	32 J
Ethylbenzene	< 2	< 2.2
m,p-Xylene	< 2	< 2.2
Methylene chloride	< 20	< 22
Naphthalene	< 5	< 5.4
Styrene	< 2	< 2.2
Tetrachloroethene	< 2	< 2.2
Toluene	< 2	< 2.2
Trichloroethene	< 2	< 2.2

SRBS01	0.50 S01 RD977
1,1,1-Trichloroethane	< 5
1,1,2-Trichlorotrifluoroethane	< 22
1,1-Dichloroethane	< 5
2-Butanone	< 54
Acetone	< 54
Ethylbenzene	< 5
m,p-Xylene	< 5
Methylene chloride	< 22
Tetrachloroethene	< 5
Toluene	< 5
Trichloroethene	< 5

SRBS62	3.00 S02 MJ639
1,1,1-Trichloroethane	< 1.8
1,1,2-Trichlorotrifluoroethane	< 4.6
1,1-Dichloroethane	< 1.8
2-Butanone	< 9.1
2-Hexanone	< 9.1
Acetone	< 9.1
Ethylbenzene	< 1.8
m,p-Xylene	< 1.8
Methylene chloride	< 18
Naphthalene	< 4.6
Styrene	< 1.8
Tetrachloroethene	< 1.8
Toluene	< 1.8
Trichloroethene	< 1.8

SRSU01	8.50 S01 RJ519
1,1,1-Trichloroethane	< 5
1,1-Dichloroethane	< 5
1,2-Dichloroethene (total)	< 10
2-Butanone	< 5
Acetone	36
Ethylbenzene	< 5
m,p-Xylene	< 10
Methylene chloride	13
Tetrachloroethene	< 5
Toluene	< 5
Trichloroethene	< 5
Xylenes (total)	< 15

SRBS30	5.00 S01 RJ152	7.50 S02 RJ398
1,1,1-Trichloroethane	< 5	< 5
1,1,2-Trichlorotrifluoroethane	< 5	< 5
1,1-Dichloroethane	< 5	< 5
1,2-Dichloroethene (total)	< 10	< 10
1-Chlorohexane	-	< 5
2-Butanone	< 5	< 10
2-Hexanone	-	< 10
Acetone	20	20 J
Ethylbenzene	< 5	< 5
m,p-Xylene	0.6 J	< 10
Methylene chloride	< 5	< 7
Naphthalene	-	< 5
Styrene	-	< 5
Tetrachloroethene	< 5	< 5
Toluene	< 5	< 5
Trichloroethene	< 5	< 5
Xylenes (total)	0.6 J	< 15

BB19003	0.00 - BB19003	0.00 - BB19003-USEPA
1,1,1-Trichloroethane	< 5	< 7
1,1,2-Trichlorotrifluoroethane	-	< 7
1,1-Dichloroethane	< 5	< 7
1,2-Dichloroethene (total)	-	< 7
2-Butanone	< 25	< 14
2-Hexanone	< 25	< 14
Acetone	< 25	30 *
Ethylbenzene	< 5	< 7
m,p-Xylene	< 5	-
Methylene chloride	< 5	4 J*
Styrene	< 5	4 J*
Tetrachloroethene	< 5	< 7
Toluene	< 5	< 7
Trichloroethene	< 5	< 7
Xylenes (total)	-	< 7

BB19004	0.00 - BB19004
1,1,1-Trichloroethane	< 5
1,1-Dichloroethane	< 5
2-Butanone	< 25
2-Hexanone	< 25
Acetone	< 25
Ethylbenzene	< 5
m,p-Xylene	< 5
Methylene chloride	< 5
Styrene	< 5
Tetrachloroethene	< 5
Toluene	< 5
Trichloroethene	< 5

BB19002	0.00 - BB19002
1,1,1-Trichloroethane	< 5
1,1-Dichloroethane	< 5
2-Butanone	< 25
2-Hexanone	< 25
Acetone	< 25
Ethylbenzene	< 5
m,p-Xylene	< 5
Methylene chloride	< 5
Styrene	< 5
Tetrachloroethene	< 5
Toluene	< 5
Trichloroethene	< 5

BB19001	0.00 - BB19001
1,1,1-Trichloroethane	< 5
1,1-Dichloroethane	< 5
2-Butanone	< 25
2-Hexanone	< 25
Acetone	< 25
Ethylbenzene	< 5
m,p-Xylene	< 5
Methylene chloride	< 5
Styrene	< 5
Tetrachloroethene	< 5
Toluene	< 5
Trichloroethene	< 5

SRBS09	0.50 S01 RJ518
1,1,1-Trichloroethane	< 6
1,1-Dichloroethane	< 6
1,2-Dichloroethene (total)	< 11
2-Butanone	9
Acetone	150
Ethylbenzene	< 6
m,p-Xylene	< 11
Methylene chloride	< 9
Tetrachloroethene	< 6
Toluene	< 6
Trichloroethene	< 6
Xylenes (total)	< 17

SRBS10	0.50 S01 RJ516
1,1,1-Trichloroethane	< 5
1,1-Dichloroethane	< 5
1,2-Dichloroethene (total)	< 10
2-Butanone	5
Acetone	67
Ethylbenzene	< 5
m,p-Xylene	< 10
Methylene chloride	13
Tetrachloroethene	< 5
Toluene	< 5
Trichloroethene	< 5
Xylenes (total)	< 15

SRBS11	0.50 S01 RJ517	0.50 S01 RJ517DL
1,1,1-Trichloroethane	< 5	-
1,1-Dichloroethane	< 5	-
1,2-Dichloroethene (total)	< 10	-
2-Butanone	37	-
Acetone	-	5200
Ethylbenzene	< 5	-
m,p-Xylene	< 10	-
Methylene chloride	11	-
Tetrachloroethene	< 5	-
Toluene	< 3	-
Trichloroethene	< 5	-
Xylenes (total)	< 15	-

SRSV10	4.00 S01 MV567
1,1,1-Trichloroethane	< 1
1,1,2-Trichlorotrifluoroethane	< 5
1,1-Dichloroethane	< 1
Ethylbenzene	< 1
m,p-Xylene	< 2
Methylene chloride	< 50
Tetrachloroethene	< 1
Toluene	< 1
Trichloroethene	< 1

SRSV01	6.50 S01 RV822
1,1,1-Trichloroethane	< 1
1,1,2-Trichlorotrifluoroethane	2.2 J
1,1-Dichloroethane	< 1
Ethylbenzene	< 1
m,p-Xylene	< 2
Methylene chloride	< 1
Tetrachloroethene	< 1
Toluene	< 1
Trichloroethene	< 1

SRSV07	2.50 S01 RV825
1,1,1-Trichloroethane	< 1
1,1,2-Trichlorotrifluoroethane	3.5 J
1,1-Dichloroethane	< 1
Ethylbenzene	< 1
m,p-Xylene	< 2
Methylene chloride	< 1
Tetrachloroethene	< 1
Toluene	< 1
Trichloroethene	< 1

SRSV06	2.00 S01 RV824
1,1,1-Trichloroethane	< 1
1,1,2-Trichlorotrifluoroethane	3.9 J
1,1-Dichloroethane	< 1
Ethylbenzene	< 1
m,p-Xylene	< 2
Methylene chloride	< 1
Tetrachloroethene	< 1
Toluene	< 1
Trichloroethene	< 1

SRSV04	4.00 S01 RV823
1,1,1-Trichloroethane	< 1
1,1,2-Trichlorotrifluoroethane	3.8 J
1,1-Dichloroethane	< 1
Ethylbenzene	< 1
m,p-Xylene	< 2
Methylene chloride	< 1
Tetrachloroethene	< 1
Toluene	< 1
Trichloroethene	< 1

PS-8	0.50 - PS-8 0-.5	1.50 - PS-8 1-1.5	2.50 - PS-8 2-2.5	3.50 - PS-8 3-3.5
1,1,1-Trichloroethane	< 50	< 50	400	400
1,1-Dichloroethane	< 50	< 50	130	90
1,2-Dichloroethene (total)	< 50	120	50	< 50
2-Butanone	< 1000	< 1000	< 1000	< 1000
2-Hexanone	< 500	< 500	< 500	< 500
Acetone	< 1000	< 1000	< 1000	< 1000
Ethylbenzene	< 50	< 50	< 50	100
Methylene chloride	< 300	< 300	4200	3700
Styrene	< 50	< 50	< 50	< 50
Tetrachloroethene	< 50	< 50	330	250
Toluene	< 100	< 100	3600	3000
Trichloroethene	220	< 50	1000	810
Xylenes (total)	< 50	< 50	520	370

SRBS04	1.00 S01 RS654	3.00 S02 RS655
1,1,1-Trichloroethane	< 6	< 6
1,1,2-Trichlorotrifluoroethane	< 23	< 24
1,1-Dichloroethane	< 6	< 6
2-Butanone	< 58	< 59
Acetone	< 58	< 59
Ethylbenzene	< 6	< 6
m,p-Xylene	< 6	< 6
Methylene chloride	< 23	< 24
Tetrachloroethene	< 6	< 6
Toluene	< 6	< 6
Trichloroethene	< 6	< 6

SRSV02	12.00 S02 RV819	22.00 S04 RV971	7.00 S01 RV820
1,1,1-Trichloroethane	< 1	< 1	< 1
1,1,2-Trichlorotrifluoroethane	2.3 J	< 5	2 J
1,1-Dichloroethane	< 1	< 1	< 1
Ethylbenzene	< 1	< 1	< 1
m,p-Xylene	< 2	< 1	< 2
Methylene chloride	< 1	< 1	< 1
Tetrachloroethene	< 1	< 1	< 1
Toluene	< 1	< 1	< 1
Trichloroethene	< 1	< 1	< 1

SRSV03	6.00 S01 RV821
1,1,1-Trichloroethane	< 1
1,1,2-Trichlorotrifluoroethane	2.3 J
1,1-Dichloroethane	< 1
Ethylbenzene	< 1
m,p-Xylene	< 2
Methylene chloride	< 1
Tetrachloroethene	< 1
Toluene	< 1
Trichloroethene	< 1

SRBS22	13.00 S03 RJ843	8.00 S02 RJ842
1,1,1-Trichloroethane	< 5	< 5
1,1,2-Trichlorotrifluoroethane	< 5	< 5
1,1-Dichloroethane	< 5	< 5
1,2-Dichloroethene (total)	< 10	< 10
1-Chlorohexane	1 J	1 J
2-Butanone	< 19	24
2-Hexanone	< 10	3 J
Acetone	68 J	21
Ethylbenzene	< 5	< 5
m,p-Xylene	< 10	< 10
Methylene chloride	7 J	6
Naphthalene	< 5	< 5
Styrene	< 5	< 5
Tetrachloroethene	< 5	< 5
Toluene	< 5	< 5
Trichloroethene	< 5	< 5
Xylenes (total)	< 15	< 15

T-1-UT74	0.00 - T-1-UT74
1,1,1-Trichloroethane	< 10
1,1-Dichloroethane	< 10
2-Butanone	< 50
2-Hexanone	< 50
Acetone	< 50
Ethylbenzene	< 10
m,p-Xylene	< 20
Methylene chloride	< 50
Naphthalene	< 10
Styrene	< 10
Tetrachloroethene	< 10
Toluene	< 10
Trichloroethene	< 10

T-2-UT74	0.00 - T-2-UT74
1,1,1-Trichloroethane	< 10
1,1-Dichloroethane	< 10
2-Butanone	< 50
2-Hexanone	< 50
Acetone	< 50
Ethylbenzene	< 10
m,p-Xylene	< 20
Methylene chloride	< 50
Naphthalene	< 10
Styrene	< 10
Tetrachloroethene	< 10
Toluene	< 10
Trichloroethene	< 10

SRSV08	3.00 S01 MV565
1,1,1-Trichloroethane	< 1
1,1,2-Trichlorotrifluoroethane	< 5
1,1-Dichloroethane	< 1
Ethylbenzene	< 1
m,p-Xylene	< 2
Methylene chloride	< 50
Tetrachloroethene	< 1
Toluene	< 1
Trichloroethene	< 1

SRSV09	4.00 S01 MV566
1,1,1-Trichloroethane	< 1
1,1,2-Trichlorotrifluoroethane	< 5
1,1-Dichloroethane	< 1
Ethylbenzene	< 1
m,p-Xylene	< 2
Methylene chloride	< 50
Tetrachloroethene	< 1
Toluene	< 1
Trichloroethene	< 1

SRBS02	0.50 S01 RD979	4.00 S02 RD980
1,1,1-Trichloroethane	< 5	< 5
1,1,2-Trichlorotrifluoroethane	< 22	< 22
1,1-Dichloroethane	< 5	< 5
2-Butanone	< 54	< 54
Acetone	< 54	< 54
Ethylbenzene	< 5	< 5
m,p-Xylene	< 5	< 5
Methylene chloride	< 22	< 22
Tetrachloroethene	< 5	< 5
Toluene	< 5	< 5
Trichloroethene	< 5	< 5

PS-5	0.50 - PS-5 0-.5	1.50 - PS-5 1-1.5	2.50 - PS-5 2-2.5
1,1,1-Trichloroethane	< 50	< 50	< 50
1,1-Dichloroethane	< 50	< 50	< 50
1,2-Dichloroethene (total)	< 50	< 50	< 50
2-Butanone	< 1000	< 1000	< 1000
2-Hexanone	< 500	< 500	< 500
Acetone	< 1000	< 1000	< 1000
Ethylbenzene	< 50	< 50	< 50
Methylene chloride	< 300	< 300	< 300
Styrene	< 50	< 50	< 50
Tetrachloroethene	< 50	< 50	< 50
Toluene	< 100	< 100	< 100
Trichloroethene	< 50	< 50	< 50
Xylenes (total)	< 50	< 50	< 50

PS-6	0.50 - PS-6 0-.5	1.50 - PS-6 1-1.5	2.50 - PS-6 2-2.5
1,1,1-Trichloroethane	< 50	< 50	< 50
1,1-Dichloroethane	< 50	< 50	< 50
1,2-Dichloroethene (total)	< 50	< 50	< 50
2-Butanone	< 1000	< 1000	< 1000
2-Hexanone	< 500	< 500	< 500
Acetone	< 1000	< 1000	< 1000
Ethylbenzene	< 50	< 50	< 50
Methylene chloride	< 300	< 300	< 300
Styrene	< 50	< 50	< 50
Tetrachloroethene	< 50	< 50	< 50
Toluene	< 100	< 100	< 100
Trichloroethene	< 50	< 50	< 50
Xylenes (total)	< 50	< 50	< 50

PS-7	0.50 - PS-7 0-.5	1.50 - PS-7 1-1.5	2.50 - PS-7 2-2.5	3.50 - PS-7 3-3.5
1,1,1-Trichloroethane	< 50	< 50	< 50	< 50
1,1-Dichloroethane	< 50	< 50	< 50	< 50
1,2-Dichloroethene (total)	< 50	< 50	< 50	< 50
2-Butanone	< 1000	< 1000	< 1000	< 1000
2-Hexanone	< 500	< 500	< 500	< 500
Acetone	< 1000	< 1000	< 1000	< 1000
Ethylbenzene	< 50	< 50	< 50	< 50
Methylene chloride	< 300	< 300	< 300	< 300
Styrene	< 50	< 50	< 50	< 50
Tetrachloroethene	100	< 50	< 50	< 50
Toluene	420	< 100	< 100	< 100
Trichloroethene	130	< 50	< 50	< 50
Xylenes (total)	80	< 50	< 50	< 50

Note: Analytes detected at least once at Sodium Reactor Experiment Area Excavation are listed in the Comparison Levels Table. Analytes listed in the table, but not displayed for a given sample, were not included in that sample's analytical suite.

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.

Soil SVOC/TPH/PCB Results
Sodium Reactor Experiment (Area IV AOC)

Santa Susana Field Laboratory

MWH MONTGOMERY WATSON HARZA

FIGURE A3.3-2

Soil Sample Location Symbol Legend

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

Comparison Levels

SVOCs	Res RBSL (ug/kg)	Eco RBSL (ug/kg)
2-Methylnaphthalene	230000	230000
4-Methylphenol	290000	4300
Acenaphthene	3400000	2500
Anthracene	17000000	2400
Benzo(a)anthracene	600	1700
Benzo(a)pyrene	6	4700
Benzo(b)fluoranthene	600	5500
Benzo(g,h,i)perylene		6400
Benzo(k)fluoranthene	600	3700
bis(2-Ethylhexyl)phthalate	250000	4900
Butylbenzylphthalate	11000000	370000
Chrysene	6000	2400
Dibenz(o,h)anthracene	170	1700
Dibenzofuran	110000	4600000
Fluoranthene	2300000	130000
Fluorene	2300000	1600
Indeno(1,2,3-cd)pyrene	600	3900
Naphthalene	6000	240000
Phenanthrene	17000000	1300
Pyrene	17000000	79000

TPHs	Res RBSL (mg/kg)	Eco RBSL (mg/kg)
C08-C11 (Gasoline Range)	1.1	- -
C11-C14 (Kerosene Range)	1400	- -
C12-C22 (Kerosene, Diesel Ranges)	1400	- -
C14-C20 (Diesel Range)	1400	- -
C20-C30 (Lubricant Oil Range)	1400	- -
C21-C30 (Lubricant Oil Range)	1400	- -
C22-C30 (Lubricant Oil Range)	1400	- -
C09-C23 (Diesel Range)	1400	- -
C09-C40 (Diesel, Oil Range)	1400	- -
C12-C14 (Kerosene Range)	1400	- -
C15-C20 (Diesel Range)	1400	- -
C23-C40 (Heavy Oil)	1400	- -
Hydrocarbons	1400	- -
TPH (as Diesel)	1400	- -
TPH (as Gasoline)	1.1	- -

PCBs	Res RBSL (ug/kg)	Eco RBSL (ug/kg)
Aroclor 1254	350	79
Aroclor 1260	350	79
Aroclor 1016	3900	1600
Aroclor 1221	350	1600
Aroclor 1232	350	79
Aroclor 1242	350	80
Aroclor 1248	350	12

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

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

Data Date: 071606

Data Box Information

Sample Location ID: SRBS01 — 1.00 (Depth in Feet) / S01 (Sample Number) / MH007 (Lab Reporting Code (EPA ID))

(Historical Sample)

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

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

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

Chemical Use Areas

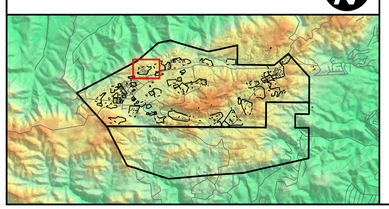
- Solvent
- Petroleum
- Oil
- Transformer
- Metal
- Debris
- Hydrazine
- Perchlorate
- Screening
- Multiple Use

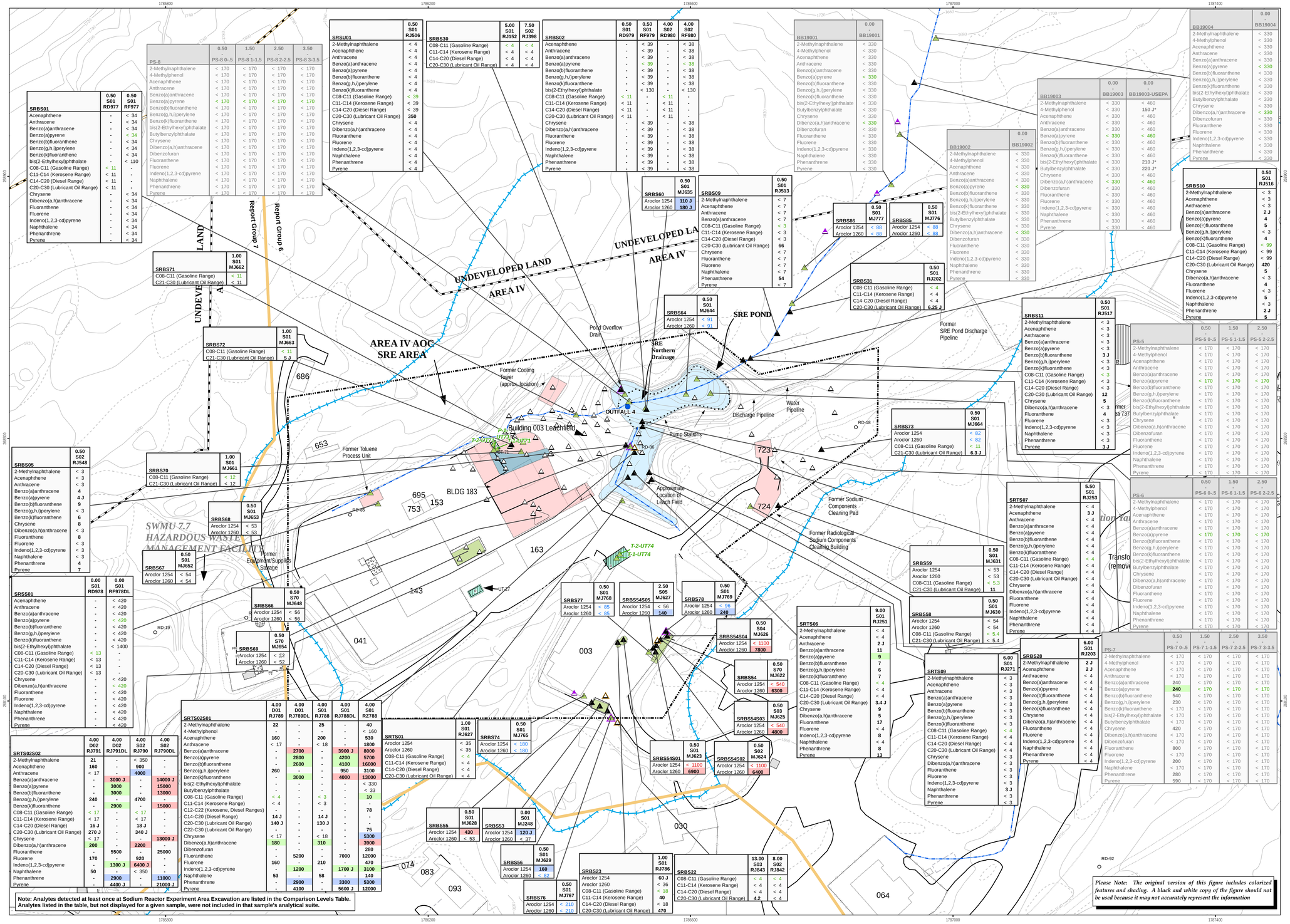
Base Map Legend

- Administrative Area Boundary
- RFI 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
- Trench
- Fence
- Pipe
- Leachfield
- NPDES Outfall
- Well
- Pond
- Possible Pond
- Drainage
- Surface Water Divide
- Elevation Contour
- Rock Outcrop

Date: Sep 29, 2006 Document: RFI-Report-Group6_SR_TPH_PCB_SVOC.mxd

1 inch equals 60 feet — Feet 0 60 120





Note: Analytes detected at least once at Sodium Reactor Experiment Area Excavation are listed in the Comparison Levels Table. Analytes listed in the table, but not displayed for a given sample, were not included in that sample's analytical suite.

Soil Dioxins Results
Sodium Reactor Experiment (Area IV AOC)

Santa Susana Field Laboratory

MWH MONTGOMERY WATSON HARZA

FIGURE A3.3-3

Soil Sample Location Symbol Legend

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

Comparison Levels

Dioxins/Furans	Background (ng/kg)	Res RBSL (ng/kg)	Eco RBSL (ng/kg)
1,2,3,4,6,7,8-HpCDD	13	690	1000
1,2,3,4,6,7,8-HpCDF	2.5	690	340
1,2,3,4,7,8,9-HpCDF	0.19	690	340
1,2,3,4,7,8-HxCDD	0.34	69	34
1,2,3,4,7,8-HxCDF	0.73	69	34
1,2,3,6,7,8-HxCDD	0.95	69	34
1,2,3,6,7,8-HxCDF	0.3	69	34
1,2,3,7,8,9-HxCDD	1.1	69	35
1,2,3,7,8,9-HxCDF	0.43	69	34
1,2,3,7,8-PeCDD	0.18	140	3.4
1,2,3,7,8-PeCDF	0.59	140	69
2,3,4,6,7,8-HxCDF	0.45	69	34
2,3,4,7,8-PeCDF	0.64	14	6.9
2,3,7,8-TCDD	0.5	6.9	3.4
2,3,7,8-TCDF	1.8	69	4.4
OCDD	140	69000	140000
OCDF	8.1	69000	99000
TCDD TEQ (ND = 0)	0.98	6.9	3.4
Total HpCDD	- -	- -	- -
Total HpCDF	- -	- -	- -
Total HxCDD	- -	- -	- -
Total HxCDF	- -	- -	- -
Total PeCDD	- -	- -	- -
Total PeCDF	- -	- -	- -
Total TCDD	- -	- -	- -
Total TCDF	- -	- -	- -

Note: (ng/kg) = nanograms per kilogram

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

Data Date: 071606

Data Box Information

Sample Location ID: SRBSO1 | 1.00 (Depth in Feet) | S01 (Sample Number) | MH007 (Lab Reporting Code (EPA ID))

(Historical Sample)

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

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

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

Chemical Use Areas

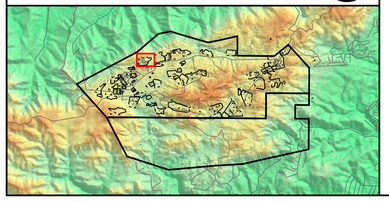
- Solvent
- Petroleum
- Oil
- Transformer
- Metal
- Debris
- Hydrazine
- Perchlorate
- Screening
- Multiple Use

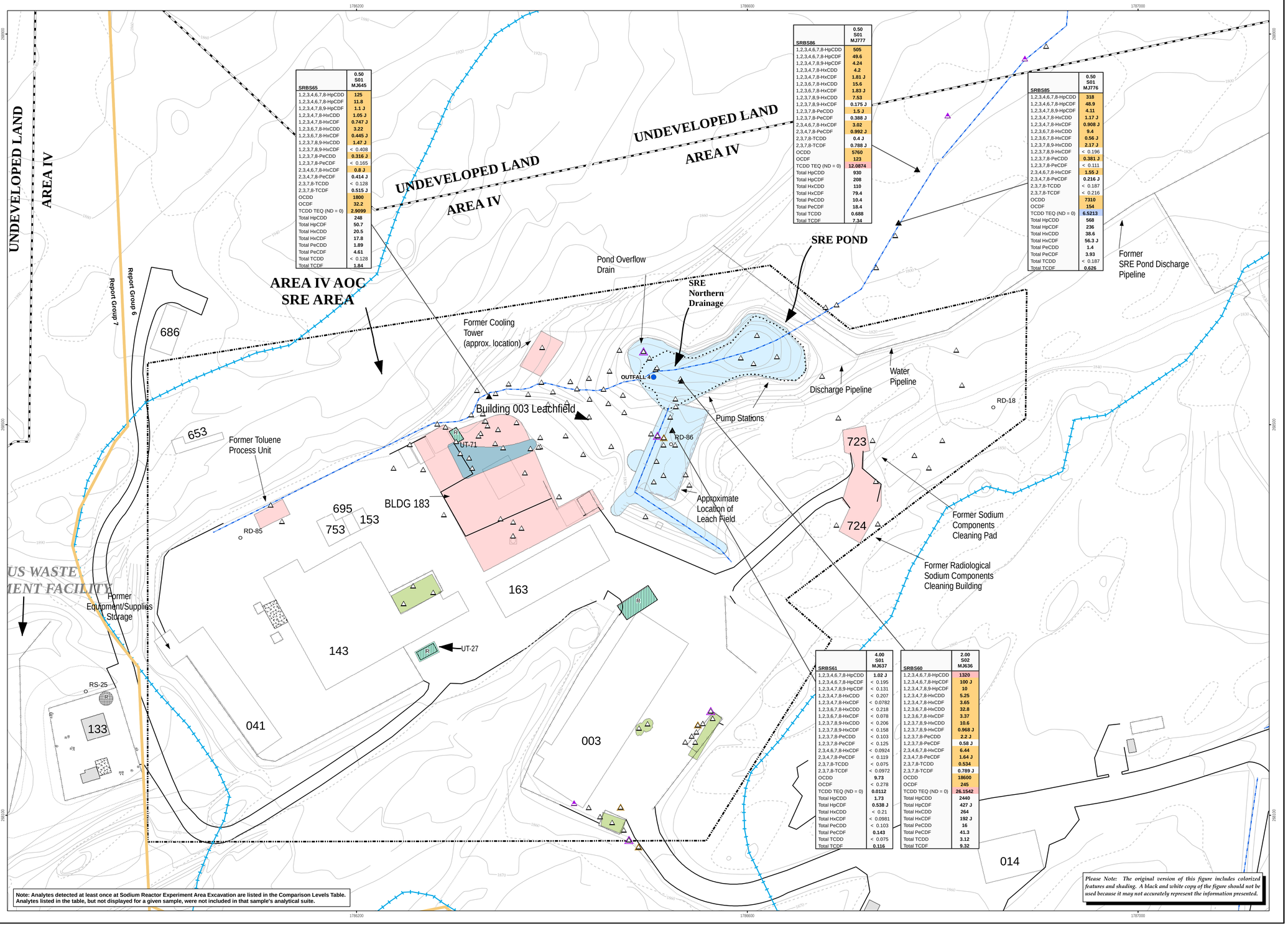
Base Map Legend

- Administrative Area Boundary
- RFI 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
- Trench
- Fence
- Pipe
- Leachfield
- NPDES Outfall
- Well
- Pond
- Possible Pond
- Drainage
- Surface Water Divide
- Elevation Contour
- Rock Outcrop

Date: Sep 26, 2006 Document: RFI-Report-Group6_SR_Dioxin.mxd

1 inch equals 40 feet — Feet 0 40 80





SRBS65	0.50 S01 MJ645
1,2,3,4,6,7,8-HpCDD	125
1,2,3,4,6,7,8-HpCDF	11.8
1,2,3,4,7,8,9-HpCDF	1.1 J
1,2,3,4,7,8-HxCDD	1.05 J
1,2,3,4,7,8-HxCDF	0.747 J
1,2,3,6,7,8-HxCDD	3.22
1,2,3,6,7,8-HxCDF	0.445 J
1,2,3,7,8,9-HxCDD	1.47 J
1,2,3,7,8,9-HxCDF	< 0.408
1,2,3,7,8-PeCDD	0.316 J
1,2,3,7,8-PeCDF	< 0.165
2,3,4,6,7,8-HxCDF	0.8 J
2,3,4,7,8-PeCDF	0.414 J
2,3,7,8-TCDD	< 0.128
2,3,7,8-TCDF	0.515 J
OCDD	1800
OCDF	32.2
TCDD TEQ (ND = 0)	2.9099
Total HpCDD	248
Total HpCDF	50.7
Total HxCDD	20.5
Total HxCDF	17.8
Total PeCDD	1.89
Total PeCDF	4.61
Total TCDD	< 0.128
Total TCDF	1.84

SRBS86	0.50 S01 MJ777
1,2,3,4,6,7,8-HpCDD	505
1,2,3,4,6,7,8-HpCDF	49.6
1,2,3,4,7,8,9-HpCDF	4.24
1,2,3,4,7,8-HxCDD	4.2
1,2,3,4,7,8-HxCDF	1.81 J
1,2,3,6,7,8-HxCDD	15.6
1,2,3,6,7,8-HxCDF	1.83 J
1,2,3,7,8,9-HxCDD	7.53
1,2,3,7,8,9-HxCDF	0.175 J
1,2,3,7,8-PeCDD	1.5 J
1,2,3,7,8-PeCDF	0.388 J
2,3,4,6,7,8-HxCDF	3.02
2,3,4,7,8-PeCDF	0.992 J
2,3,7,8-TCDD	0.4 J
2,3,7,8-TCDF	0.788 J
OCDD	5760
OCDF	123
TCDD TEQ (ND = 0)	12.0874
Total HpCDD	930
Total HpCDF	208
Total HxCDD	110
Total HxCDF	79.4
Total PeCDD	10.4
Total PeCDF	18.4
Total TCDD	0.688
Total TCDF	7.34

SRBS85	0.50 S01 MJ776
1,2,3,4,6,7,8-HpCDD	318
1,2,3,4,6,7,8-HpCDF	48.9
1,2,3,4,7,8,9-HpCDF	4.11
1,2,3,4,7,8-HxCDD	1.17 J
1,2,3,4,7,8-HxCDF	0.908 J
1,2,3,6,7,8-HxCDD	9.4
1,2,3,6,7,8-HxCDF	0.56 J
1,2,3,7,8,9-HxCDD	2.17 J
1,2,3,7,8,9-HxCDF	< 0.196
1,2,3,7,8-PeCDD	0.381 J
1,2,3,7,8-PeCDF	< 0.111
2,3,4,6,7,8-HxCDF	1.55 J
2,3,4,7,8-PeCDF	0.216 J
2,3,7,8-TCDD	< 0.187
2,3,7,8-TCDF	< 0.216
OCDD	7310
OCDF	154
TCDD TEQ (ND = 0)	6.5213
Total HpCDD	568
Total HpCDF	236
Total HxCDD	38.6
Total HxCDF	56.3 J
Total PeCDD	1.4
Total PeCDF	3.93
Total TCDD	< 0.187
Total TCDF	0.626

SRBS61	4.00 S01 MJ637
1,2,3,4,6,7,8-HpCDD	1.02 J
1,2,3,4,6,7,8-HpCDF	< 0.195
1,2,3,4,7,8,9-HpCDF	< 0.131
1,2,3,4,7,8-HxCDD	< 0.207
1,2,3,4,7,8-HxCDF	< 0.0782
1,2,3,6,7,8-HxCDD	< 0.218
1,2,3,6,7,8-HxCDF	< 0.078
1,2,3,7,8,9-HxCDD	< 0.206
1,2,3,7,8,9-HxCDF	< 0.158
1,2,3,7,8-PeCDD	< 0.103
1,2,3,7,8-PeCDF	< 0.125
2,3,4,6,7,8-HxCDF	< 0.0924
2,3,4,7,8-PeCDF	< 0.119
2,3,7,8-TCDD	< 0.075
2,3,7,8-TCDF	< 0.0972
OCDD	9.73
OCDF	< 0.278
TCDD TEQ (ND = 0)	0.0112
Total HpCDD	1.73
Total HpCDF	0.538 J
Total HxCDD	< 0.21
Total HxCDF	< 0.0981
Total PeCDD	< 0.103
Total PeCDF	0.143
Total TCDD	< 0.075
Total TCDF	0.116

SRBS60	2.00 S02 MJ636
1,2,3,4,6,7,8-HpCDD	1320
1,2,3,4,6,7,8-HpCDF	100 J
1,2,3,4,7,8,9-HpCDF	10
1,2,3,4,7,8-HxCDD	5.25
1,2,3,4,7,8-HxCDF	3.65
1,2,3,6,7,8-HxCDD	32.8
1,2,3,6,7,8-HxCDF	3.37
1,2,3,7,8,9-HxCDD	10.6
1,2,3,7,8,9-HxCDF	0.968 J
1,2,3,7,8-PeCDD	2.2 J
1,2,3,7,8-PeCDF	0.58 J
2,3,4,6,7,8-HxCDF	6.44
2,3,4,7,8-PeCDF	1.64 J
2,3,7,8-TCDD	0.534
2,3,7,8-TCDF	0.789 J
OCDD	18600
OCDF	245
TCDD TEQ (ND = 0)	26.1542
Total HpCDD	2440
Total HpCDF	427 J
Total HxCDD	264
Total HxCDF	192 J
Total PeCDD	16
Total PeCDF	41.3
Total TCDD	3.12
Total TCDF	9.32

Note: Analytes detected at least once at Sodium Reactor Experiment Area Excavation are listed in the Comparison Levels Table. Analytes listed in the table, but not displayed for a given sample, were not included in that sample's analytical suite.

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.

Soil Metals/pH Results
Sodium Reactor Experiment (Area IV AOC)

Santa Susana Field Laboratory

MWH MONTGOMERY WATSON HARZA

FIGURE A3.3-4A

Soil Sample Location Symbol Legend

- ▲ Soil sample location with detected Metals/pH
- ▲ Soil sample location with no detected Metals/pH
- △ Soil sample location not analyzed for Metals/pH
- △ 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	0.34
Barium	140	15000	15
Beryllium	1.1	150	5.7
Boron	9.7	15000	6.3
Cadmium	1	2.6	0.0031
Calcium	- -	- -	- -
Chromium	36.8	3400	940
Cobalt	21	1500	10
Copper	29	3000	1.1
Hexavalent Chromium	- -	110	15
Iron	28000	- -	- -
Lead	34	150	0.063
Magnesium	- -	- -	- -
Manganese	495	9500	63
Mercury	0.09	23	0.89
Methyl mercury	- -	7.6	0.17
Molybdenum	5.3	380	0.11
Nickel	29	1500	0.1
Organic Lead	34	150	0.063
Potassium	- -	- -	- -
Selenium	0.655	380	0.18
Silver	0.79	380	0.55
Sodium	- -	- -	- -
Thallium	0.46	6.1	3.2
Vanadium	62	76	1.6
Zinc	110	23000	22

Note: (mg/kg) = milligrams per kilogram

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

Data Date: 071606

Data Box Information

Sample Location ID — SRBS01; 1.00 — Depth in Feet; S01 — Sample Number; MH007 — Lab Reporting Code (EPA ID)

(Historical Sample)

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	Analyte positively identified; Associated numerical value is considered estimated
*	Data validation not performed
-	Analyte not reported
[#]	If more than one result per sample depth, the maximum is presented, with number of results in backets.

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

Chemical Use Areas

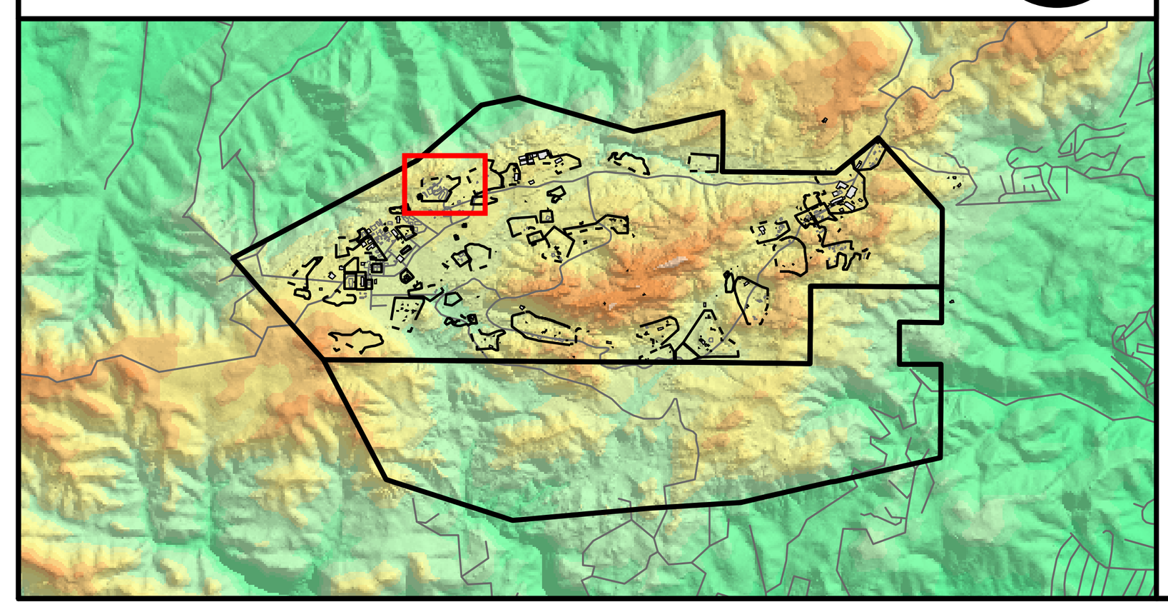
Solvent, Petroleum, Oil, Transformer, Metal, Debris, Hydrazine, Perchlorate, Screening, Multiple Use

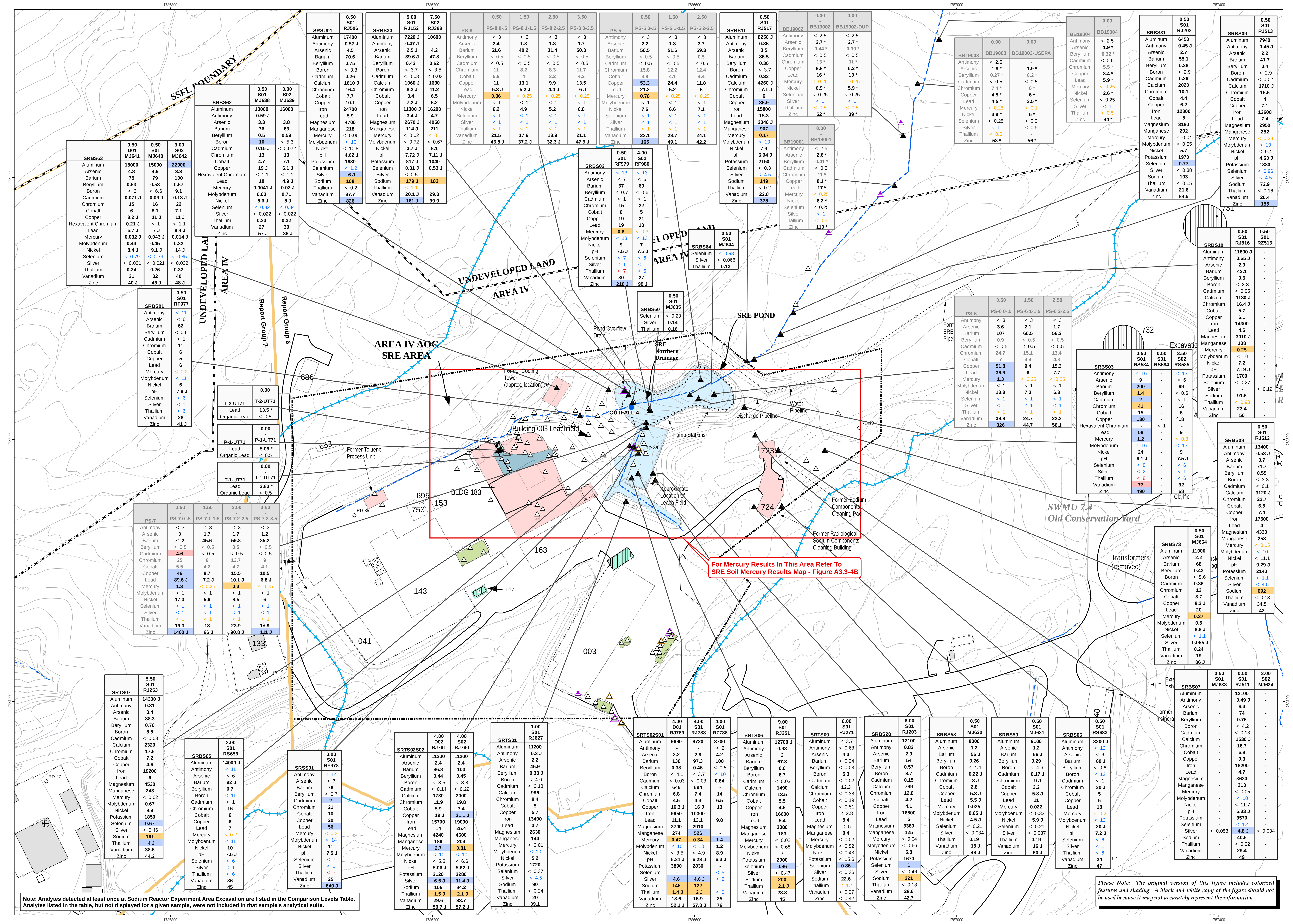
Base Map Legend

Administrative Area Boundary; RFI 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; Trench; Fence; Pipe; Leachfield; NPDES Outfall; Well; Pond; Possible Pond; Drainage; Surface Water Divide; Elevation Contour; Rock Outcrop

Date: Sep 28, 2006 Document: RFI-Report-Group6_SR_Metals.mxd

1 inch equals 60 feet (0 60 120 Feet)





AREA IV AOC
SRE AREA

SRE POND

Pond Overflow Drain

SRE Northern Drainage

Former Cooling Tower (approx. location)

Building 003 Leachfield

OUTFALL 4

Pump Stations

Discharge Pipeline

Water Pipeline

RD-18

RD-86

UT-71

BLDG 183

723

724

695

753

153

Approximate Location of Leach Field

Former Sodium Components Cleaning Pad

Former Radiological Sodium Components Cleaning Building

Soil sample location with detected Mercury
- 0.001600 - 0.090000
- 0.090001 - 4.900000
- 4.900001 - 35.000000

Soil sample location with no detected Mercury
- 0.0 - 0.09 mg/kg Background
- 0.09 - 4.90 mg/kg
- 13.00 - 35.00 mg/kg

Soil Sample Location
- Soil sample location not analyzed for Mercury
- Contained unit soil sample
- Refused sample (refusal depth < 1' below ground surface)
- Soil sample not analyzed by any sample method

Notes:
1. All results in milligrams per kilogram.
2. If more than one sample result per sample location, the maximum is presented.

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

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

Chemical Use Areas
- Solvent
- Petroleum
- Oil
- Transformer
- Metal
- Debris
- Hydrazine
- Perchlorate
- Screening
- Multiple Use

Soil Mercury Results
Sodium Reactor Experiment (Area IV AOC)
SANTA SUSANA FIELD LABORATORY

1 inch equals 50 feet

0 50 100 Feet

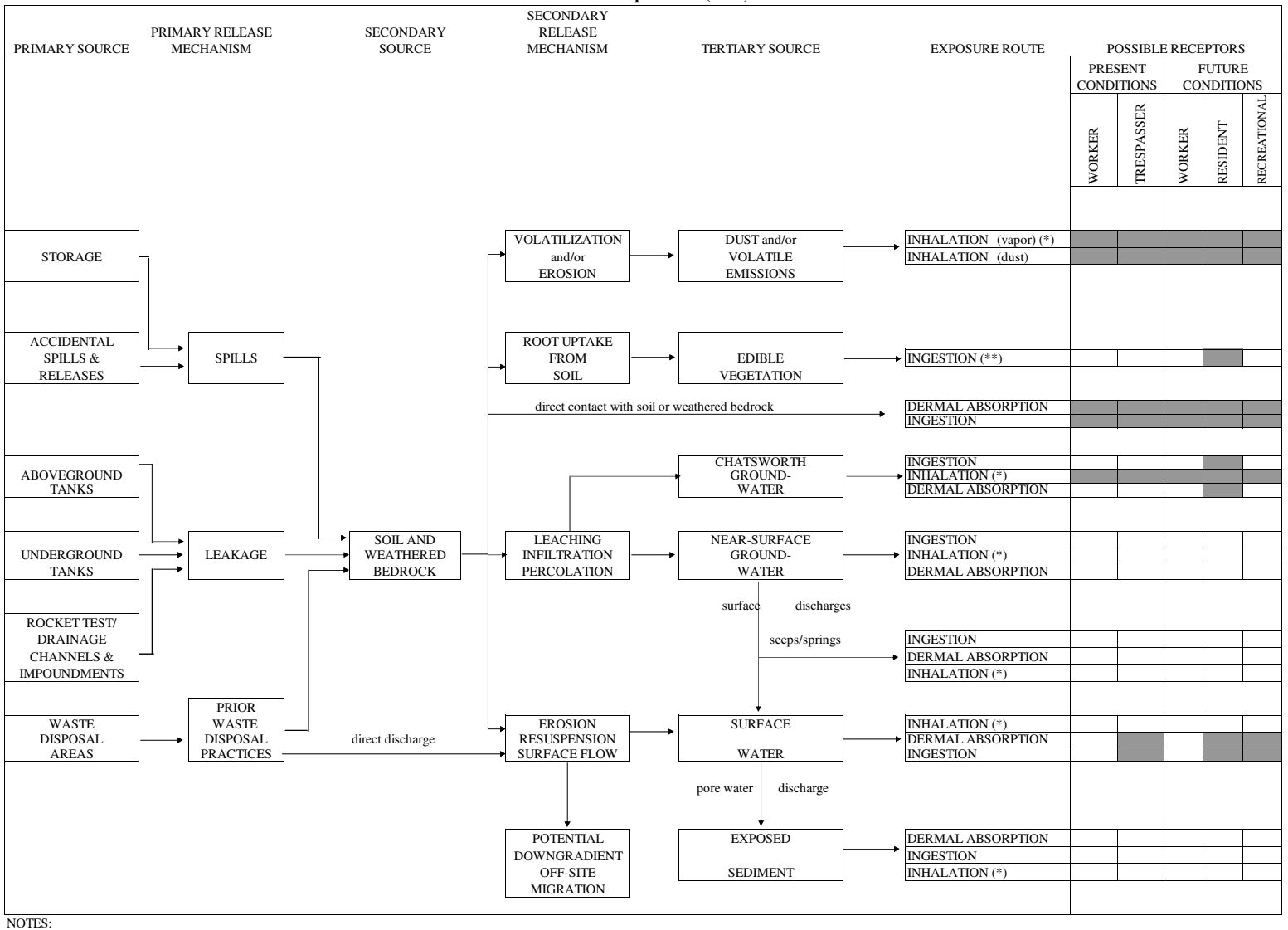
Date: Sep 28, 2006

RFI-Report-Group6_SR_Mercury_11x17.mxd

FIGURE A3.3-4B

Figure A3.4-1

Human Health Risk Assessment Conceptual Site Model
Sodium Reactor Experiment (SRE) Area



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-residental and non-worker receptors include only outdoor air exposure. For residents and workers, inhalation of volatiles from near-surface groundwater includes pathways associated with both migration to indoor air and ambient air (domestic groundwater use is an incomplete exposure pathway). For residents and workers, inhalation of volatiles from Chatsworth formation groundwater includes pathways associated with both migration to indoor air and ambient air. Exposure to fugitive dust is limited to non-VOC compounds.

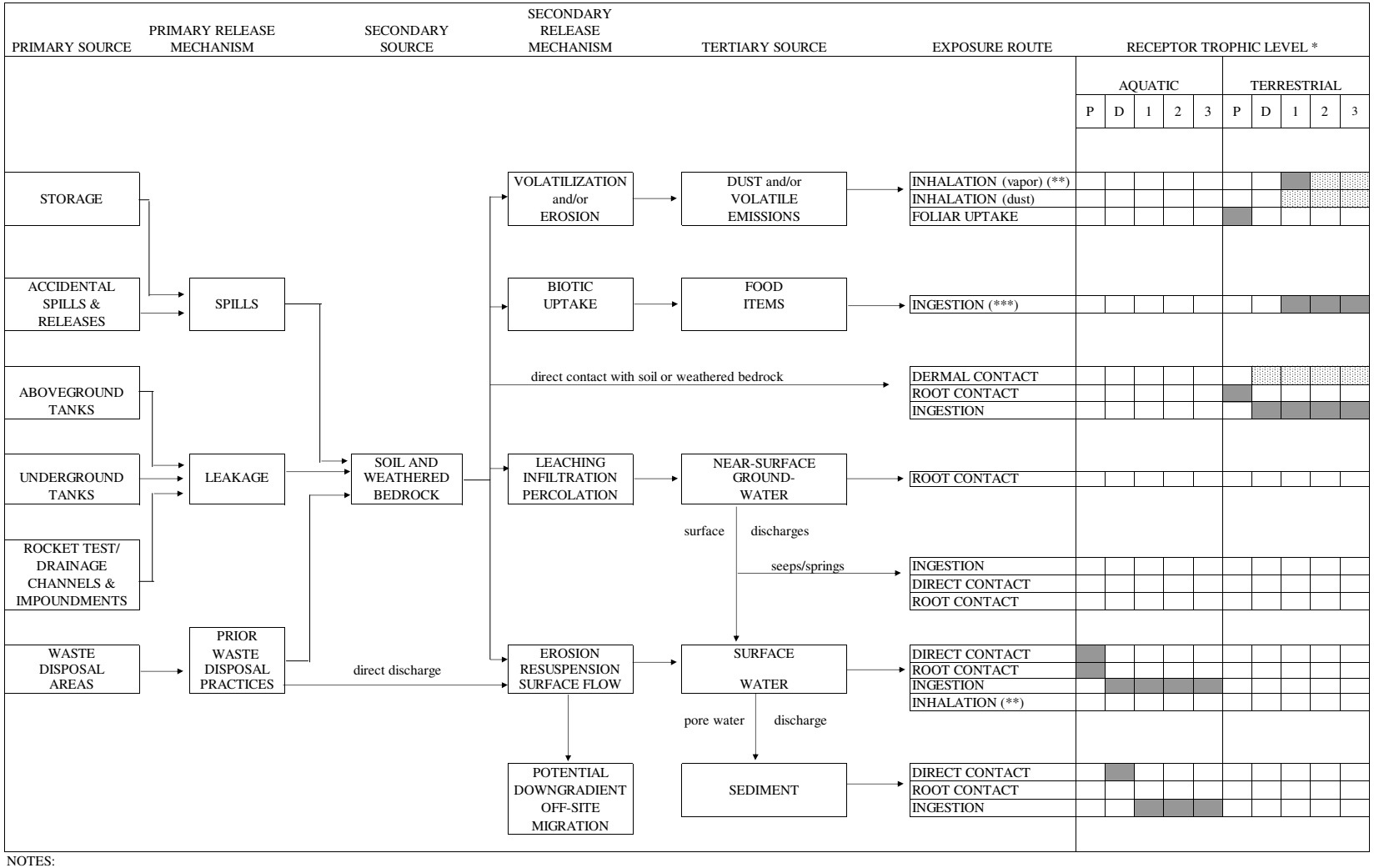
(**) Exposure limited to bioaccumulatable compounds as described in the text.

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

- incomplete exposure pathways not evaluated in this risk assessment

Table A3.4-2 (1 of 1)

Ecological Risk Assessment Conceptual Site Model
Sodium Reactor Experiment (SRE) Area



NOTES:

(*) Trophic Level: P = primary producers (e.g., plants); D = detrivores (e.g., invertabrates); 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.

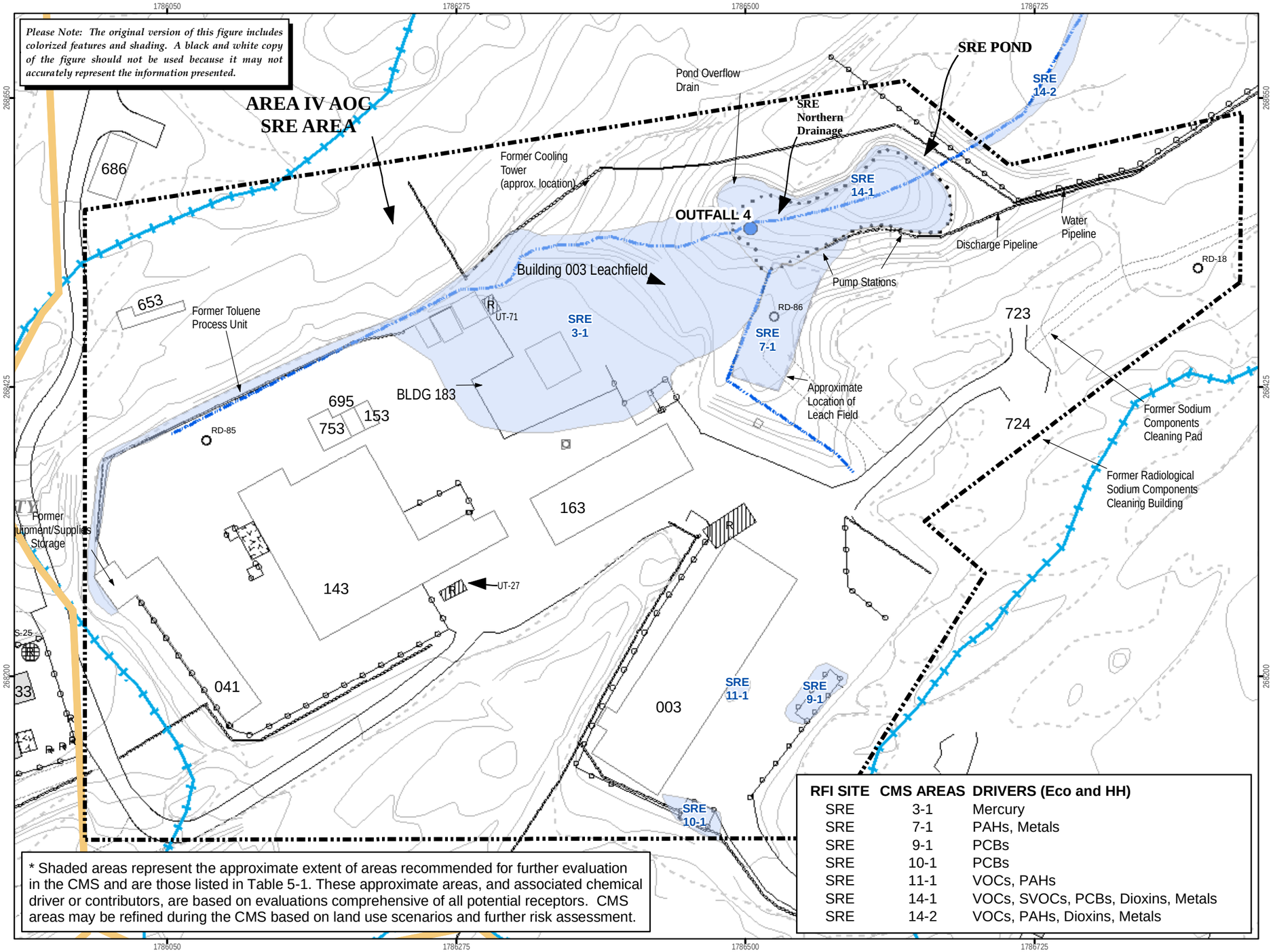
(***) Exposures limited to bioacummulative compounds as defined in the text.

- 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

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.



RFI SITE	CMS AREAS	DRIVERS (Eco and HH)
SRE	3-1	Mercury
SRE	7-1	PAHs, Metals
SRE	9-1	PCBs
SRE	10-1	PCBs
SRE	11-1	VOCs, PAHs
SRE	14-1	VOCs, SVOCs, PCBs, Dioxins, Metals
SRE	14-2	VOCs, PAHs, Dioxins, Metals

* Shaded areas represent the approximate extent of areas recommended for further evaluation in the CMS and are those listed in Table 5-1. These approximate areas, and associated chemical driver or contributors, are based on evaluations comprehensive of all potential receptors. CMS areas may be refined during the CMS based on land use scenarios and further risk assessment.

Base Map Legend

- Administrative Area Boundary
- RFI Boundary
- Report Group 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
- NPDES Outfall
- Drainage
- Pond
- Possible Pond
- Leachfield
- Pipe
- Well

CMS Areas

SRE 7-1 — SRE CMS Areas

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

CMS area designations identified in Table A3.5-1

Surficial Media
Site Action Recommendations
Sodium Reactor Experiment

Date: Sep 29, 2006

Document: RFI-Report-Group6_SR_CMS_ Areas.mxd

1 inch equals 80 feet

0 80 160 Feet

SANTA SUSANA FIELD LABORATORY

MWH MONTGOMERY WATSON HARZA

FIGURE A3.5-1

ATTACHMENT A3-1

REGULATORY AGENCY DOCUMENTS

Department of Energy
San Francisco Operations Office
1333 Broadway
Oakland, California 94612

SEP 30 '85 PM

SEP 24 1985

Mr. G. W. Meyers
Vice President
Atomics International
Business Segment
Rocketdyne
P. O. Box 309
Canoga Park, California 91304

SUBJECT: Certification Docket for the SRE and Building 003

Dear Wayne,

Enclosed is a copy of the Certification Docket describing the remedial actions to decontaminate the SRE and Bldg. 003.

The SRE and Bldg. 003 are officially terminated from the DOE radiologically contaminated Surplus Facilities Program and are released to Rockwell International, Rocketdyne Division for unrestricted use.

If you have any questions, please call Len Lanni at (415) 273-6444.

Sincerely,

James K. Hartman, Director
Magnetic Fusion and Nuclear
Division

Enclosure

cc w/o encl:
Art Whitman, HQ

07849RC

(6450-01)

U.S. DEPARTMENT OF ENERGY
SAN FRANCISCO OPERATIONS OFFICE
MAGNETIC FUSION AND NUCLEAR DIVISION

CERTIFICATION FOR UNRESTRICTED USE OF THE SODIUM REACTOR EXPERIMENT(SRE) COMPLEX AND THE HOT CAVE FACILITY(BLDG. 003)

AGENCY: San Francisco Operations Office, Department of Energy

ACTION: Notice of Certification of Decommissioned Facilities for Unrestricted Use

SUMMARY: The Department of Energy has completed the radiological surveys and has taken remedial actions to decontaminate and decommission DOE contaminated areas that were found in the SRE complex and Bldg.003. The Department, through the San Francisco Operations Office, has issued the following statement:

STATEMENT OF CERTIFICATION FOR UNRESTRICTED USE OF THE SRE COMPLEX AND BLDG. 003 AT ROCKWELL INTERNATIONAL's SANTA SUSANA FIELD LABORATORY, CHATSWORTH, CALIFORNIA

The Department of Energy, Office of Nuclear Energy, Office of Terminal Waste and Remedial Action, Division of Remedial Action Projects and the Department of Energy San Francisco Operations Office have reviewed the remedial actions and the radiological survey reports of the SRE complex and Bldg. 003. Based on this review, DOE certifies that there is no evidence the facilities pose a radiological threat to either personnel or the environment. Therefore, the SRE complex and Bldg. 003 are removed from the DOE radiologically contaminated Surplus Facilities Program and are suitable for unrestricted use.

For further information contact:

Mr. Leonard Lanni, Project Manager
Magnetic Fusion and Nuclear Division
U.S. Department of Energy
1333 Broadway
Oakland, California 94612
Telephone:(415)273-6444 or FTS:536-6444

SUPPLEMENTARY INFORMATION:

The Department of Energy has established a program to characterize and when necessary, correct the radiological conditions of DOE contaminated surplus facilities. The objective of the program is to insure that these surplus facilities and any associated properties in their vicinity are within or below the radiological guidelines established by the ANSI Standard N13.12 and the NRC Regulatory Guide 1.86 .

The SRE complex, located at the Rockwell's Santa Susana Field Laboratory, Chatsworth, California, consists of a series of buildings used to support the Atomic Energy Commission activities to demonstrate the feasibility of a high temperature sodium-cooled graphite-moderated reactor as the heat source for a central power station.

The Hot Cave Facility, Bldg. 003, located at the Rockwell's Santa Susana Field Laboratory, was used to analyze fuel burn-up samples for the System for Nuclear Auxillary Power (SNAP) Program and the evaluation of various irradiation experiments.

Radiological surveys conducted before the decontamination and decommissioning activities for the SRE complex and Bldg. 003 showed gross contamination of mixed fission products and beta-gamma emitters.

The remedial actions, including decontamination and decommissioning for both the SRE and Bldg. 003 were completed in 1982.

Based on the review of the final remedial action project report, the San Francisco Operations Office has concluded that the SRE complex and Bldg. 003 are radiologically acceptable and suitable for release for unrestricted use and are therefore removed from the Surplus Facilities Program.

These findings are supported by the Department of Energy's Certification Dockets for the SRE complex and Bldg. 003. The dockets are available for review between the hours of 8:00 a.m to 4:00 p.m. Monday through Friday (except Federal holidays) at the following locations:

1. U.S. Department of Energy
   San Francisco Operations Office
   Technical Information Center
   1333 Broadway
   Oakland, California 94612

2. U.S. Department of Energy
   Public Document Room
   Forrestal Bldg. Room 1E-190
   Washington,D.C 20545

Date: July 23, 1985

William R. Voigt

William R. Voigt,Jr., Acting Director
Office of Terminal Waste Disposal
and Remedial Action
DOE/HQ

RESOURCE MANAGEMENT AGENCY
county of ventura

Environmental Health Division
Donald W. Koepp
Director

October 5, 1994

A.J. Lenox
Rocketdyne Division
P.O. Box 7922
Canoga Park, CA 91306-7922

REVIEW OF UNDERGROUND STORAGE TANK REMOVAL REPORTS FOR ROCKWELL INTERNATIONAL, SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY CALIFORNIA

The Ventura County Environmental Health Division (VCEHD) has received the report dated July 13, 1994, for the above-referenced site. This report presented a comprehensive review of site status for 35 underground tanks at the Rockwell Santa Susana Field Laboratory facility. Summarizing available tank removal information on a tank-by-tank basis allowed the VCEHD to gain an understanding of the underground fuel tank history at this facility for the first time. Based on this information, determinations were made which are outlined below:

1. Based on the information available in our files and the above-mentioned report, the VCEHD will not require additional work for the following numbered tanks:

1	11	36	47
2	18	42	49
6	19	43	50
8	22	44	52
9	27	45	54 (same as 36)
10	28	46	66

2. Tank # 3 will be added to the LUFT site list. The site assessment defined the lateral extent in the soil. There is no information available to support that the contamination detected during the tank removal was remediated or that verification samples were collected to document the remediation. You are required to respond within thirty days of receipt of the release notification documentation which you will receive shortly.

09621 RC

800 South Victoria Avenue, L1730, Ventura, CA 93009 (805) 654-3518 FAX (805) 654-2480

3. As per your recommendations, tanks #55 and #67 will require additional investigation. Both tanks will be added to the LUFT site list. You are required to respond within thirty days of receipt of the release notification documentation which you will receive shortly. Tank # 55 was also referred to as tank # 12. This tank is listed as containing radioactive waste. The VCEHD requires clarification on whether radioactive waste was stored in this tank.

4. Tanks #37 and #38 are listed as LUFT site #C94011. Tanks #39, 40, and 41 are listed as LUFT site #C90067. Comments with regard to additional site assessment or remediation at these sites will be issued separately by VCEHD.

5. The reports on tanks #'s 48, 51, and 53 do not contain sufficient information for a determination to close the files on these tanks. The VCEHD does not consider the presence of VCEHD representatives in the photograph attributed to tank #53 to be significant. You are required to obtain at least two soil samples from these three tanks at the approximate location of the base of each of the former tank excavations. The VCEHD will use this information to determine whether there is a need for additional work. **Submit a proposal to perform this additional assessment.**

California Health and Safety Code §25299.37 requires that the above-mentioned information be submitted in report form to this Division. Submit said report by December 15, 1994.

If you have any questions, please contact me at (805) 654-3525 Monday through Thursday.

Michael C. McFadden

MICHAEL C. MCFADDEN
UNDERGROUND TANK PROGRAM
ENVIRONMENTAL HEALTH DIVISION

MCM/sw/9rockwel

c: Gay Norris, Los Angeles Regional Water Quality Control Board
Peter Raftery, GTI

Boeing North American, Inc.
Rocketdyne Division

6633 Canoga Avenue
P.O. Box 7922
Canoga Park, CA 91309-7922

February 16, 1998
In reply refer to 98RC0922

Penny Nakashima
California Environmental Protection Agency
Facilities Permitting Branch
Department of Toxic Substances Control
Region 3
1011 N. Grandview Avenue
Glendale, CA 91201

BOEING

Subject: RCRA Field Investigation Workplan Amendment

Dear Ms. Nakashima:

As we discussed during a prior meeting, Boeing North American, Inc., Rocketdyne Propulsion and Power, proposes to include one additional Areas of Concern (AOC) to the RCRA Facility Investigation program. The new AOC is the Sodium Reactor Experiment (SRE) pond located in Area IV. Attached is a brief description of the AOC and the sampling locations.

If you have any questions, please feel free to call me at (818) 586-5695.

Sincerely,

Art Lenox
Environmental Remediation

AL:bc
Enclosure

cc: Committee to Bridge the Gap, c/o J. Lyou (w/encl.)
Dixie Hambrick, Ogden Environmental and Energy Services (w/o encl.)
Phil Chandler, DTSC (w/o encl.)
Craig Christmann, DTSC (w/o encl.)
R. Marshall/CSUN, Oviatt Library (w/encl.)
J. Weaver/Simi Valley Library (w/encl.)
J. Metzler/LA Public Library, Platt Branch (w/encl.)

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1 N. Grandview Ave.
ndale, CA 91201

April 29, 1998

Pete Wilson
Governor

Peter M. Rooney
Secretary
for Environmental
Protection

Mr. Art Lenox
Environmental Remediation
Boeing North American, Inc.
Rocketdyne Propulsion and Power
6633 Canoga Avenue
P. O. Box 7922
Canoga Park, CA 91309-7922

Dear Mr. Lenox:

RCRA FIELD INVESTIGATION WORKPLAN AMENDMENT TO INCLUDE SODIUM REACTOR EXPERIMENT POND, AREA IV, SANTA SUSANA FIELD LABORATORY, SIMI HILLS, EPA ID NUMBER CA

The Department of Toxic Substances Control (DTSC) has reviewed the RCRA Field Investigation Workplan Amendment to include Sodium Reactor Experiment Pond, Area IV, Santa Susana Field Laboratory, Simi Hills. DTSC concurs with the inclusion of this area and requests additional information and a revised RCRA Facility Investigation Workplan Amendment to be provided as described in the enclosed comments.

If you have any questions concerning this matter, please contact Penny Nakashima at (818)551-2900.

Sincerely,

Philip B. Chandler, C.E.G.
Supervising Hazardous Substances
Engineering Geologist
Southern California Permitting Branch

Enclosure

cc: see next page

05-04-98 P03:13 IN

003125RC

cc: Dr. Joseph Lyou
Committee to Bridge the Gap
1637 Butler Avenue, Suite 203
Los Angeles, California 90025

Dr. Michael Sullivan
Rocketdyne Propulsion and Power
Boeing North American, Inc.
6633 Canoga Avenue
P. O. Box 7922
Canoga Park, CA 91309-7922

Dr. T. R. Hathaway/Dr. Debbie Oudiz
Department of Toxic Substances Control
301 Capitol Mall, 3rd Floor
Sacramento, California 95812

Mr. Craig Christmann
Department of Toxic Substances Control
1011 N. Grandview Avenue
Glendale, California 91201

COMMENTS ON WORKPLAN PROPOSAL FOR SODIUM REACTOR EXPERIMENT POND AREA IV SANTA SUSANA FIELD LABORATORY

1. The radiological release report for the Sodium Reactor Experiment (SRE) Complex and Pond needs to be provided.

2. If documentation for the underground tank removal performed under Ventura County oversight, does not demonstrate that samples were collected and analyzed from borings along the pipeline from the tank to the generator, then the RCRA Facility Investigation (RFI) Workplan Amendment must include such sampling.

3. The document entitled "Assessment of Pond Sediments in R2, SRE and Perimeter Ponds, at the SSFL", GRC, 1990 needs to be provided.

4. Previous Sampling-SRE Pond. The locations/depths of the 14 sediment samples collected in July 1980 must be described. Sampling locations from all previous investigations must be shown on Figure 3 and described in the RFI Workplan Amendment.

5. A site description needs to be provided in the RFI Workplan Amendment which indicates the approximate thickness of the soil/sediment overlying the bedrock, describes the area that comprises the SRE Complex, discusses the operations that were performed in each of the buildings in the SRE Complex and lists the chemicals that were used in the operations.

<u>Proposed Sampling - SRE Pond</u>

1. Influent enters the pond from two channels near the western end of the pond and effluent is discharged through a grating near the northeast end of the pond. The RFI Workplan Amendment needs to be revised to include additional samples within the SRE pond and surrounding area to determine the vertical and lateral extent of contamination. All samples should be analyzed for VOCs, SVOCs, metals, TPH, and pH.

2. The rationale for the proposed limited analysis and/or elimination of constituents of concern needs to be provided in the RFI Workplan Amendment .

3. If it cannot be shown that the liquids used in the cleaning operations strictly followed a pathway just to the north of the Sodium Components Cleaning Pad, then additional samples are needed in downslope areas. Also, additional samples will be needed in the area surrounding the pad to determine if it has been impacted by the subsequent sandblast operations. The foregoing needs to be included in the RFI Workplan Amendment

4. The RFI Workplan Amendment states that a sample will be collected directly next to previous soil sample location PS-7 and analyzed for VOCs to verify or confirm the reported elevated VOC concentrations. Table 1 shows that sample PS-7 contained metals and SVOCs and sample PS-8 contained VOCs. The metals and SVOCs should be included in the analysis of the sample adjacent to PS-7.

5. The proposed sampling plan states that if VOCs are not detected, then additional sampling will not be proposed for other areas within the SRE complex. DTSC cannot concur with this procedure for defining the extent of contamination. Not only have contaminants been detected within the SRE pond at different locations laterally and vertically, but the description provided in the site history states that operations at the SRE complex, pad and pond handled and/or received discharges of hazardous substances. These hazardous substances may have impacted other areas in the complex and unless the data are not useable because of field or laboratory QA/QC problems, then a thorough investigation is necessary to determine if the other areas within the complex pose a risk to human health and the environment and ecologic receptors.

6. The six samples proposed are not sufficient to adequately characterize the SRE complex. At a minimum, additional samples are needed in the following areas:

   - west end where the influent enters the pond along both of the channels

   - upstream of where the influent enters the pond along the discharge flow pathway

- at the east end of the pond where effluent was discharged and downslope of the discharge area

- along the path from the Sodium Components Cleaning Pad to the SRE Pond

- at and around Building 163 where the hazardous wastes are currently stored.

The Boeing Company
Rocketdyne Propulsion & Power
6633 Canoga Avenue
P.O. Box 7922
Canoga Park, CA 91309-7922

CERTIFIED – RETURN RECEIPT REQUESTED

December 7, 1998
In reply refer to 98RC6441

BOEING

Philip B. Chandler
Facilities Permitting Branch
California Environmental Protection Agency
Department of Toxic Substances Control
Region 3
1011 N. Grandview Avenue
Glendale, CA 91201

Subject: Revised Sodium Reactor Experiment (SRE) RFI Workplan Amendment
Santa Susana Field Laboratory
Ventura County, CA

Dear Mr. Chandler:

In response to your April 29, 1998 correspondence regarding the SRE RFI Workplan Amendment, Boeing North American, Inc., Rocketdyne Propulsion and Power (Rocketdyne) has prepared this submittal package. This package includes: a Rocketdyne response to each Department of Toxic Substances Control (DTSC) comment (below), SRE Radiological release documentation (Attachment 1), Underground Storage Tank UT-27 closure information (Attachment 2), a copy of a 1990 report summarizing an assessment of pond sediments at the Santa Susana Field Laboratory (Attachment 3), and the revised SRE RFI Workplan Amendment (Attachment 4). Rocketdyne is confident this information will enable the DTSC to complete the review and grant authorization to proceed with the investigation. With DTSC concurrence, Rocketdyne intends to initiate field work during January 1999.

Provided below are Rocketdyne's responses to specific DTSC comments. Additional descriptions are provided in the text of the Revised SRE RFI Workplan (Attachment 4).

DTSC Comment 1. *The radiological release report for the Sodium Reactor Experiment (SRE) Complex and Pond needs to be provided.*

Rocketdyne Response: The radiological release documentation for the SRE Complex is provided in Attachment 1.

DTSC Comment 2. *If documentation for the underground tank removal performed under Ventura County oversight does not demonstrate that samples were collected and analyzed from borings along the pipeline from the tank to the generator, then the RCRA Facility Investigation (RFI) Work Plan Amendment must include such sampling.*

Rocketdyne Response: Existing statutes provide that the State Water Resource Control Board (SWRCB) regulates underground petroleum fuel storage tanks. Under a memorandum of understanding with the SWRCB, the Ventura County Environmental Health Department (VCEHD) is the lead agency for UST removal and remediation activities in Ventura County. VCEHD was on site during tank and pipeline removal activities in 1988 and closed the UST project based on the absence of contamination (Attachment 2). Consequently, Rocketdyne is not proposing additional work at UT-27 because it is unnecessary, a poor utilization of resources and will nullify already completed VCEHD action.

DTSC Comment 3. *The document entitled "Assessment of Pond Sediments in R2, SRE, and Perimeter Ponds at the SSFL", GRC, 1990 needs to be provided.*

Rocketdyne Response: Rocketdyne has enclosed a copy of the report (Attachment 3). This report was originally provided to the Regional Water Quality Control Board, Los Angeles Region on 26 April 1991.

DTSC Comment 4. *Previous sampling - SRE Pond. The locations/depths of the sediment samples collected in July 1990 must be described. Sampling locations from all previous investigations must be shown on Figure 3 and described in the RFI Work Plan Amendment.*

Rocketdyne Response: The sampling section in the RFI Workplan has been revised as requested. Figure 2 of the revised SRE RFI Workplan Amendment (Attachment 4) identifies all previous soil sample locations.

DTSC Comment 5. *A site description needs to be provided in the RFI Work Plan Amendment which indicates the approximate thickness of the soil/sediment overlying the bedrock, describes the area that comprises the SRE Complex,*

discusses the operations that were performed in each of the buildings in the SRE Complex and lists the chemicals used in the operations.

Rocketdyne Response: The site description has been revised as requested (see Attachment 4).

DTSC Proposed Sampling Comments- SRE Pond

DTSC Comment 1. *Influent enters the pond from two channels near the western end of the pond and effluent is discharged through a grating near the northeast end of the pond. The RFI Work Plan Amendment needs to be revised to include additional samples within the SRE Pond and surrounding area to determine the vertical and lateral extent of contamination. All samples should be analyzed for VOCs, SVOCs, metals, TPH, and pH.*

Rocketdyne Response: The proposed sampling section has been revised to respond to this comment (see Attachment 4, revised SRE RFI Work Plan Amendment). As discussed in the revised SRE Workplan Amendment, sediment samples were collected from two locations within the SRE Pond in December 1997 to evaluate the extent of elevated concentrations previously detected in samples collected by GRC in 1990. Ogden collected four additional samples in 1997 from other locations near the pond to further evaluate the results of the GRC samples. No additional sampling is proposed in the SRE Pond because the Pond has been sufficiently characterized given its shallow depth to bedrock (approximately 3 feet bgs) and small size (approximately 0.1 acre). As described in the revised RFI Workplan Amendment, additional sampling is proposed in the area surrounding the pond as requested by DTSC.

DTSC Comment 2. *The rationale for the proposed limited analysis and/or elimination of constituents of concern needs to be provided in the RFI Work Plan Amendment.*

Rocketdyne Response: The proposed sampling section has been revised to respond to this comment (see Attachment 4, revised RFI Work Plan Amendment).

DTSC Comment 3. *If it cannot be shown that the liquids used in the cleaning operations strictly followed a pathway to the north of the Sodium Component Cleaning Pad, then additional samples will be needed in downslope areas. Also, additional samples will be needed in the area surrounding the pad to determine if it has been impacted by sandblast operations. The foregoing needs to be included in the RFI Work Plan Amendment.*

Rocketdyne Response: The proposed sampling section has been revised to respond to this comment (see Attachment 4, revised RFI Work Plan Amendment).

DTSC Comment 4. *The RFI Work Plan Amendment states that a sample will be collected directly next to previous sample location PS-7 and analyzed for VOCs to verify or confirm the reported elevated VOC concentrations.*

BOEING

Rocketdyne Response: The RFI Work Plan Amendment mistakenly identified the previous sample as PS-7. The correct sample is PS-8, and the RFI Work Plan Amendment has been revised to correct this error.

DTSC Comment 5. *The proposed sampling plan states that if VOCs are not detected then additional sampling will not be proposed for other areas within the SRE Complex. DTSC cannot concur with this procedure for defining the extent of contamination. Not only have the contaminants been detected within the SRE Pond both laterally and vertically. But the description provided in the site history states that operations at the SRE Complex, pad, and pond handled and/or received hazardous substances. These hazardous substances may have impacted other areas within the complex and, unless the data are not useable because of field or laboratory QA/QC problems, then a through investigation is necessary to determine if other areas within the complex pose a risk to human health or the environment and ecological receptors.*

Rocketdyne Response: The proposed sampling plan has been revised in response to this and the next comment (see Attachment 4, revised SRE Work Plan Amendment).

DTSC Comment 6. *The 6 samples proposed are not sufficient to adequately characterize the SRE Complex. At a minimum, additional samples are needed in the following areas*:

- *west end where influent enters the pond along both channels*

  Rocketdyne Response: As shown on Figure 2 of the revised SRE Work Plan Amendment, soil/sediment samples were previously collected at two locations (SRBS04 and SRBS02) at the west end of the SRE Pond, where influent entered the pond from both channels.

- *upstream of where the influent enters the pond along the discharge pathway*

  Rocketdyne Response: As discussed in the revised SRE Workplan Amendment, a surface soil sample (SRSS01) and a shallow subsurface soil sample (SRBS05) have been collected in this area.

- *at the east end of the pond where effluent was discharged and downslope of the discharge area*

  Rocketdyne Response: As discussed in the revised SRE Work Plan Amendment, effluent from the SRE Pond was pumped into a pipeline that ran east to the Old Conservation Yard (SWMU 7.4), where it discharged to a concrete lined access box which discharged to a natural drainage. The drainage downstream of the outlet of the SRE Pond pipeline has been sampled for the SRE constituents of concern. Figure 3 of the revised SRE Workplan Amendment shows the location of the soil samples downstream of the SRE pipeline discharge point.

  If inadvertent discharge occurred over the SRE Pond spillway, this drainage has already been sampled as part of the McLaren/Hart sampling performed in 1993. The location of these samples is also shown on Figure 2 of the revised SRE RFI Work Plan (Attachment 4). The McLaren/Hart samples were also analyzed for SRE constituents of concern and the results were less than RFI field action levels. Because of this, no further sampling in the drainage downstream of the SRE spillway is proposed.

- *along the path from the Sodium Components Cleaning Pad to the SRE Pond*

  Rocketdyne Response: As discussed in the revised SRE Workplan Amendment, an additional soil sample is proposed downslope of the Sodium Components Cleaning Pad along the primary drainage to the SRE Pond. A second sample s proposed in a slight topographic depression east of the pad to determine potential impacts in this direction.

- *at and around the Building 163 where hazardous materials are currently stored*

  Rocketdyne Response: This area has been used as a hazardous waste generator storage area since 1992. Hazardous wastes are stored in Department of Transportation approved shipping containers and liquids stored within secondary containment to prevent releases to the environment. In addition, weekly inspections are conducted to ensure proper storage and records maintained by Rocketdyne personnel. There have been no spills reported in this area since activity began. Therefore, Rocketdyne is not proposing any soil investigation activities to address hazardous waste storage activities at Building 163. Rocketdyne, however, has proposed one soil vapor sample location immediately north of Building 163 to confirm that

there have not been any historical releases (related to SRE activities) in this area.

If you have any questions regarding this submittal or would like to schedule a meeting to clarify any issues, please do not hesitate to let me know. I can be reached at (818) 586-5695.

Sincerely,

BOEING

Art Lenox
Environmental Remediation

AL:bc
Attachments

cc: Committee to Bridge the Gap, c/o J. Lyou (w/encl.)
Dixie Hambrick, Ogden Environmental and Energy Services (w/encl.)
Penny Nakashima, DTSC (w/encl.)
R. Marshall, CSUN, Oviatt Library (w/encl.)
J. Weaver, Simi Valley Library (w/encl.)
J. Metzler, LA Public Library, Platt Branch (w/encl.)

(SHEA-016831)

Department of Toxic Substances Control

Jesse R. Huff, Director
10151 Croydon Way, Suite 3
Sacramento, California 95827-2106

Winston H. Hickox
Secretary for
Environmental
Protection

Gray Davis
Governor

March 2, 1999

Mr. Arthur J. Lenox
Environmental Remediation Safety, Health & Environmental Affairs
Rocketdyne Division - Boeing North American, Inc.
6633 Canoga Avenue MS SS-14
P.O. Box 7922
Canoga Park, California 91309-7922

Dear Mr. Lenox:

RESPONSE TO REVISED RFI WORK PLAN ADDENDUM, SODIUM REACTOR COMPLEX AREA, AREA IV AREA OF CONCERN (AOC), SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CALIFORNIA

The Department of Toxic Substances Control (DTSC) has reviewed the Revised Work Plan for the Sodium Reactor Complex dated December 7, 1998. We are forwarding these comments to you in draft format because of some uncertainties associated with the existing data and unfamiliarity with the SRE Lab site. DTSC staff are in transition to the project and have only recently begun to work on the Boeing Santa Susana Field Laboratory site. Geologic Services Unit staff who provided review comments will want to personally visit the site and more fully discuss site history and characterization activities with you. Once these activities are completed, DTSC can finalize our comments within a few days time.

Your cooperation and understanding for the DTSC redirected staffing are appreciated and we look forward to working with you in the future. Please contact Mr. Richard McJunkin at (916) 255-3672 or me at (916) 255-3600 if you have any questions of comments.

Sincerely,

Gerard J. Abrams

Gerard J. Abrams, R.G.
Rockwell Project Manager

Enclosures

03-15-99A11:52 RCV

002031 RC

DRAFT COMMENTS

MEMORANDUM

TO: Gerard Abrams, R.G.
Project Manager
Facility Permitting Branch

FROM: Richard McJunkin, CEG
Senior Engineering Geologist
Geologic Services Unit

REVIEWED BY: XXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXX

DATE: March 1, 1999

SUBJECT: **RESPONSE TO *REVISED RCRA WORK PLAN ADDENDUM, SODIUM REACTOR COMPLEX AREA, AREA IV AREA OF CONCERN, SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CALIFORNIA* DATED DECEMBER 7, 1998**

TECHNICAL REQUEST

Per your request, the Geologic Services Unit (GSU) has reviewed the document *RCRA Field Investigation Amendments for Boeing North American, Inc., Rocketdyne Propulsion and Power, Santa Susana Field Laboratory, Ventura County, California* (Work Plan). The date of

the Work Plan is uncertain, however, Attachment 4 of the Work Plan entitled *Revised RFI Work Plan Addendum, Sodium Reactor Complex Area, Area IV Area of Concern (AOC), Santa Susana Field Laboratory, Ventura County, California* (Revised Work Plan), is dated December 7, 1998. Three AOCs are addressed in the Work Plan and the Sodium Reactor Experiment (SRE) Complex is one AOC and was the focus of this review. The SRE Complex is within Area IV in the western-most part of the Santa Susana Field Laboratory (SSFL) in Ventura County, California. Most of the SSFL is owned by Boeing North American, Inc. (Boeing). In addition to review of the Work Plan, discussions regarding the site were made with Boeing and Department of Toxic Substances Control (DTSC) staff; in addition, a brief visit to the SRE Complex was performed as part of an introductory site tour of the SSFL facility with Arthur Lenox of Boeing and Gerard Abrams of DTSC on February 11, 1999. This is the only site visit performed by new DTSC team members who have pending assignments to assist Boeing with RCRA Facility Investigation (RFI) and Corrective Action activities.

Due to the brief amount of staff time involvement with the SRE Complex project and GSU review resources limited to only text of the Work Plan, comments and recommendations provided below are in "draft" format and subject to modification after communication with Boeing and other DTSC staff; also, an additional GSU visit to the SRE Complex to inspect and perform on-site discussions with Boeing and possibly other DTSC staff is needed. The visit to the SRE Complex is proposed to occur as soon as scheduling permits (i.e., probably the week of March 15, 1999 when Boeing has other characterization activities planned). After completing the proposed site visit to the SRE Complex with Boeing staff, review comments will be finalized within two to three days.

SITE OVER VIEW

The SRE Complex was operational from 1957 until 1964 and used for part of an Atomic Energy Commission program to develop a sodium cooled thermal reactor for civilian application. The area encompassed by the SRE Complex is just over nine acres in the northeast part of Area IV of the SSFL. During the operational period, numerous buildings were part of the SRE Complex as well as several exposed facilities including a pond, a pipeline, leach field, cleaning pad, storage pad and area(s), a suspect industrial waste dry well, and at least two underground storage tanks.

The SSFL is mostly underlain by Chatsworth Formation which is Cretaceous in age. Chatsworth Formation is predominantly sandstone with interbedded lenses of fine-grained dark siltstone that do not appear laterally continuous. Both the sandstone and siltstone dip approximately 30-degrees in a northerly direction and are well-bedded and tightly cemented such

that fracturing (i.e., jointing) is developed. Several joint sets are common in the formation and appear to generally trend in a northerly direction that varies slightly in northerly trend across the SSFL which conforms to the approximate east-west strike of bedrock. Dips of joint patterns are unknown and do not appear to be characterized. The soil mantle over bedrock in the SRE Complex is cited (Revised Work Plan, p. 1) to be 15 to 20 feet thick. Exposures of indurated sandstone surrounded by a mantle of soil are common within the SRE Complex.

CONCLUSIONS AND RECOMMENDATIONS

GSU conclusions and recommendations provided below are based upon review of the Work Plan, technical discussions with DTSC and Boeing staff, and one site visit to the SRE Complex that was performed on a tour of the SSFL property. Experience gained from working on numerous other hazardous waste release sites with a similar geologic and hydrogeologic settings is also incorporated into developing conclusions and recommendations provided in this review. GSU recommendations are indented and in **bold** type below individual conclusions. The technical merit of GSU recommendations is to qualify and reinforce existing data collected by Boeing and to provide for closure of site characterization activities at the SRE Complex.

1. The entire nine acre (approximately) SRE Complex is not familiar to GSU staff who rely heavily on site inspections to acquire an understanding of former site activities respective to the geologic setting and to obtain an appreciation for past, present, or proposed site characterization activities. A review of Work Plan text, maps, and figures does not provide for the experience gained by performing a site inspection. Also, several former buildings and/or sites are not discussed in the Work Plan (e.g., Former Building (?) 686, Former Building (?) 653, and several unnamed pads shown in Figure 2 of the Work Plan).

> **GSU needs to perform a detailed site inspection of the SRE Complex with Boeing staff and thoroughly discuss the operational history and handling and use of Contaminants of Concern (COCs) at <u>all</u> former buildings and/or pads in the complex; also, existing analytical data needs to be compared with previous site characterization activities to better assist Boeing with planning future site investigation.**

2. The potential for contamination to reside in the fractured bedrock (i.e., Chatsworth Formation) vadose zone underlying the SRE Complex derived from surface operations has not

been identified or characterized. Contaminant pathways from surface operations to the vadose zone were not described in documents reviewed by GSU to prepare this memorandum.

In the future, vadose zone characterization may need to be addressed if pathways are identified from contaminant source areas characterized at or near ground surface.

3. Sediments in the SRE Pond showed detectable emission data from alpha, beta, and gamma sources (see, for example, Appendix G in *Assessment of Pond Sediments in R2, SRE, and Perimeter Ponds at the Rockwell International Corporation, Rocketdyne Division, Santa Susana Field Laboratory, Ventura County, California, dated July 26, 1990*). An evaluation of radiological data is beyond the scope of a review by GSU.

Closure certification of potential impacts from emission by radionuclides in SRE Pond sediments should be performed by the Department of Health Services (DHS).

4. Several soil samples and a soil vapor sample have been collected from SRE Pond sediments and have been analyzed for contaminants (Work Plan). Most of the samples collected exhibited low concentrations of contaminants, including volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPHs), metals, and radionuclides. Additional soil sampling to check for contaminants was proposed by DTSC in previous comments; however, this prior DTSC recommendation was not accepted by Boeing.

GSU recommends that Boeing install one or two back hoe trenches approximately 10-feet long through the SRE Pond sediments to bedrock (e.g., interpreted refusal is 2.5- to 3.5-feet deep) so that a visual inspection may be performed of the SRE Pond sediments in cross section. If discoloration or other visual evidence for possible contamination is present in trench sidewalls, soil samples should be collected from suspect areas for analyses. If no discoloration or other visible evidence for contamination is present in trench walls, GSU will certify the SRE Pond for 'no further action' (NFA) excluding the radionuclide certification needed by DHS.

5. The Work Plan (p. 4-5) states that additional soil samples were collected in 1997 and 1998 from the SRE Pond by Ogden Environmental (p. 4-5). The Work Plan also states that the data from this activity are not yet available and will be released in conjunction with the RFI Report. Without question, the withholding by Boeing of any site characterization or analytical data

involving sites being reviewed for NFA severely restricts GSU from offering meaningful recommendations and does not provide for the spirit of cooperation that is needed to rapidly pursue closure for sites on the SSFL. The withholding of data also has the potential to duplicate efforts by GSU because issues that may be resolved at the moment need to be postponed for discussion at a future date.

Boeing should release all available characterization data to DTSC for sites being reviewed for efforts to complete site characterization activities (e.g., certification of sites for NFA).

6. The location of several soil sample locations down-gradient from the SRE Pond are identified by Figure 2 of the Work Plan. Page 4 of the Work Plan states that these samples were collected in April 1992 according to an approved DTSC and US Environmental Protection Agency work plan. The first soil sample collected down-gradient from the SRE Pond impoundment is at a distance of approximately 375 feet. The rationale for collecting a soil sample no closer than 375 feet from the SRE Pond that is intended to characterize potential discharge(s) is uncertain to GSU.

The rationale for selecting the closest soil sample to the SRE Pond at a distance of 375 feet for the purpose of characterizing a potential discharge(s) needs to be provided. Also, GSU needs to walk the overflow drainage below the SRE Pond and examine areas where soil samples were collected.

7. The Work Plan indicates that a pipeline was used to transmit effluent eastward from the SRE Pond to the Old Conservation Yard which is outside the SRE Complex. The materials used to construct this pipeline and whether it is located above- or below-ground are uncertain.

If the pipeline is above-ground, the entire length of pipeline run should be visually inspected for leaks; if past areas of leakage are detected, soil sampling should be implemented in the local area of the observed leak(s). If the pipeline is below-ground, it should be pressure tested to check for leakage; if pressure testing indicates leakage, all points of the pipeline where leaks have occurred need to located and surrounding soils sampled for contaminants.

8. The discharge point of the pipeline that delivered effluent from the SRE Pond to the Old Conservation Yard was to a concrete-lined access box and then to a natural drainage the flowed into Silvernale Reservoir (Revised Work Plan, p. 2).

The Old Construction Yard access box needs to physically be inspected during the proposed follow up site visit by GSU as well as the natural drainage leading to Silvernale Reservoir where effluent from the SRE Pond was discharged. Depending upon observations made by GSU and discussions with Boeing staff, some additional soil sampling in the area may needed in addition to that currently proposed.

9. The Revised Work Plan indicates that a septic tank and leach field are located near the southern inlet channel for the SRE Pond (p. 2) and shows that soil sampling and soil vapor sampling have been performed at the site (Figure 2). Soil sample SRSS01 was collected near-surface in this area and detected elevated concentrations of lead and zinc; soil sample SRBS05 was collected nearby at a depth of three-feet below ground surface and analytical results did not exceed the Field Action Level (FAL).

GSU needs to visually inspect the Leach Field area and be present to assist with the selection of additional soil sampling proposed by Boeing. A shallow back hoe trench in this area to observe subsurface conditions may be necessary to provide for a rapid determination by GSU for NFA.

10. At least two underground storage tanks (USTs) are identified by Boeing as being present in the SRE Complex (Revised Work Plan, p. 2-3). One UST identified by Boeing as UT-27 was removed in 1988 (Work Plan, p. 2-3) which was approved by the Ventura County Environmental Health Department (VCEHD). The second tank in the SRE Complex is identified by Boeing as UT-71. The Work Plan specified that UT-27 would be removed in November or December of 1998 but it is unclear to GSU if this task was actually performed. Sample collection methods and analytical procedures used by Boeing to verify that contamination was characterized to clear removal of the tanks and piping systems are unknown.

Boeing should provide GSU with historical data regarding numbers and locations of soil samples or soil vapor samples used to characterize the UT-27 site. Unless Boeing has data to provide for characterization of the immediate area of the tank and associated piping, it is prudent to collect a soil vapor sample (or samples) in potentially impacted areas during future soil vapor sampling proposed for mid-March 1999. GSU recommends the same criteria for UT-71 if characterization data are not available to verify an appropriate closure. However, if UT-71 has not been removed, GSU should participate in removal actions and assist with collecting soil samples which should be obtained from the immediate area of UT-71 and the associated piping system. Further, if UT-71 has not been removed, it may be

appropriate for Boeing to collect soil vapor samples during upcoming field activities proposed for mid-March 1999; if soil vapor data are non-detect for UT-71, the data should provide for precluding the collection of future soil samples from the area of the UT-71 and the piping system when excavated.

11. Soil vapor sampling is proposed at six locations in proximity to former buildings in the SRE Complex (Work Plan, Figure 2). GSU is not fully apprised of historical activities performed in buildings that are in proximity to proposed soil gas sampling points. However, GSU is fully confident for the use of soil vapor sampling to rapidly characterize sites and obtain closure (e.g., NFA).

To provide for assurance to fully characterized the SRE Complex for VOCs in a single effort, Boeing should <u>double</u> (at least) the number of soil vapor sampling points proposed in the Work Plan. Soil vapor sampling proposed by GSU should form a tighter pattern for data collection around former or existing buildings. If solvents were used in any of the former or existing buildings, it may be appropriate to collect soil vapor samples from directly below the building pad or in the foot print of the pad.

Please contact me at 916-255-3672 if you have any questions regarding comments presented in this memorandum. To correspond by E-Mail, my address is RMCJUNKI@dtsc.ca.gov.

RESOURCE MANAGEMENT AGENCY
county of ventura

Environmental Health Division
Donald W. Koepp
Director

April 19, 1999

Mr. John Shao
Boeing North American, Inc./Rocketdyne
6633 Canoga Ave. MS T487
P.O. Box 7922
Canoga Park, CA 91309-7922

SOIL SAMPLING RESULTS FOR PERMIT TO ABANDON #2425

Based on the soil sample results taken at the time of tank removal at the Santa Susana Field Laboratory, Tank UT-71, all constituents tested for were below detection levels. At this time, the Environmental Health Division requires no further work.

If you have any questions regarding this matter, please call me at 805/654-2435.

Pat Koscinski

PAT KOSCINSKI
HAZARDOUS MATERIALS PROGRAM
ENVIRONMENTAL HEALTH DIVISION

PK:pp>ugt\boeing

002896 RC

800 South Victoria Avenue, Ventura, CA 93009-1730 (805) 654-2813 FAX (805) 654-2480
Internet Web Site Address: www.ventura.org/env_hlth/env.htm

RESOURCE MANAGEMENT AGENCY

county of ventura

Environmental Health Division
Robert Gallagher
Director

July 25, 2001

David Chung
Boeing/ Rocketdyne
6633 Canoga Ave.
Canoga Park, CA 91309

SOIL SAMPLING RESULTS FOR CLOSURE PERMIT #2639-C

Based on the soil sample results taken at the time of tank removal at Boeing/ Rocketdyne, UT-74 located at the Top of Woolsey Canyon Road, California all constituents tested for were non-detectable. No further work will be required by the Ventura County Environmental Health Division at this time.

If you have any questions regarding this matter, please call me at 805/654-2435.

JIM WADA
HAZARDOUS MATERIALS PROGRAM
ENVIRONMENTAL HEALTH DIVISION

JW:pricep>ugt\2639cRckdyn072501

07-31-01A09:51 RCVD

002827 RC

800 South Victoria Avenue, Ventura, CA 93009-1730 (805) 654-2813 FAX (805) 654-2480
Internet Web Site Address: www.ventura.org/env_hlth/env.htm

Department of Toxic Substances Control

Alan C. Lloyd, Ph.D.
Agency Secretary
Cal/EPA

8800 Cal Center Drive
Sacramento, California 95826-3200

Arnold Schwarzenegger
Governor

June 30, 2005

Mr. Arthur J Lenox
The Boeing Company
6633 Canoga Avenue
P.O. Box 7922
Canoga Park, California 91309-7922

CLARIFICATION OF RCRA FACILITY INVESTIGATION (RFI) REQUIREMENTS, SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CALIFORNIA

Dear Mr. Lenox:

This letter is a follow-up regarding clarification of RFI requirements discussed in meetings on April 4, 2005 (soil background) and April 20, 2005 (general RFI Characterization issues) between DTSC and Boeing. RFI requirements clarified during the meetings included the following:

i. Modify the Soil Background Data Set
ii. Sampling at pole mounted transformers
iii. Need to resurvey topography after RFI sampling completed if any changes have occurred (i.e. minor grading, building demo or interim measures).
iv. Need to characterize artificial fill placed after RFI sampling completed (i.e. Old Conservation Yard (OCY) "unknown" fill source).
v. Soil Sampling prior to Corrective Measures Study (CMS) to further define clean-up boundaries
vi. Inclusion of DOE radiological data in RFI Reports
vii. Providing a bibliography and access to DOE reports

The following has been agreed to:

i. Soil Background Data Set.

Samples from BG03 location differ chemically and geologically from background samples from onsite formations and will be removed. Prior DTSC site decisions using soil background will not be affected by this data set modification for the RFI. All remaining existing background sample locations will remain in the dataset.

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Boeing will collect additional samples at existing background sample locations to augment the existing soil background dataset for metals not analyzed during previous sampling events or replace sample data that had elevated analytical detection limits.

Information regarding the supplemental Soil Background Sampling is summarized in a letter from Boeing to DTSC dated April 8, 2005, which details the locations and analysis of the samples. Additional background locations or sampling depths are not required.

Results from the proposed sampling that show an order of magnitude or greater difference for metal concentrations (i.e. the dataset) will be evaluated further for possible anthropogenic impacts and acceptability before the data is incorporated into the background data set. Boeing and DTSC will use best professional judgment in determining acceptability of supplemental metal results. The final soil background data set from this and earlier sampling will be published in a separate report for DTSC review and approval.

The Standard Risk Assessment Methodology (SRAM) will use 95% UCL of 99% percentile (or max if lower) and the Wilcoxon Rank Sum (WRS) Test per SRAM Workplan (2005) for risk assessment.

Characterization will also use the 95% UCL of the 99 percentile (or max if lower) along with other site information (e.g., sampling data trends, risk assessment findings, historical operations) in a best professional judgment approach to make additional sampling decisions.

ii. PCB sampling at pole mounted transformers

The soil beneath onsite Boeing pole mounted transformers (installed prior to 1980) will be visually inspected for staining.

At locations where there is a single pole-mounted transformer (installed pre-1980) and no staining or leakage is identified, soil sampling/analysis for PCBs would not be conducted. If, however, staining of the soil is identified, then soil sampling will be conducted.

Where two or more transformers (installed prior to 1980) are or have been mounted on a pole(s) above an unpaved surface, then soil sampling will be conducted regardless of staining conditions on the poles or transformers. This approach is suggested due to the combined volume of multiple transformers.

If, the ground surface beneath the two or more mounted transformers (installed pre-1980) is covered with asphalt or concrete and staining is not identified, then soil sampling/analysis for PCBs will not be conducted. If, however, staining is identified on the paved surface, then soil sampling will be conducted.

If PCBs are detected from nearby SWMUs, samples will also be collected beneath pole mounted transformers adjacent to or within the SWMU.

A map showing all onsite Boeing owned pole mounted transformers will be prepared. Pole mounted transformers installed prior to 1980 will be identified (based on available information).

The RFI report(s) will have an affirmative statement summarizing the results of the pole mounted investigation within/near the reporting area.

All SSFL transformer inspection, sampling, and data will be reported to the DTSC. All reports will be signed by licensed professional (standard practice).

iii. Need to resurvey topography after RFI sampling completed if any changes have occurred (i.e. significant and minor grading, building demolition or interim measures).

For the Old Conservation Yard (OCY) site:

The RFI report will identify estimated extent of fill placement area and depth. The extent of fill in the Old Conservation Yard will be mapped and shown on a figure in the RFI report. Instead of re-surveying, depth estimates of the fill at OCY will be supported with hand auger data collected from 2 to 3 locations to document existing soil conditions. A note will also be provided on the figure that describes the topographical changes relative to fill.

Other RFI site locations:

In areas where significant changes in topography occur (due to import of fill material or building demolition), Boeing will resurvey the topography and provide information regarding the thickness and extent of fill at SWMUs and AOCs. Where resurveys are not conducted, Boeing will map in the extent of the fill. The figures will be modified to show the most recent topographic changes. In summary, these include: (1) text to describe amount of fill and/or topographic changes, (2) a figure showing the extent and location of fill material, along with a note to describe topographic changes; (3) hand

auger data will be collected to confirm fill depth in areas of broad fill placement (small building demolitions will be noted but not checked with hand auger).

Fill will not be placed above known areas of elevated soil concentrations resulting in estimated unacceptable risks.

Re-surveying will be conducted at areas where significant soil disturbance has occurred at SWMUs or AOCs. For example, following significant soil excavations at Interim Measures clean up activities (FSDF, Building 203 and Happy Valley) surveying was conducted. In addition, building demolition at SWMU and AOC locations that involve extensive soil movement (e.g., Building 4059) may warrant surveying to ensure excavation boundaries are documented so that subsequent RFI soil sampling will be performed and located correctly. If surveying information is not available, then the report should clearly indicate this and existing figures and photos will be used to document excavation boundaries.

The above requirements for mapping and re-surveying apply to SWMUs and AOCs sites investigated during the RFI.

iv. Fill from unknown sources, regardless of thickness, must be documented and adequately characterized when emplaced after RFI sampling is completed.

Boeing will provide statements in the RFI report that will either describe (1) the origin of the fill material (when documentation is available), or (2) state that the origin of the fill is unknown (if documentation does not exist). Boeing will provide supporting data that demonstrate that the fill is not impacted (e.g., sampling data, visual observations during construction, boring or trench logs, or photographs), photographs or other documentation that describes the current condition of the fill material. The RFI report will provide a statement (signed by an appropriate licensed professional) affirming that the fill is not impacted and does not pose a risk to human health or the environment.

In the case of the Old Conservation Yard site, analytical data of the fill material, description of DTSC-directed investigation of the berm soils subsequently used as fill material, and photographs will be included in the revised RFI report.

v. Soil Sampling prior to CMS to further define clean up boundaries

During the course of RFI sampling, it may be efficient to defer further sampling of an impacted area in a SWMU to the CMS or CMI phase of work provided sufficient characterization has been completed to delineate the volume and extent of

contamination. This is predicated upon the assumption that (1) the risks posed by the impacted area will require remediation and (2) existing RFI characterization results enable a volumetric estimate that would not change CMS evaluation of appropriate cleanup technologies, or CEQA-related determinations (i.e. the characterization should be sufficient that the volumes estimated generally are within a factor of 10).

The Old Conservation Yard site has a localized area that meets these criteria. RFI sampling has identified an area that has elevated dioxin concentrations in soil that will require remediation (excavation is presumed). The source of the dioxins is from burned and charred telephone poles and the extent of impacts is based on visual indicators (e.g. location of charred poles, the lateral extent is partially bounded with paved surfaces and bedrock). Since the extent and volume of the impacted soils is discernable and the soils will need to be removed then it may be efficient to defer further sampling until after the cleanup action (i.e., CMI) at which time more complete confirmation sampling will be conducted.

The remaining two DOE issues (i.e., vi. inclusion of radiological data in RFI Reports, and vii. providing an Area IV bibliography and access to DOE reports), still need to be resolved and we look forward to hearing from you soon.

If you have any questions regarding these issues, please do not hesitate to give me a call at (916) 255-3600.

Sincerely,

For

Gerard J Abrams, C.HG.
Senior Engineering Geologist
Northern California Permitting and Corrective Action Branch

cc: Mr. Stephen Baxter
Department of Toxic Substances Control
1011 Grandview Avenue
Glendale, California 912101-2205

Ms. Laura Rainey
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

GA:mm
GA36W 065

ATTACHMENT A3-2

SUBSURFACE INFORMATION

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBSØ1

SHEET 1 OF 1

PROJECT NAME: Rocketdyne	PROJECT NUMBER: 313150002	ELEVATION AND DATUM: Sunny	LOCATION: SRE POND ULS 4
DRILLING COMPANY	DRILLER: T.B.	DATE AND TIME STARTED: 12/29 1400	DATE AND TIME COMPLETED: 12/2 1430
DRILLING EQUIPMENT	DRILLING METHOD: push	COMPLETION DEPTH: Ø.5'	TOTAL NO. OF SAMPLES: 2
SIZE AND TYPE OF BIT	HOLE DIAMETER: 2"	NO. OF SAMPLES: BULK / SS	DRIVE / PITCHER
DRILLING FLUID	DRILLING ANGLE	WATER LEVEL: FIRST —	AFTER _____ HOURS
SAMPLE HAMMER TYPE / DRIVING WT. / DROP		HYDROGEOLOGIST / DATE: T. Burton	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
		X			Surface: drainage (6" deep), moist	ML	—	40	60	@ 1415
	1				Sandy silt (ML), dk. yellow-brn. (10YR 3/4), moist, med. stiff, vf sand, micaceous, med. plasticity					SRBSØ1SØ1DØ.5
										No H.S. taken
										Full Sleeves
					T.D. Ø.5'					
					Backfilled w/soil					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBSØ2

SHEET 1 OF 1

PROJECT NAME: Rocketdyne	PROJECT NUMBER: 313150002	ELEVATION AND DATUM: sunny	LOCATION: SRE Pond, ULS 2
DRILLING COMPANY	DRILLER: T.B.	DATE AND TIME STARTED: 12/2/97 1510	DATE AND TIME COMPLETED: 12/2 1640
DRILLING EQUIPMENT	DRILLING METHOD: Push, HA	COMPLETION DEPTH: (5')	TOTAL NO. OF SAMPLES: (4)
SIZE AND TYPE OF BIT	HOLE DIAMETER: 2"-4"	NO. OF SAMPLES: BULK / SS / DRIVE / PITCHER	
DRILLING FLUID	DRILLING ANGLE	WATER LEVEL: FIRST Ø'	AFTER ____ HOURS: Ø'
SAMPLE HAMMER TYPE / DRIVING WT. / DROP		HYDROGEOLOGIST / DATE: T. Burton 12/2/97	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
		X			Surface: Pond, reeds 5" deep					@1520
	1	X								SRBSØ2SØ1DØ.5
										No H.S. taken
	2				@2' Poorly graded sand w/gravel, (SP), dk.yellow brn (10YR 3/4), wet, loose, sub angular gravels (1/2"), fine-med. sand	SP	20	75	5	Full Sleeves
	3				@4.5' Silty sand (SM), v.dk.grey brn. (2.5Y 3/2), wet, loose-med.dense, fine					@1620
	4	X								SRBSØ2SØ2D4.Ø
		X			sand, dk.greengrey stains (5BG 3/1)	SM	–	60	40	No H.S. taken
	5				@5' as above, dk. greenish grey (5BG 3/1) TD	SM	–	60	40	Full Sleeves
					T.D. 5' (Terminated before refusal)					@1640
					Backfilled w/cuttings					
					NOTE: COULD NOT HAND AUGER ANY DEEPER DO CAVING OF WET, LOOSE - MED. DENSE, SANDY SEDS.					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBSØ3

SHEET 1 OF 1

PROJECT NAME: Rocket dyne	PROJECT NUMBER: 313150002	ELEVATION AND DATUM: Sunny	LOCATION: SRE POND ULS 1
DRILLING COMPANY	DRILLER: K J.	DATE AND TIME STARTED: 12/17/97 0900	DATE AND TIME COMPLETED: 12/17 0945
DRILLING EQUIPMENT	DRILLING METHOD: HA	COMPLETION DEPTH: 35'	TOTAL NO. OF SAMPLES: 2
SIZE AND TYPE OF BIT	HOLE DIAMETER: 4"	NO. OF SAMPLES: BULK / SS / DRIVE / PITCHER	
DRILLING FLUID	DRILLING ANGLE	WATER LEVEL: FIRST —— Ø'	AFTER _____ HOURS
SAMPLE HAMMER TYPE / DRIVING WT. / DROP		HYDROGEOLOGIST / DATE: T. Burton 12/17/97	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
		X			Surface: Pond, reeds					@ 0920
	1				@ Ø.5' decaying organics, reeds					SRBSØ3SØ1DØ.5 Full Sleeve
	2				@ 2' Poorly graded sand w/ gravel (SP), dk yellowish brn. (10YR3/4) wet- loose subround-subangular gravels (1")	SP	10	85	5	RESAMPLED @ DØ.5 ON 1/29/98
	3	X				SM	15			@ 0940
	4				@ ~~TB~~ 3' Silty sand w/ gravel (SM), v. dk. grey (10YR 2/1), wet, med. sand, med. dense subround gravels (ss, 2")					SRBSØ3SØ2D3.5 Full Sleeve
	5									
					T.D. 35' bedrock (refusal) Hole backfilled w/ cuttings					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBSØ4

SHEET 1 OF 1

PROJECT NAME Rocketdyne	PROJECT NUMBER 313150002	ELEVATION AND DATUM	LOCATION SRE POND ULS8
DRILLING COMPANY	DRILLER K.J.	DATE AND TIME STARTED 1/26/98 0840	DATE AND TIME COMPLETED 0855
DRILLING EQUIPMENT	DRILLING METHOD HA	COMPLETION DEPTH 3	TOTAL NO. OF SAMPLES 2
SIZE AND TYPE OF BIT	HOLE DIAMETER 4"	NO. OF SAMPLES: BULK / SS	DRIVE / PITCHER
DRILLING FLUID	DRILLING ANGLE	WATER LEVEL: FIRST —	AFTER ____ HOURS
SAMPLE HAMMER TYPE / DRIVING WT. / DROP		HYDROGEOLOGIST / DATE T. Burton 1/26/98	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
					Sfc: dry leaves; small cobbles					
	1	X			in topsoil → 9"	SW	–	95	5	@0840
SW										SRBSØ4SØ1D1.Ø
	2				@ 1.Ø' Well graded sand (SW),					FULL
					dK. brownish yellow (10YR 6/4), moist,					
	3	X			loose, vf-med gr., twigs +	SW	–	95	5	@ ~~3.0~~ 1.5 0850
					rootlets					SRBSØ4SØ2D3.Ø
	4									FULL
					@ 3' As above, wet, no veg.					
					– No gunite encountered –					
					T.D. 3'					
					(Term. Before Refusal)					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS05

SHEET 1 OF 1

PROJECT NAME: Rocketdyne	PROJECT NUMBER: 313150002	ELEVATION AND DATUM:	LOCATION: SRE POND UL S 30
DRILLING COMPANY:	DRILLER: T.B.	DATE AND TIME STARTED: 1/26/98 0900	DATE AND TIME COMPLETED: 0935
DRILLING EQUIPMENT:	DRILLING METHOD: HA	COMPLETION DEPTH: 3'	TOTAL NO. OF SAMPLES: 1
SIZE AND TYPE OF BIT:	HOLE DIAMETER: 4"	NO. OF SAMPLES: BULK: SS:	DRIVE: PITCHER:
DRILLING FLUID:	DRILLING ANGLE:	WATER LEVEL: FIRST: —	AFTER _____ HOURS
SAMPLE HAMMER TYPE: DRIVING WT.: DROP:		HYDROGEOLOGIST / DATE: T. Burton 1/26/98	CHECKED BY / DATE:

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
ML	0	X			Sfc. grassy, adj. to 3' concrete ditch (@crack)	ML	—	35	65	Resample SRBS05S002 @ 0820 7/14/00 d=0.5, SVOCs
	1				@ 1.0' Sandy silt (ML), v. dk. yellowish bra. (10YR 3/4), stained yellow brn (10YR), moist, loose, fine gr.,					
SM	2					SM				
	3	X			trace rootlets					@ 0930 SRBS05S001 3.0' TB
	4				@ 2.5-3' Silty sand (SM), mottled greyish brown - strong brown - very dk. grey ( ), moist, loose, fine-med. gr., micaceous, rootlets (1")					EUM
					T.D. 3.0' Concrete Refusal					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBSØ6 SHEET 1 OF 1

PROJECT NAME Rocketdyne	PROJECT NUMBER 313150007	ELEVATION AND DATUM	LOCATION SRE POND ULS 7
DRILLING COMPANY	DRILLER T. Burton	DATE AND TIME STARTED 1/29/98 1115	DATE AND TIME COMPLETED 1/29/98 1130
DRILLING EQUIPMENT Slidehammer	DRILLING METHOD push	COMPLETION DEPTH Ø.5'	TOTAL NO. OF SAMPLES 1
SIZE AND TYPE OF BIT	HOLE DIAMETER 2"	NO. OF SAMPLES / BULK / SS / DRIVE / PITCHER	
DRILLING FLUID	DRILLING ANGLE	WATER LEVEL FIRST —	AFTER _____ HOURS
SAMPLE HAMMER TYPE DRIVING WT. DROP		HYDROGEOLOGIST / DATE T. Burton 1/29/98	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
SM		X			Sfc: grassy slope	SM	tr	70	30	@ 1120 SRBSØ6SØ1DØ.5 FULL (90%)
	1				@ Ø.5' silty sand (SM), dK. greyish brn. 10YR3/2, moist, very loose-loose, fine-med. gr., rootlets					
	2				T.D. Ø.5' (Term. Before Refusal)					

UGDEN

FIELD LOG OF BORING

BORING NUMBER SRB507

SHEET 1 OF 1

PROJECT NAME ~~DOE~~ Rocketdyne	PROJECT NUMBER 313150002	ELEVATION AND DATUM	LOCATION SRE UCS 15				
DRILLING COMPANY	DRILLER	DATE AND TIME STARTED 6/30/00 1205	DATE AND TIME COMPLETED 1210				
DRILLING EQUIPMENT	DRILLING METHOD HA/Slidehammer	COMPLETION DEPTH 0.5'	TOTAL NO. OF SAMPLES 1				
SIZE AND TYPE OF BIT	HOLE DIAMETER 2"	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER	
DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST ___		AFTER ___ HOURS		
SAMPLE HAMMER TYPE DRIVING WT. DROP		HYDROGEOLOGIST / DATE T. Burton 6/30/00	CHECKED BY / DATE				

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
		X	100	20	SFC: dry grasses, low slope adj. to south road above SRE Pond	ML	-	25	75	@1210 SRB507 S01 D0.5' RJ511
	1									
	2				@ 0.5' Silt w/sand (ML), dry, v. loose, dk. brown (10YR3/3), non-plastic, vf-fine grained					
					T.D. 0.5' bgs Boring Terminated Prior to Refusal					

MWH

Former 723

X BS07

Dirt Access Road

Site Sketch Map

Boring #: SR BS07 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL - SRE
Logged By: JDolmat	Reviewed By:
Drilling Contractor: —	
Drill Rig Type/Method: hand trowel / Auger	
Drillers Name: B Burton / B Stewart	
Borehole Diam./Drill Bit Type: 3"	Total Depth: 3' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 1405 2/14/06 Drill Finish Time/Date: ~~A28~~
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
									Reoccupied Former Sodium Component Cleaning Pad					
S01	X			X			0.5'	SM	Silty Sand, Brown (10YR 4/3) loose, dry, trace plant material surface sloping SE 10-20° low regitation, ash layer 0.25 inch, NOT sampled	—	—	5	70	25
S02	X			X			3'	SM	Silty sand, pale yellow (2.5Y 7/4) weathered chatsworth Formation, loose dry trace coarse sand, Fine gravel refusal 3' chatsworth formation	tr	tr	—	70	30

QA/QC

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS08

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
ROCKETDYNE SSFL	31315000.02		SRE AREA IV AOC

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
		6/30/00 @ 1500	6/30/00 @ 1505

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
			(1)

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER _____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	1/2	X			SILTY SAND (SM) 2.5Y 5/4 LIGHT OLIVE BROWN, LOOSE, DRY, FINE TO medium.		Ø	85	15	SRBS08SØ1 0=0.5 PID = Øppm ULS = 14
					TOTAL DEPTH = 0.5'					
					BORING TERMINATED PRIOR TO REFUSAL.					
					DETAILS: BY FENCE, RUSTY PIPES. GOOD VIEW.					

UGUEN

FIELD LOG OF BORING

BORING NUMBER ~~SRBS~~ SRBS509

SHEET 1 OF 1

PROJECT NAME: Rocketdyne SSFL	PROJECT NUMBER: 313150008	ELEVATION AND DATUM:	LOCATION: SRE AREA IV POG	
DRILLING COMPANY:	DRILLER: SM	DATE AND TIME STARTED: 6/30/00 1630	DATE AND TIME COMPLETED: 6/30/00 1645	
DRILLING EQUIPMENT:	DRILLING METHOD: slidehammer	COMPLETION DEPTH: 0.5'	TOTAL NO. OF SAMPLES: 1	
SIZE AND TYPE OF BIT:	HOLE DIAMETER:	NO. OF SAMPLES: BULK: SS:	DRIVE: 1	PITCHER:
DRILLING FLUID:	DRILLING ANGLE:	WATER LEVEL: FIRST: —	AFTER ____ HOURS	
SAMPLE HAMMER TYPE: DRIVING WT.: DROP:		HYDROGEOLOGIST / DATE: STM 6/30/00	CHECKED BY / DATE: T. Burton 8/14/00	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	1/2	X			Silty Sand (SM) 2.5YR 4/2 5/4	SM	0	85	15	SRBS509S01
					light olive, loose, dry.					D: 0.5"
					Fine to medium tar-like					PID: 0 ppm
					substance from 4-6" of					@1640
					sleeve.					U65: 22
					Boring terminated prior to refusal.					
					*GPS location					
					* Re-sample on 7/6/00 @ 0830 / ~~1145~~ - RJS18 for VOCs					

UGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS10S01

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
ROCKETDYNE SSFL	223150002		AREA IV AOC SRE

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
		7/5/00 1415	7/5/00 1435

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
	HA	0.5'	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
					1	

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST —	AFTER _____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
			STM / 7/5/00	T. Burton 8/14/00

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.5	X			Silty Sand (SM), 10YR 8/6 Yellow, DRY, LOOSE, FINE TO Medium.	SM	5	15	80	SRBS10S01 D=0.5 ULS = 21 PID = 0 ppm @ 1430
					BORING TERMINATED PRIOR TO REFUSAL.					
					IN DRAINAGE, DOWN FROM OUTFALL PIPE.					
					- GPS POSITION					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS11 (SRBS11501 TB)

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
ROCKETDYNE SSFL	313150002		S AREA II AOC SRE

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
		7/5/00 1525	7/5/00 1550

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
	slidehammer	0.5'	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
					1	

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST —	AFTER _____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
			STM 7/5/00	T. Burton 8/14/00

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.5	X			Silty Sand (SM) 10YR 4/2 dark grayish brown, dry, loose, fine to medium.	SM	10	70	20	SRBS11501 D=0.5 HLS = @20 PID = 0 ppm @1545 RJ 517
					Boring terminated prior to refusal.					
					In drainage, down from outfall pipe.					
					* Poison Oak!					
					- GPS position					

UGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS12

SHEET 1 OF 1

PROJECT NAME 313150002	PROJECT NUMBER ROCKET DYNE	ELEVATION AND DATUM	LOCATION SRE	
DRILLING COMPANY	DRILLER SAJID HUSAIN	DATE AND TIME STARTED 09/27/00; 1515	DATE AND TIME COMPLETED 09/27/00; 1540	
DRILLING EQUIPMENT	DRILLING METHOD HAND AUGER	COMPLETION DEPTH 0.5'	TOTAL NO. OF SAMPLES 1	
SIZE AND TYPE OF BIT	HOLE DIAMETER 4"	NO. OF SAMPLES: BULK / SS	DRIVE / PITCHER	
DRILLING FLUID NONE	DRILLING ANGLE 90°	WATER LEVEL: FIRST	AFTER _____ HOURS	
SAMPLE HAMMER TYPE / DRIVING WT. / DROP		HYDROGEOLOGIST / DATE D. BARRIER	CHECKED BY / DATE	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
		X			@0'; SILTY SAND [SM];	SM	-	60	40	@1530;
	1				DK. YEL. BRN [10YR 4/6];					SRBS12.5@0.5'
					DRY-MOIST; LOOSE					RJ@48
	2				T.P. @ 0.5'					
					Ref. @ 0.5'					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS13

SHEET 1 OF 1

PROJECT NAME: Rocketdyne	PROJECT NUMBER: 3131500002	ELEVATION AND DATUM:	LOCATION: SRE	
DRILLING COMPANY:	DRILLER: S. Husain	DATE AND TIME STARTED: 09/28/00; 0750	DATE AND TIME COMPLETED: 09/28/00; 0810	
DRILLING EQUIPMENT:	DRILLING METHOD: Drive	COMPLETION DEPTH: 0.5'	TOTAL NO. OF SAMPLES: 1	
SIZE AND TYPE OF BIT:	HOLE DIAMETER: 3"	NO. OF SAMPLES:	BULK:	SS: DRIVE: 1 PITCHER:
DRILLING FLUID:	DRILLING ANGLE: ~~Dip~~ 90°	WATER LEVEL:	FIRST:	AFTER _____ HOURS
SAMPLE HAMMER TYPE:	DRIVING WT.:	DROP:	HYDROGEOLOGIST / DATE: D. Barrie	CHECKED BY / DATE:

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0	X			@ 0'; Silty Sand w/ Gravel [SM]; Yel Brn [10 YR 5/6]; Dry - Moist; Loose; f. GR. T.D. @ 0.5' Ref. @ 0.5'	SM	15	55	30	@ 0800; SRBS13S@1D0.5 RS@49
	1									

FIELD LOG OF BORING

BORING NUMBER SRBS14

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne	31315D002		SRE

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	S. Hussain	09/28/00 0815	09/28/00 0825

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
	DRIVE	0.5'	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
	3"					

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ____ HOURS
	90°			

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
			D. Barrie	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	1	X			@ 0'; Silty Sand w/ Gravel (SM); YEL-BRN (10YR 5/6); DRY-MOIST; LOOSE; F. GR.	SM	20	55	25	@ 0820; SRBS14SH @ 0.5'; RJ@SD
					T.D. @ 0.5'					
					Term. prior to Ref.					

UGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS15

SHEET 1 OF 1

PROJECT NAME: ROCKETDYNE	PROJECT NUMBER: 31315 0002	ELEVATION AND DATUM:	LOCATION: SRE
DRILLING COMPANY:	DRILLER: S. HUSAIN	DATE AND TIME STARTED: 9/28/00; 0835	DATE AND TIME COMPLETED: 9/28/00; 0850
DRILLING EQUIPMENT:	DRILLING METHOD: DRIVE	COMPLETION DEPTH: 0.5'	TOTAL NO. OF SAMPLES: 1
SIZE AND TYPE OF BIT:	HOLE DIAMETER: 3"	NO. OF SAMPLES: BULK: SS:	DRIVE: PITCHER:
DRILLING FLUID: NONE	DRILLING ANGLE: 90°	WATER LEVEL: FIRST	AFTER _____ HOURS
SAMPLE HAMMER TYPE: DRIVING WT.: DROP:		HYDROGEOLOGIST / DATE: D. Berrie	CHECKED BY / DATE:

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	1	X			@0'; SILTY SAND (SM); DK. YEL. BRN (10YR 4/4); MOIST; LOOSE; F. GR.	SM	Tr	70	30	@ 0845; SRBS15 SP1 0-0.5' RJ #5

UGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS16

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocket Dove	313150002		SRE

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	S. Husain	9/28/00; 0855	9/28/00; 0905

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
	Drive	0.5'	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
	3"					

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ____ HOURS
NONE	90°			

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
			D. Barrie	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	1	X			@0; Silty Sand w/ Gravel [SM]; DK. Yel. BRN [10YR 4/4]; DRY-MOIST; LOOSE; F. GR. T.D. @ 0.5' Term. prior to Ref.	SM	15	45	40	@0900; SRBS1650@0.5' RJ@52

UGUEN

FIELD LOG OF BORING

BORING NUMBER SRB517

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocket Dyne	313150002		SRE

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	S. Hussain	9/28/00; 0915	9/28/00; 0925

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
	DRIVE	0.5'	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
	3"					

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ____ HOURS
NONE	90°			

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
			D. Barrie	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	1	X			@0'; Silty Sand w/ Gravel (SM); Moist; Dk. Yel. Brn (10YR 4/4); Loose; f. Gr. T.D. @ 0.5' Term. prior to Ref.	SM	20	50	30	@ 0920'; SRB517S01 00.5' RJ #53

FIELD LOG OF BORING

BORING NUMBER SRB518

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne	313150002		SRE

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	S. Hussain	09/28/00;	09/28/00;

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
	Drive	0.5'	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
	3"					

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER _____ HOURS
None	90°			

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
			D. Barcio	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	1	X			@0'; Silty Sand (SM); Yel. Brn (10YR 5/4); Dry-Moist; F-M Gr. T.D. 0.5' Term. prior to Ref.	SM	T:	70	30	@ 0940; SRBS18S01D0.5 RJ0944-26 RJ054

UGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS19

SHEET 1 OF 1

PROJECT NAME: Rocket D/W R	PROJECT NUMBER: 313150002	ELEVATION AND DATUM:	LOCATION: SRE		
DRILLING COMPANY:	DRILLER: S. Husein	DATE AND TIME STARTED: 09/28/00; 0955	DATE AND TIME COMPLETED: 09/28/00; 1005		
DRILLING EQUIPMENT:	DRILLING METHOD: Drive	COMPLETION DEPTH: 0.5'	TOTAL NO. OF SAMPLES: 1		
SIZE AND TYPE OF BIT:	HOLE DIAMETER: 3"	NO. OF SAMPLES	BULK	SS	DRIVE: 1 / PITCHER
DRILLING FLUID: NONE	DRILLING ANGLE: 90°	WATER LEVEL	FIRST —	AFTER ____ HOURS	
SAMPLE HAMMER TYPE:	DRIVING WT.:	DROP:	HYDROGEOLOGIST / DATE: D. Barrie	CHECKED BY / DATE:	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	1	X			@ 0'; Clayey Sand w/ Gravel (SC); Yel. Brn (10YR 5/6); Moist; Sand = F. Gr. M.D. = Ø.5' Term prior to Ref.	SC	30	45	25	@ 1000; SRBS19SØ1DØ5 RJØ55

UGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS2D

PROJECT NAME: Rocket Dyne	PROJECT NUMBER: 31315000Z	ELEVATION AND DATUM:	LOCATION: SRE			
DRILLING COMPANY:	DRILLER: S. Husrin	DATE AND TIME STARTED: 9/28/00; 1015	DATE AND TIME COMPLETED: 9/28/00; 1025			
DRILLING EQUIPMENT:	DRILLING METHOD: Drive	COMPLETION DEPTH: 0.5'	TOTAL NO. OF SAMPLES: 1			
SIZE AND TYPE OF BIT:	HOLE DIAMETER: 3"	NO. OF SAMPLES	BULK	SS	DRIVE: 1	PITCHER
DRILLING FLUID: None	DRILLING ANGLE: 90°	WATER LEVEL	FIRST		AFTER _____ HOURS	
SAMPLE HAMMER TYPE:	DRIVING WT.:	DROP:	HYDROGEOLOGIST / DATE: D. Barrie		CHECKED BY / DATE:	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	1	X			(SD); Silty Sand w/ Gravel (SM); DK. Yel. Brn (10YR 4/4); Dry - Moist; Loose; F. Gr. T.D. @ 0.5' Term. prior to Ref.	SM	15	45	40	@ 1020; SRBS2D5@1DD.5' RJ@56

OGDEN

~~Surface and~~ DSB Shallow Soil Sample Log

Project Number	Project Name	Date	Time
313150002	Rocket Dyne	9/28/00	1040

Sample Identification Number and Time	Checked by
SRBSZ1	

Sampled by	Recorded by
D. Barrie	D. Barrie

Method of Collection: Drive

Surface Description: Drainage

Notes:

Soil Sample Data

Location: SRE

Coordinates	Elevation

Lithology	Depth ~~(in.)~~ (ft)	Soil Description	Est. % of G	S	F	Comments
		@0'; Silty Sand w/ Gravel	20	45	35	@1040;
	1	[SM]; DK. yel. BRN (10YR 4/4);				SRBSZ1SΦ1@0.5'
		Moist; Loose; F. Gr. Sand.				SRBSZ1DΦ1@0.5'
		T.D. Φ.5'				RJΦ57
		Term. prior to ref.				RJΦ58 (Dup.)
		Backfilled w/ Soil				NOTE:
						RZ Φ57 Coll.
						@1040 (Split)

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS22

SHEET 1 OF 1

PROJECT NAME: DOE	PROJECT NUMBER: 313150004	ELEVATION AND DATUM:	LOCATION: SRE
DRILLING COMPANY: Interphase	DRILLER: ERIC	DATE AND TIME STARTED: 11/17/00; 1430	DATE AND TIME COMPLETED: 11/17/00; 1500
DRILLING EQUIPMENT: Geoprobe	DRILLING METHOD: Direct Push	COMPLETION DEPTH: 13'	TOTAL NO. OF SAMPLES: 2
SIZE AND TYPE OF BIT:	HOLE DIAMETER: 4"	NO. OF SAMPLES: BULK / SS / DRIVE: 2 / PITCHER	
DRILLING FLUID: NONE	DRILLING ANGLE: 90°	WATER LEVEL: FIRST	AFTER _____ HOURS
SAMPLE HAMMER — TYPE / DRIVING WT. / DROP		HYDROGEOLOGIST / DATE: D. Barrie	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
					Surface: Soil	SM	-	80	20	
					@0'; Silty Sand (SM);					
			3.5/4'		Dk. yel. Brn.; Moist;					
					Loose-Med. Dense					
										@4';
	5									PID = 3 ppm
			3.5/4'							
					@8'; Silty Sand (SM); As					@8'; @1445
		X			Above	SM	-	80	20	PID = 4.5 ppm
										SRBS22S02D8'
										RJ842
			4'/4'							
	10									
										@12'; PID = 2 ppm
			1'/1'		@13'; As Above					@1450
		X				SM	-	80	20	SRBS22S03D13'
					T.D. 13'					RJ843
					Term. @ refusal					PID = 7 ppm
					Backfilled w/					
					Hydrated Bentonite					
					Lith. As					

OGDEN

FIELD LOG OF BORING

BORING NUMBER ~~TB~~ 23 SRBS ~~TA~~ 1.0 3/28/01

SHEET 1 OF 1

PROJECT NAME ~~DOE~~ Rocketdyne	PROJECT NUMBER 313150002	ELEVATION AND DATUM	LOCATION AREA IV AOC SRE # 40
DRILLING COMPANY	DRILLER	DATE AND TIME STARTED 11/2/00	DATE AND TIME COMPLETED 11/2/00
DRILLING EQUIPMENT	DRILLING METHOD HAND AUGER	COMPLETION DEPTH 1'	TOTAL NO. OF SAMPLES 1
SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES: BULK	SS: DRIVE: PITCHER
DRILLING FLUID	DRILLING ANGLE	WATER LEVEL: FIRST	AFTER _____ HOURS
SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE
			CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
					SILTY SAND. BROWN. DRY LOOSE	SM	—	75	25	~~TB~~ SRBS ~~TA~~ 501 1.0
	1				POORLY SORTED					R@1600; RJ786
					Refusal @ 1' bgs					
					NOTE STRONG ODOR IN SAMPLE					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS24

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne	313150007		SRE ULS

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	CMC, JO	3/26/01 1348	3/26/01 1354

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
Slide Hammer		0.5'	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER _____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.5	X	100		Dry, Rocks, sandy silt					Soil sample @ 1354
	1									0-0.5 ft

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS25

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne	313150002		SRE, ULS

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	CMC, JD	3/26/01 1407	3/26/01 1409

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
Slide hammer		0.5'	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
					1	

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER _____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
			Thomas / [illegible]	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.5	X	100		Silty, clayey sand (SM), dry, dense, grayish brown (10YR4/2),	SM	–	60	40	Sample @ 1409 D: 0.5ft (SØ1)
	1				TD = 0.5' bgs					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS 26

SHEET ____ OF ____

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne			SRE

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	CMC, JD	3/26/01 1420	3/26/01 1422

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
Slide Hammer		0.5'	

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.5	X	100		sandy, dry, light brown					Sample @ 1422
	1									0-0.5ft

OGDEN

FIELD LOG OF BORING

BORING NUMBER SB5527

SHEET ____ OF ____

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne			SRE

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	CMC, VJ	3/26/01 1435	3/26/01 1439

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
slidehammer		0.5	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.5	X			sandy silt, light brown					sample @ D = 0.5 ft

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS28 SHEET ____ OF ____

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne			SRE

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
AMEC	CMC, ES	4/6/01 1045	4/6/01 1120

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
Hydrauger		6.0'	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
					-leaves, grass, gravel off of road					
	1				dark brown silty sand					
	1.5				-oxidation of silty sand, medium					
	2				brown					
	3									
	4				-continued medium brown					
	5				silty sand					
	6	X	100		dark + medium brown silty sand for sample					took soil sample SRBS28 S01 @ 1120 @ D-6.0ft

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRE529

SHEET ____ OF ____

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne	313150002		SRE

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	?	?	

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
		3.0 ft	

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	1									
	2									
	3				refusal @ 3.0					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBSX30 TB

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne	313150002		JRE #16a

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
		3/26/01 1245	3/28/01

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
Slidehammer			

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER _____ HOURS

SAMPLE HAMMER TYPE Slide DRIVING WT. DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
	[illegible] 3/27/01	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
					leaves, dry brush, rock, topsoil ≈ 4"					~~Sample~~
	1				light brown soil, sandy silt					
	2				water at about 2.0 ft, some oxidation mottling					
	3				@ 3.5 ft ~~Sat~~ starting to turn grey					
	3.5									
	4				grey-brown @ 5.0 ft wet					
	5	X								Sample @ 1542 D - 5.0 ft
	6				sandy silt @ 6.0 ft					
	7				grey/brown @ 7.0 ft					
	8									
	9				Slide hammer @ 9.5 ft					~~Sample @ 1548~~
	10				refusal @ 9.5 ft					
	15									

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRB530 SHEET ____ OF ____

PROJECT NAME Rocketdyne	PROJECT NUMBER 31315002	ELEVATION AND DATUM	LOCATION SRE
DRILLING COMPANY	DRILLER Joy Daugherty	DATE AND TIME STARTED 5/15/01 1515	DATE AND TIME COMPLETED 5/16/01
DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH 8.2 ft	TOTAL NO. OF SAMPLES 2
SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES / BULK / SS / DRIVE / PITCHER	
DRILLING FLUID	DRILLING ANGLE	WATER LEVEL: FIRST / AFTER ____ HOURS	
SAMPLE HAMMER TYPE 5/1.d9 DRIVING WT. DROP		HYDROGEOLOGIST / DATE	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	1	X			med-light brown dry sandy-silt					SRB530S01 @ 1530 D = 1.0 ft
	2									
	3				ground water @ 3.0 ft					
	4									
	5				very wet sandy-silt					
	6				very wet sandy-silt					SRB530S02 @ 1015 D = 7.5 ft
	7									
	8				refusal @ 8.2 ft					
	9									
	10									

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS31

SHEET ____ OF ____

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne			SRE

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
AMEC	CMC, ES	4/4/01 1245	4/6/01 1345

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
slide hammer		0.5'	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.5	X	100		+ leaves, dry brush,					sample SRBS31501
					+ sample taken w/ silty sand, medium brown → dark, weathered bedrock and oxidation					@ 1300 @ 0.5'

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRB532

SHEET 1 OF 1

PROJECT NAME: Rocketdyne	PROJECT NUMBER:	ELEVATION AND DATUM:	LOCATION: SRE
DRILLING COMPANY:	DRILLER: Ed Sprague/Jay Dougherty	DATE AND TIME STARTED: 4/12/01 1412	DATE AND TIME COMPLETED: 4/12/01 1440
DRILLING EQUIPMENT: Handauger	DRILLING METHOD:	COMPLETION DEPTH: 4.0'	TOTAL NO. OF SAMPLES: 2
SIZE AND TYPE OF BIT:	HOLE DIAMETER:	NO. OF SAMPLES: BULK: SS:	DRIVE: PITCHER:
DRILLING FLUID:	DRILLING ANGLE:	WATER LEVEL: FIRST:	AFTER ____ HOURS
SAMPLE HAMMER TYPE: DRIVING WT.: DROP:		HYDROGEOLOGIST / DATE:	CHECKED BY / DATE:

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.5'				sandy silt, med brown					SRB532501
										RT223
					stopped out 1.0'					
	1.0'				weathered bedrock					
					light brown					
	4.0'				sandy silt, light brown					SRB532502
										RT224

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRB533

SHEET 1 OF 1

PROJECT NAME: Rocketdyne	PROJECT NUMBER:	ELEVATION AND DATUM:	LOCATION: SRE
DRILLING COMPANY:	DRILLER: Ed Sacco/Wes Daugherty	DATE AND TIME STARTED: 4/12/01 1458	DATE AND TIME COMPLETED: 4/12/01 1510
DRILLING EQUIPMENT: Hand auger	DRILLING METHOD:	COMPLETION DEPTH: 1.0'	TOTAL NO. OF SAMPLES: 1
SIZE AND TYPE OF BIT:	HOLE DIAMETER:	NO. OF SAMPLES: BULK: SS:	DRIVE: PITCHER:
DRILLING FLUID:	DRILLING ANGLE:	WATER LEVEL: FIRST:	AFTER ____ HOURS
SAMPLE HAMMER TYPE: DRIVING WT.: DROP:		HYDROGEOLOGIST / DATE:	CHECKED BY / DATE:

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.5'				sandy silt, med brown					SRB533501
										RV225
	1.0'				refusal @ 1.0ft					
					stepped out 1.0ft					
					still had refusal @ 1.0ft					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRB534

SHEET ____ OF ____

PROJECT NAME: Ecketdyn	PROJECT NUMBER:	ELEVATION AND DATUM:	LOCATION: SRE
DRILLING COMPANY:	DRILLER: Ed Sarao/Ney Daugherty	DATE AND TIME STARTED: 4/12/01 1513	DATE AND TIME COMPLETED: 4/12/01 1529
DRILLING EQUIPMENT: Handauger	DRILLING METHOD:	COMPLETION DEPTH: 1.0'	TOTAL NO. OF SAMPLES: 1
SIZE AND TYPE OF BIT:	HOLE DIAMETER:	NO. OF SAMPLES: BULK: SS:	DRIVE: PITCHER:
DRILLING FLUID:	DRILLING ANGLE:	WATER LEVEL: FIRST:	AFTER ____ HOURS
SAMPLE HAMMER TYPE: DRIVING WT.: DROP:		HYDROGEOLOGIST / DATE:	CHECKED BY / DATE:

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.5'				Sandy silt & gravel					SRB5345001
					med brown & grey					RJ226
	1.0'				deepened; refusal @ 1.0'					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRB535

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne			SRE

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	Ed Sarabia/Jay Daugherty	4/12/01 1546	4/12/01 1620

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
Handauger		5.5'	2

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
/						

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.5'				sandy silt dark brown					SRB535501 RJ227
	4.0'				deepened; silty sand, dark brown, incomplete sample					
	5.5'				deepened; silty sand, dark brown; only 1/2 sleeve full					SRB535501 RJ228

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS 37-39

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne	31315 0002		SRE NEAR BLDG 183

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	CMC, JD	5/18/01	5/18/01

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
Slide Hammer		0.5'	3

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.5'	X	100		SILTY CLAYEY SAND (SM), DRY DENSE, GRAYISH BROWN (10YR 4/2)	SM	-	60	40	soil samples taken at D- 0.5' bgs
					TD = 0.5' bgs					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS 40,42-52

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne	31315 0002		SRE NEAR BLDG 183

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	CMC, JD	8/2/01	8/2/01

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
Side Hammer		0.5'	12

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER _____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.5	X	100		SILTY CLAYEY SAND (SM), DRY, DENSE	SM	-	60	40	Soil samples taken
	1				GRAYISH BROWN (10YR 4/2)					at D - 0.5' bgs.
					TD = 0.5' bgs					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS 41

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne	31315 ØØ2		SRE NEAR BLDG 183

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	CMC, JD	4/12/Ø1	4/12/Ø1

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
Slide Hammer		Ø5'	2

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER _____ HOURS

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	Ø.5'	X	100		SILTY CLAYEY SAND (SM), DRY DENSE, GRAYISH BROWN (10YR 4/2)					soil sample SRBS41-SØ1 D - Ø.5' bgs
	1									
	2									
	3	X	100		SAME AS ABOVE					soil sample SRBS41-SØ2 D - 3Ø' bgs
					TD = 3Ø' BGS					

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRBS 53

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne	31315ØØØ2		Transformer

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	CMC, JD	4/12/Ø1	4/12/Ø1

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
Slide Hammer		Ø.5'	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER _____ HOURS

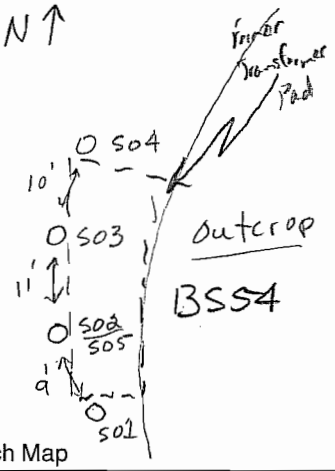
SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
			4/12/Ø1	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	Ø.5'	X	100		SILTY SAND (SM) LIGHT OLIVE BROWN	SM	-	70	30	Soil sample taken at
	1				(2.5YR 5/3) LOOSE SLIGHLY MOIST					D - Ø.5' bgs
					HIT BEDROCK @ 0.5' - SHALLOW					
					REFUSAL - CHATSWORTH FORMATION					
					TD - 0.5' BGS					

MWH

Former B003

Asphalt parking Area



Site Sketch Map

Boring #: SRBS 54 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: SSFL - SRE

Logged By: JDolmat Reviewed By:

Drilling Contractor: —

Drill Rig Type/Method: hand trowel / Auger

Drillers Name: B Burton / B Stewart

Borehole Diam./Drill Bit Type: 3" Total Depth: varies Ref. Elev.:

Sampler Type:

Depth to 1st Water (▽): Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Depth to other Water Bearing Zones:

Drill Start Time/Date: 10:40 02/14/06 Drill Finish Time/Date: 11:10 2/14/06

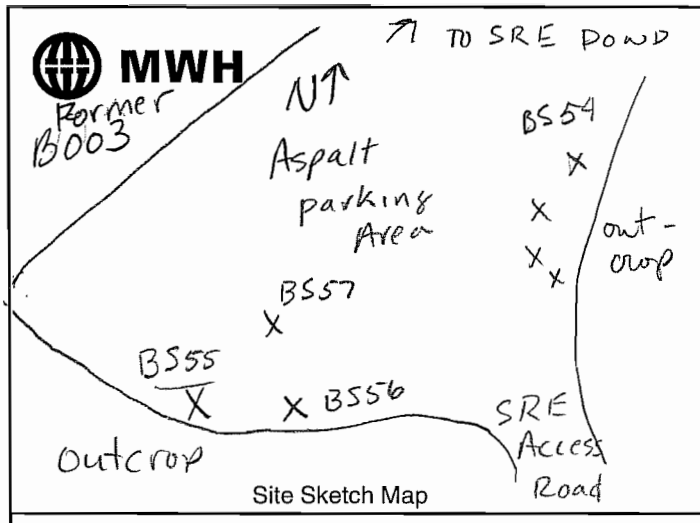
Well Completion Time/Date: —

Soil Boring Backfill Time/Date: —

	PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
										Composite sample - Pole Mounted Transformers					
SO1		X			X			0.5'	SM	silty sand (sm), light olive brown (2.5 YR 5/3), loose, slightly moist	—	—	—	70	30
										hit Bedrock @ 0.5' shallow refusal - chatsworth formation					
SO2		X			X			0.5'	SM	silty sand (sm) same as above	-	—	—	70	30
SO5		X			X			2.5'		refusal @ 2.5'					
SO3		X			X			0.5'	SM	same - trace course sand refusal @ 1'	—	tr	-	70	30
SO4		X			X			0.5'	SM	silty sand (sm) same as above trace gravel refusal @ 1'	tr	—	—	70	30

QA/QC

MWH



Site Sketch Map

Boring #: SRBS55 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL-SRE
Logged By: JDalmat Reviewed By:	
Drilling Contractor: —	
Drill Rig Type/Method: Hand trowel	
Drillers Name: B Burton	
Borehole Diam./Drill Bit Type: 3"	Total Depth 1' / Ref. Elev.
Sampler Type: Hand	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 02/14/06 Drill Finish Time/Date:
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

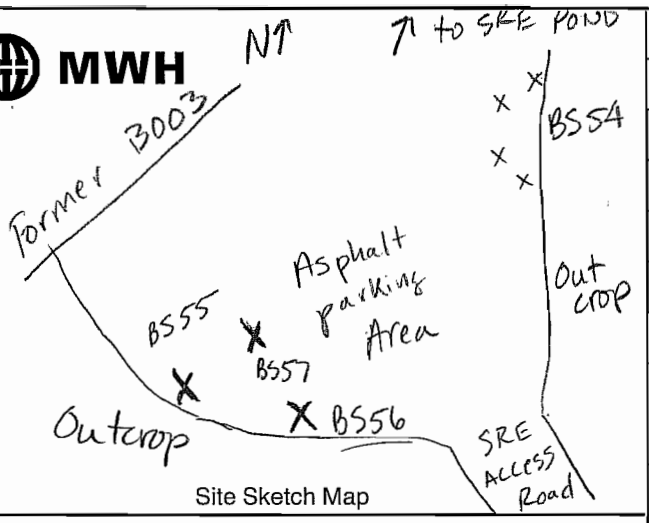
Transformer Pad SE of B003

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
							0		0-0.5' Nonnative granite gravel Fill					
	X			X			0.5'	SM	silty sand (SM) (2.5 6/4) light yellowish brown, loose, dry, trace med/coarse sand	-	tr	tr	70	30
							2							
							3		refusal @ 1' chatsworth formation					
							4		surface flat, bare no ash layer					
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

S01

QA/QC

MWH



Site Sketch Map

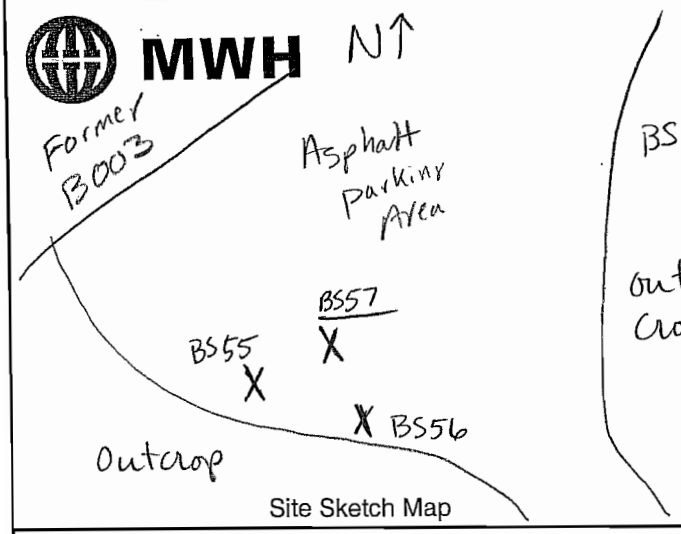
Boring #: SR BS 56 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL-SRE
Logged By: J Dolmat	Reviewed By:
Drilling Contractor: —	
Drill Rig Type/Method: hand trowel / Auger	
Drillers Name: B Burton / B stewart	
Borehole Diam./Drill Bit Type: 3"	Total Depth 1' / Ref. Elev.
Sampler Type: Hand	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 11:45 2/14/06 Drill Finish Time/Date: same
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

Transformer Pad SE B003

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
SO1	X			X			0.5'	SM	Silty Sand (SM) Brown (10YR 4/3) loose, dry, trace med/coarse sand refusal @ 1' chatsworth formation	—	tr	tr	60	40
							1		Surface Flat, Bare NO ash layer					
							2							
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



Site Sketch Map

Boring #: SR BS57 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: SSFL -SRE

Logged By: JDolmat Reviewed By:

Drilling Contractor: —

Drill Rig Type/Method: hand pick

Drillers Name: B Burton / B Stewart

Borehole Diam./Drill Bit Type: 3" Total Depth 0.5' Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Depth to other Water Bearing Zones:

Drill Start Time/Date: 12:20 2/14/06 Drill Finish Time/Date:

Well Completion Time/Date: —

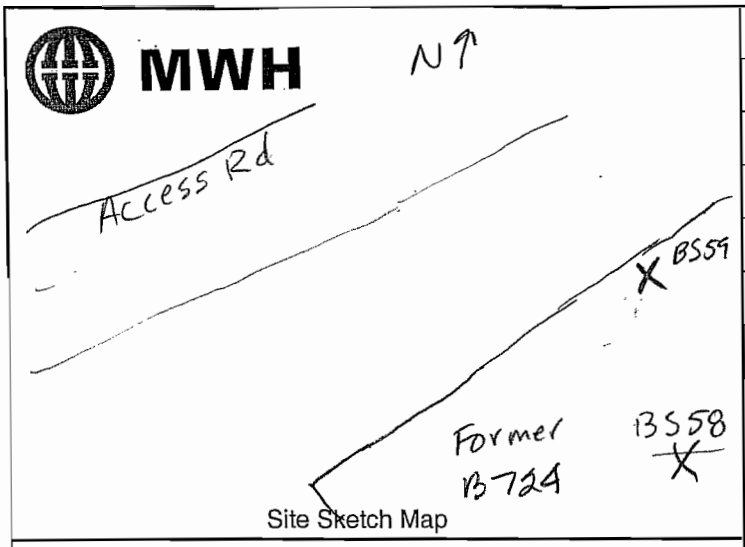
Soil Boring Backfill Time/Date: —

Transformer Pad SE B003

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
									0-0.5' Asphalt/Road base					
							1		0.5' Bedrock					
									Chatsworth Formation					
							2		NO Sample					
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



Site Sketch Map

Boring #: SRBS58 MW#: Sheet 1 of 1

Project: Group 1, Data Gap

Job #: Site: SSFL - SRE

Logged By: J Dolmat Reviewed By: -

Drilling Contractor: —

Drill Rig Type/Method: hand trowel / Auger

Drillers Name: B Burton / B Stewart

Borehole Diam./Drill Bit Type: 3" Total Depth 0.5' Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Depth to other Water Bearing Zones:

Drill Start Time/Date: 1323 2/14/06 Drill Finish Time/Date: same

Well Completion Time/Date: —

Soil Boring Backfill Time/Date: —

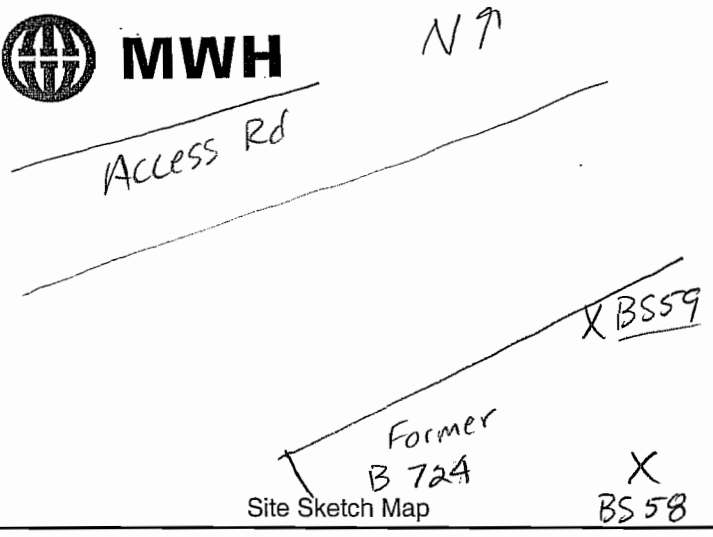
B724

Hot Oil Sodium Cleaning Facility

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
Soil	X			X			0.5'	(SM)	silty sand, lt olive brown (2.5Y 5/3), loose, dry, trace plant material, sub angular	—	5	10	65	20
							1							
							2		refusal 0.5' chatsworth formation					
							3							
							4		surface low vegitation, flat No ash layer					
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



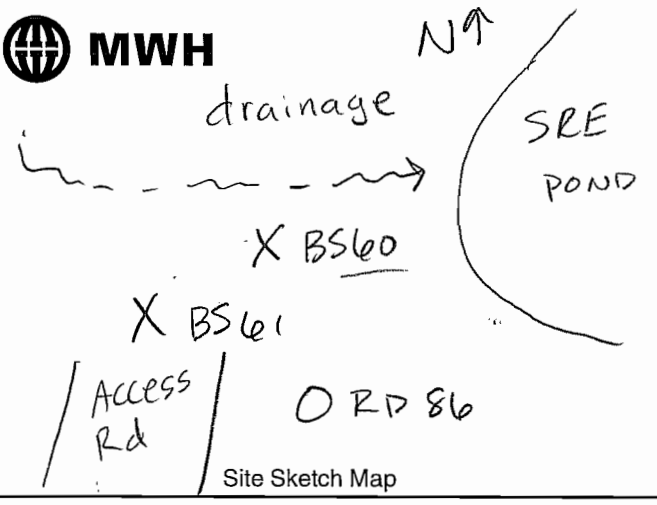
Site Sketch Map

Boring #: SR BS 59 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL - SRE
Logged By: JDolmat	Reviewed By:
Drilling Contractor: N A	
Drill Rig Type/Method: hand trowel / Auger	
Drillers Name: B Burton / B Stewart	
Borehole Diam./Drill Bit Type: 3"	Total Depth 0.5' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 1335 2/14/06 Drill Finish Time/Date: Same
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
									Hot Oil Sodium Cleaning Facility					
SO1	X			X			0.5'	SM	silty Sand (sm) Brown (10YR 4/3) loose, slightly moist, trace plant material	—	—	5	60	35
							1							
							2		refusal @ 0.5' Chatsworth Formation					
							3							
							4		surface low grassy vegitation NO ash layer, flat					
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



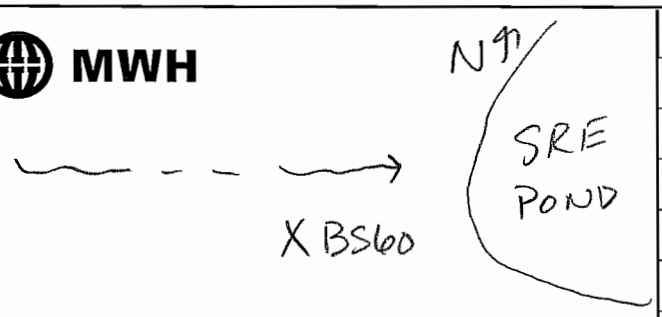
Site Sketch Map

Boring #: SRBS60 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL - SRE
Logged By: JDolmat	Reviewed By:
Drilling Contractor: —	
Drill Rig Type/Method: Hand Auger	
Drillers Name: B Stewart	
Borehole Diam./Drill Bit Type: 3"	Total Depth: 2' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 2/14/05 1450 Drill Finish Time/Date:
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	SRE Leach Field west of POND Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
S01	X			X			0.5'	SM	Silty sand DK Brown (10YR 3/3) loose, moist trace Coarse Sand & Plant material	—	tr	5	60	35
S02	X			X			2'	SP	sand with silt, DK Brown (10YR 3/3) loose, moist trace clay lenses	—	—	—	90	10
							4		Surface sloping N/NE 10° NO vegitation NO ash layer Boring not deepened to Bedrock					

QA/QC

MWH



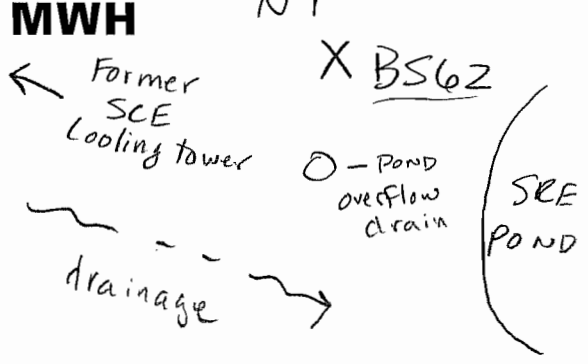
Site Sketch Map

Boring #: SR BS 61 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL - SRE
Logged By: JDolmat	Reviewed By:
Drilling Contractor: —	
Drill Rig Type/Method: hand Auger	
Drillers Name: B Burton	
Borehole Diam./Drill Bit Type: 3"	Total Depth 4' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 9:32 2/15/06 Drill Finish Time/Date: 9:40
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	SRE Leach Field Former SRBS02 Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
	X							SM	Silty sand (10YR 4/3) Brown loose moist	—	—	—	80	20
	X						1	SM	Silty sand (10YR 4/3) Brown loose, moist	—	—	—	80	20
	X						2	SM	Silty Sand (10YR 3/6) DK yellowish Brown, loose, moist	—	—	—	80	20
							3	SM	Silty Sand (10YR 3/4) DK yellowish Brown loose, moist	—	—	—	80	20
SO1	X			X			4'							
							4							
							5		increase in moisture with depth					
							6		Surface sloping N/NE 10°					
							7		NO vegitation					
							8		NO ash layer					
							9		Boring not deepened to Bedrock					
							10							
							11							
							12							

QA/QC

MWH



Site Sketch Map

Boring #: SR BS62 MW#:	Sheet 1 of 1
Project: Grayson Data Gap	
Job #:	Site: SSFL - SRE
Logged By: JDolmat Reviewed By:	
Drilling Contractor: —	
Drill Rig Type/Method: Hand Auger	
Drillers Name: B Stewart	
Borehole Diam./Drill Bit Type: 3"	Total Depth: 7' / Ref. Elev.
Sampler Type: —	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 9:57 2/15/06 Drill Finish Time/Date: 10:01
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

Drainage Pathway Former Cooling Tower

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
	X			X			0.5'	SM	silty sand dark yellow Brown (10YR 4/4) loose, moist trace med-coarse sand	–	–	–	65	35
	X			X			3'	SM	(10YR 4/1) dark gray 3' same as 0.5'	–	–	–	65	35
									refusal @ 7' chatworth formation					
									Surface dense vegitation (poison oak) 30-40° slope S/SE, 0.125" ash layer NOT sampled					

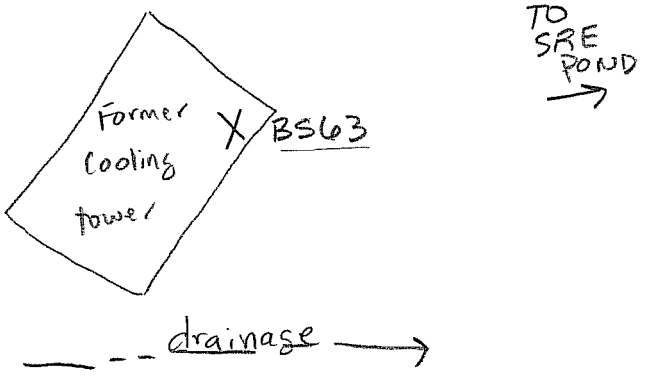
SO1

SO2

QA/QC

MWH

N9



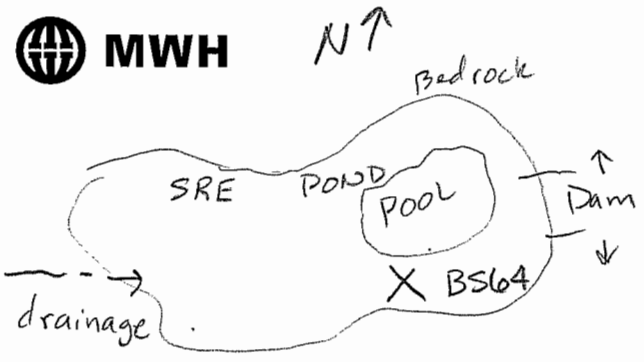
Site Sketch Map

Boring #: SRBS63 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL - SRE
Logged By: JDolmat	Reviewed By:
Drilling Contractor: —	
Drill Rig Type/Method: Hand trowel / Auger	
Drillers Name: B Burton	
Borehole Diam./Drill Bit Type: 3"	Total Depth: 3.5' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 1027 2/15/06 Drill Finish Time/Date:
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

	PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
										BASE Former Cooling Tower					
S01		X			X			0.5'	SM	silty sand, dark yellowish Brown (10YR 3/16) loose, dry	—	—	—	70	30
								1		trace concrete gravel					
										surface sloping SE 10-20°					
								2							
								3							
S02		X			X			3'	ML	Sandy Silt with clay	—	—	—	30	70
								4		dark yellowish brown (10YR 3/4)					
										med stiff, moist, weak					
								5		cementation, med plasticity					
										* surface ash 0.25 inch					
								6		very dark gray (10YR 3/1)					
										NOT SAMPLED					
								7							
										refusal 3.5' unknown					
								8		obstruction, possible					
										concrete or chatsworth					
								9		Formation					
								10							
								11							
								12							

QA/QC

MWH



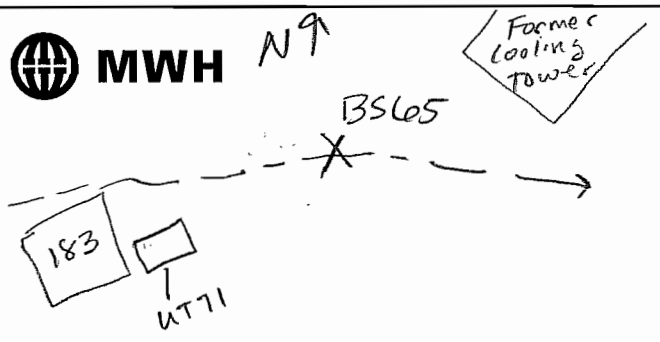
Site Sketch Map

Boring #: SRBS64 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL - SRE
Logged By: JDolmat	Reviewed By:
Drilling Contractor: —	
Drill Rig Type/Method: Hand trowel	
Drillers Name: B Burton	
Borehole Diam./Drill Bit Type: 3"	Total Depth: 0.5' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 11:31 2/15/06 Drill Finish Time/Date: same
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	EAST END SRE POND Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
Soil	X			X			0.5'	SP	Sand, olive brown (2.5Y 4/3) sub round - rounded, loose very moist surface flat, moist grassy, no ash layer not augered to bedrock	—	—	50	50	—
							1							
							2							
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



Site Sketch Map

Boring #: SR BS65 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL - SRE
Logged By: JDolmat	Reviewed By:
Drilling Contractor: —	
Drill Rig Type/Method: hand trowel	
Drillers Name: B. Burton	
Borehole Diam./Drill Bit Type: 3"	Total Depth 0.5' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 11:58 2/15/06 Drill Finish Time/Date: 1201
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date:
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
									Drainage downstream of mercury release					
SO1	X			X			0.5'	ML	sandy silt, dark Brown (10YR 3/3) med dense/stiff moist, trace med/coarse sand	—	tr	tr	40	60
							1							
							2		surface flat, bare, covered with black IM tarp					
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MONTGOMERY WATSON

Boring #: SRBS66 MW#: Sheet 1 of 1

Project: SSFL

Job #: Site: SRE

Logged By: T. Burton Reviewed By:

Drilling Contractor: NA

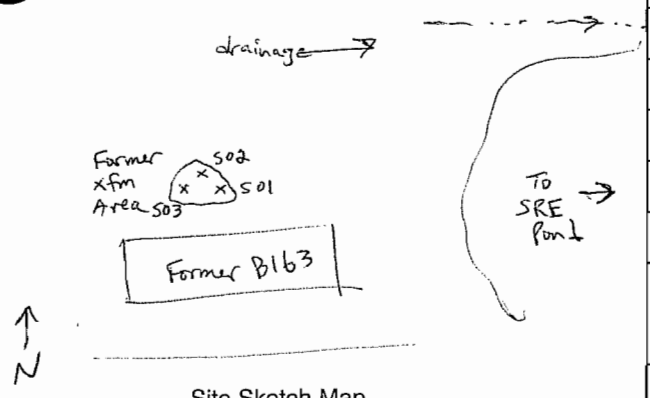
Drill Rig Type/Method: Hand Auger

Drillers Name: NA

Borehole Diam./Drill Bit Type: Total Depth 2'

Ref. Elev.

Sampler Type:



Site Sketch Map

Depth to 1st Water (▽): Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Depth to other Water Bearing Zones:

Drill Start Time/Date: Drill Finish Time/Date:

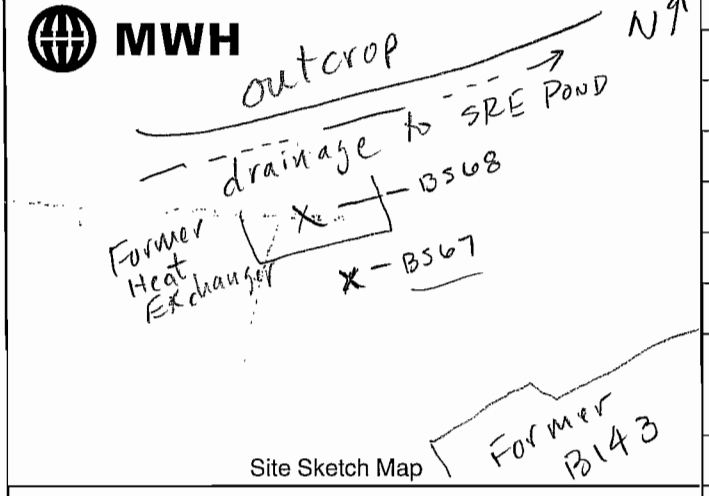
Well Completion Time/Date:

Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description (lateral composites same for SØ1, SØ2, SØ3)	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
NA	X	MS 649, 650, 651					0.5'		Sfc: bare, flat, disturbed soil covered with black IM tarp	—	—	tr	75	25
							1		@ 0' Silty vf. sand (SM), moist, dense, dark yellowish brown (10YR 4/6)					
							2							
							3		Refusal @ 2' bgs - sandstone					

QA/QC

MWH



Site Sketch Map

Boring #: SRBS67 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL - SRE
Logged By: JDalmat Reviewed By:	
Drilling Contractor: NA	
Drill Rig Type/Method: Hand Auger	
Drillers Name: B Burton / B Stewart	
Borehole Diam./Drill Bit Type: 3"	Total Depth 2' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 2/15/06 Drill Finish Time/Date:
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

Tetralin Heat Exchanger

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
Soil	X			X			0.5'		Surface flat, grassy shrub, 0.25" ash layer NOT sampled	—	—	5	75	20
							1	SM	silty sand, dark yellowish brown (10YR 4/4) moist, med dense					
							2		refusal @ 2' asphalt					
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

Out crop

MWH

drainage to SRE POND

N ↑

Former Heat Exchanger → BS68 X

X BS67

Former B143

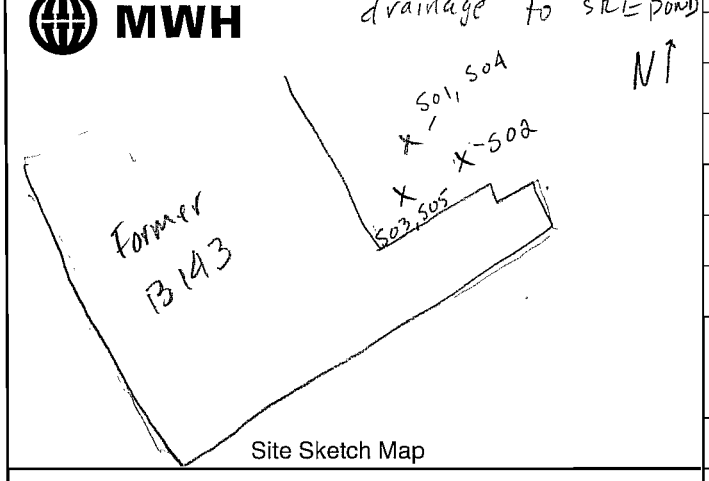
Site Sketch Map

Boring #: SRBS68 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL-SRE
Logged By: JDolmat	Reviewed By:
Drilling Contractor: NA	
Drill Rig Type/Method: Hand Auger	
Drillers Name: B Burton / B Stewart	
Borehole Diam./Drill Bit Type: 3"	Total Depth 0.5' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 2/15/06 Drill Finish Time/Date:
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Tetralin Heat Exchanger Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
	X			X			0.5'		surface flat, grassy shrub vegitation	—	—	tr	75	25
									ash layer 0.25 inch not sampled					
							1	SM	silty sand, yellowish brown (10YR 5/4), dry, med dense					
							2		trace fine gravel					
							3		refusal @ 0.5'					
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



Site Sketch Map

Boring #: SR B569 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL - SRE
Logged By: J Dalmat	Reviewed By:
Drilling Contractor: NA	
Drill Rig Type/Method: Hand Auger	
Drillers Name: B Burton / B Stewart	
Borehole Diam./Drill Bit Type: 3"	Total Depth 3' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 2/16/06 Drill Finish Time/Date:
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

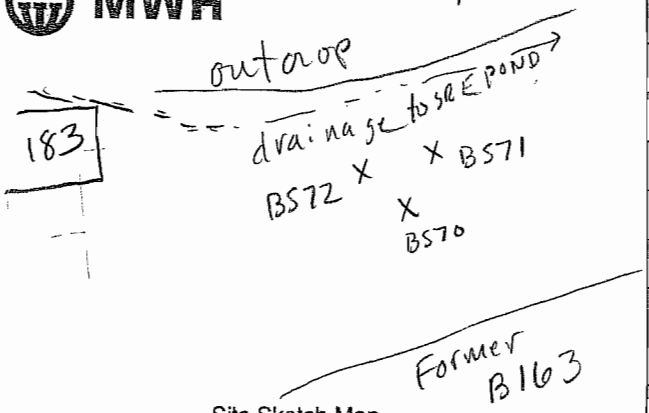
Composite Sampling - Former Substation B143

	PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
SO1/SO2										Surface: bare flat disturbed soil	—	—	tr	70	30
SO3	NA	X			X			0.5'		grassy and shrub vegitation					
								1	SM	silty sand, moist, clense,					
										dark yellowish brown (10YR 3/4)					
								2							
SO4/SO5										0.25 ash layer not sampled					
		X			X			3'	SM	Refusal @ 1' - SOB.					
								3		3' lithology same as 0.5'					
								4							
								5							
								6							
								7							
								8							
								9							
								10							
								11							
								12							

QA/QC

MWH

NT



Site Sketch Map

Boring #: SR BS70 – BR BS72 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: SSFL – SRE

Logged By: JDolmat Reviewed By:

Drilling Contractor: NA

Drill Rig Type/Method: hand Auger

Drillers Name: B Burton B Stewart

Borehole Diam./Drill Bit Type: 3" Total Depth: 1'

Ref. Elev.:

Sampler Type:

Depth to 1st Water (▽): Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Depth to other Water Bearing Zones:

Drill Start Time/Date: 2/10/06 Drill Finish Time/Date:

Well Completion Time/Date: —

Soil Boring Backfill Time/Date: —

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
							0		Turbine and Generator Area					
									surface disturbed soil					
SO1	X			X			1'		Flat covered with Tarp	15	10	10	60	5
								SW	Gravelly sand, yellowish brown (10YR 5/4)					
							2		angular to sub angular gravel, moist dense					
							3		refusal @ 2' caused by gravel not bedrock					
							4		at each boring refusal @ 2'					
							5		SR BS70, SR BS71 SR BS72					
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: SRBS73 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: SSFL-SRE

Logged By: JDolmat Reviewed By:

Drilling Contractor: NA

Drill Rig Type/Method: Hand Auger

Drillers Name: B Burton

Borehole Diam./Drill Bit Type: 3" Total Depth: 0.5' Ref. Elev.:

Sampler Type:

Depth to 1st Water (▽): Time/Date:

Depth to Water After Drilling (▼): Time/Date:

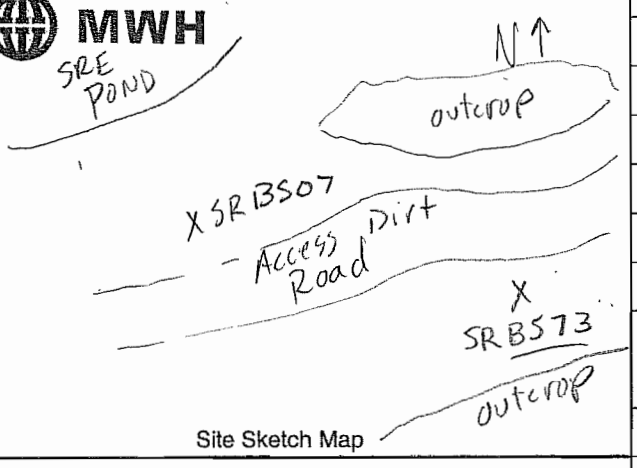
Depth to other Water Bearing Zones:

Drill Start Time/Date: 2/16/05 Drill Finish Time/Date:

Well Completion Time/Date:

Soil Boring Backfill Time/Date:

Site Sketch Map



PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/Clay
	X			X			0.5'	SM	Silty sand dark yellowish Brown 10YR 4/6, moist, loose surface Flat low vegitation ash layer 0.25 inch not sampled	—	—	—	70	30
							1							
							2		Not to Bedrock					
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

SO1

MWH

Boring #: SRBS74 MW#: Sheet 1 of 1

Project:

Job #: Site: SRE-55FH

Logged By: Reviewed By:

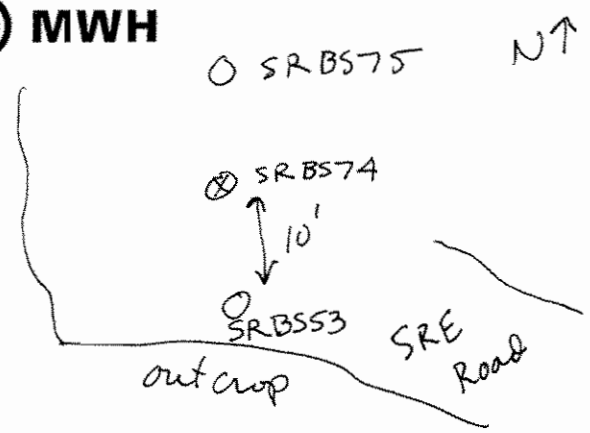
Drilling Contractor:

Drill Rig Type/Method:

Drillers Name:

Borehole Diam./Drill Bit Type: Total Depth 0.5' Ref. Elev.

Sampler Type:



Site Sketch Map

Depth to 1st Water (▽): Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Depth to other Water Bearing Zones:

Drill Start Time/Date: 4/11/06 Drill Finish Time/Date:

Well Completion Time/Date:

Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
01	X			X			0.5		Surface 1' vegitation grassy flat up to 6" standing water near SRBS55					
							1		SILTY SAND 10YR 4/6 wet soft	—	—	30	40	30
							2		1' road base gravel 2-3"					
									1.25' bedrock Chatsworth					
							3		Fm					
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: SRBS75 MW#: Sheet 1 of 1

Project:

Job #: Site: SRE-SSFL

Logged By: J Dolmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: Hand Auger

Drillers Name:

Borehole Diam./Drill Bit Type: Total Depth 0.5'

Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): Time/Date:

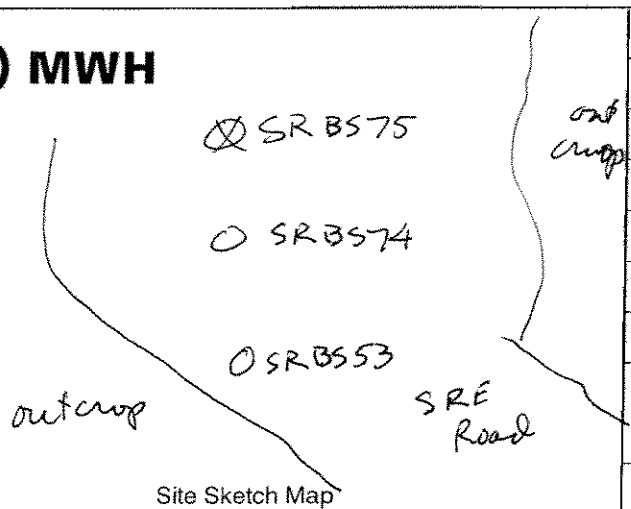
Drill Start Time/Date: 4/11/06 Drill Finish Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Well Completion Time/Date:

Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date:

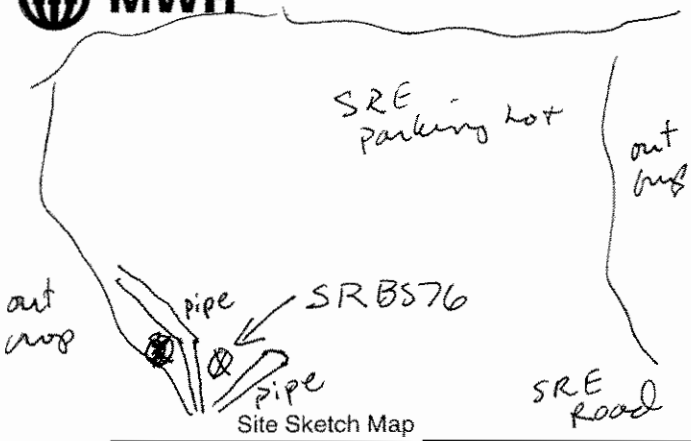


Site Sketch Map

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
501	X			X			0.5		Sugass 6"-1' grassy Vegitation					
							1		silty sand 10YR4/3 Brown wet soft	—	—	30	40	30
							2		refusal 1.5 feet chatsworth fm					
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



Site Sketch Map

Boring #: SR BS 76 MW#: Sheet 1 of 1

Project:

Job #: Site: SRE-SSFL

Logged By: J Dolmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: Hand Auger

Drillers Name:

Borehole Diam./Drill Bit Type: 4" Total Depth 0.5'

Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): Time/Date:

Drill Start Time/Date: 4/11/04 Drill Finish Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Well Completion Time/Date:

Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
201	X			X			0.5'		Between outcrop and asphalt Road surface 1" grassy vegetation refusal @ 0.5' asphalt SILTY SAND 10YR 4/4 DK Brown moist soft	–	–	30	40	30
							1							
							2							
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: SRB577 MW#: Sheet 1 of 1

Project:

Job #: Site: SRE-SSFL

Logged By: Reviewed By:

Drilling Contractor:

Drill Rig Type/Method:

Drillers Name:

Borehole Diam./Drill Bit Type: Total Depth 1'

Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): Time/Date:

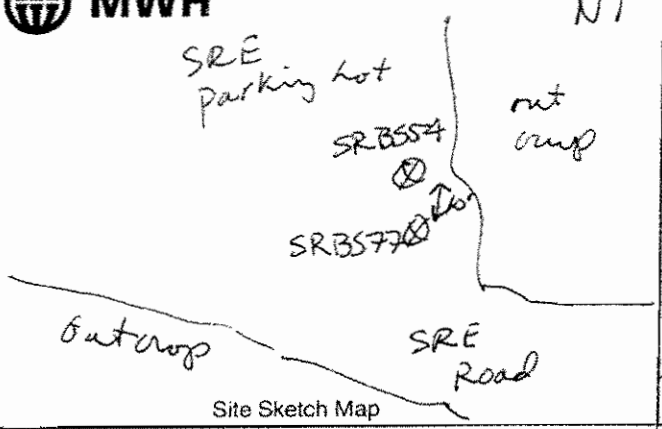
Depth to Water After Drilling (▼): Time/Date:

Depth to other Water Bearing Zones:

Drill Start Time/Date: 4/11/06 Drill Finish Time/Date:

Well Completion Time/Date:

Soil Boring Backfill Time/Date:



Site Sketch Map

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
01	X			X			0.5		Surface flat 1' Vegitation grassy	—	—	10	35	55
							1		SANDY SILT 10YR 3/3 DK Brown			30	40	30
									0.5 - 1' silty SAND 10YR 4/4					
							2		1' refusal @ chatsworth Fm					
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: SRBS78 MW#: Sheet 1 of 1

Project:

Job #: Site: SRE-SSFL

Logged By: J. Dolmat Reviewed By: T Bulton

Drilling Contractor:

Drill Rig Type/Method:

Drillers Name:

Borehole Diam./Drill Bit Type: 4" Total Depth 0.5

Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): Time/Date:

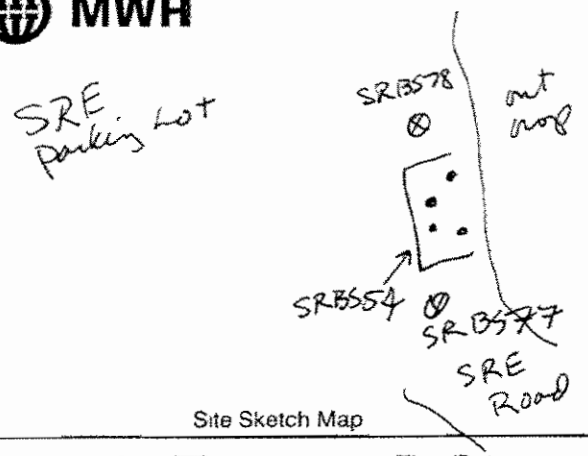
Drill Start Time/Date: 4/11/06 Drill Finish Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Well Completion Time/Date:

Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date:



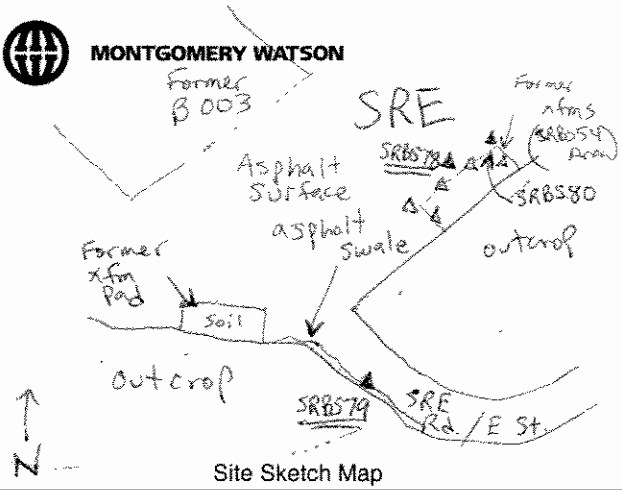
Site Sketch Map

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
	X			X			0.5'		Surface flat, surrounded by asphalt 1'-2' grassy vegetation SILTY SAND 10YR 4/4 dk yellow brown moist soft, roots. asphalt refusal 0.5'	–	10	20	30	40
							1							
							2							
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

3A/QC

SRBS79

MONTGOMERY WATSON



Site Sketch Map

Boring #:	MW#:	Sheet 1 of	
Project:			
Job #:	Site:		
Logged By: T. Burton	Reviewed By:		
Drilling Contractor:			
Drill Rig Type/Method:			
Drillers Name:			
Borehole Diam./Drill Bit Type:		Total Depth	—
		Ref. Elev.	
Sampler Type:			
Depth to 1st Water (▽):	Time/Date:	Drill Start Time/Date:	Drill Finish Time/Date:
Depth to Water After Drilling (▼):	Time/Date:	Well Completion Time/Date:	
Depth to other Water Bearing Zones:		Soil Boring Backfill Time/Date:	

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of				
										Gravel	Sand			Silt/clay
											Coarse	Medium	Fine	
									Surface: asphalt overlying sandstone bedrock, upslope of transformer pad. No sample could be collected at location - boring refused at bedrock = 3" bgs					

QA/QC

SRBS80

MONTGOMERY WATSON

Boring #: MW#: Sheet 1 of

Project:

Job #: Site:

Logged By: T. Burton Reviewed By:

Drilling Contractor:

Drill Rig Type/Method:

Drillers Name:

Borehole Diam./Drill Bit Type: Total Depth

Ref. Elev.

see log for SRBS79

Site Sketch Map

Sampler Type:

Depth to 1st Water (▽): Time/Date:

Drill Start Time/Date: Drill Finish Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Well Completion Time/Date:

Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
							1		Surface: Asphalt overlying older asphalt road surface adjacent to transformer pad. No sample could be collected; refusal on asphalt.					
							2							
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: SRBS81 MW#: Sheet 1 of

Project:

Job #: Site: SRE - SSFh

Logged By: Reviewed By:

Drilling Contractor:

Drill Rig Type/Method:

Drillers Name:

Borehole Diam./Drill Bit Type: 4" Total Depth 1.5' Ref. Elev.

Sampler Type:

Drill Start Time/Date: 4/11/06 Drill Finish Time/Date:

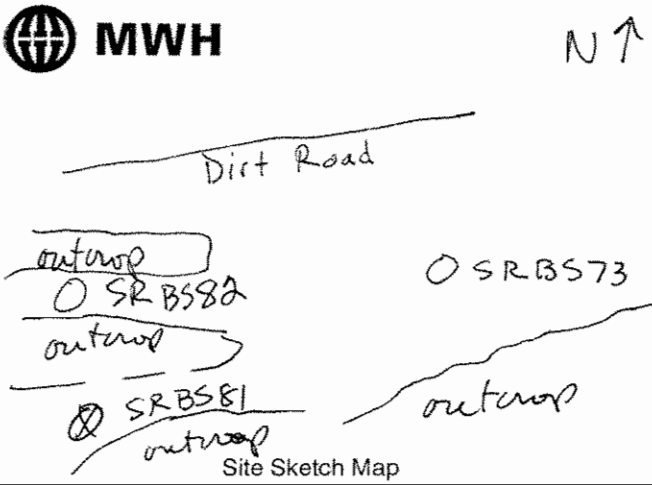
Well Completion Time/Date:

Soil Boring Backfill Time/Date:

Depth to 1st Water (▽): Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Depth to other Water Bearing Zones:



Site Sketch Map

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description (between two W-E outcrops)	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
	X			X			0.5		Surface grassy vegitation up to 2' sloping 10-20° to E					
							1		Silty SAND (10YR 3/2) very dk brown wet soft	–	–	20	40	40
							2		refusal @ 1.5 chatsworth Fm					
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: SRBS82 MW#: Sheet 1 of

Project:

Job #: Site: SRE SSFL

Logged By: Reviewed By:

Drilling Contractor:

Drill Rig Type/Method:

Drillers Name:

Borehole Diam./Drill Bit Type: Total Depth 1.5'

Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): Time/Date:

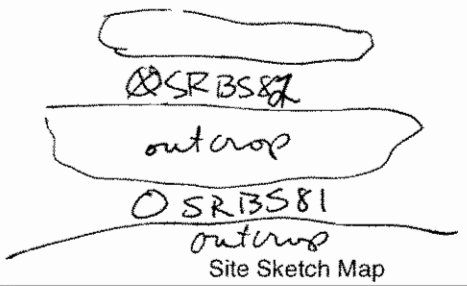
Depth to Water After Drilling (▼): Time/Date:

Depth to other Water Bearing Zones:

Drill Start Time/Date: 4/11/06 Drill Finish Time/Date:

Well Completion Time/Date:

Soil Boring Backfill Time/Date:



Site Sketch Map

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
301	X			0X			0.5		Surface grassy vegetation 2" fill sloping 10-20° E	—	10	20	30	40
							1		SILTY SAND 10YR 3/3 DK Brown moist soft					
							2							
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

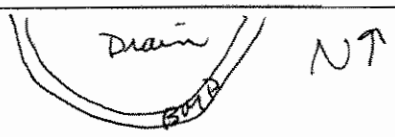
Site Sketch Map O RD18

Boring #: SRBS83 MW#:	Sheet 1 of
Project:	
Job #:	Site: SRE-SSFL
Logged By:	Reviewed By:
Drilling Contractor:	
Drill Rig Type/Method:	
Drillers Name:	
Borehole Diam./Drill Bit Type: 4"	Total Depth 1' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 4/11/06 Drill Finish Time/Date:
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date:
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
SO1	X			X			0.5		Surface sloping 20-30° to N grassy vegetation 1-2' tall	—	10	20	40	30
							1		SILTY SAND 10YR4/4 Dk Yellow Brown moist Soft					
							2							
							3		Refusal 1' chatsworth FM					
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



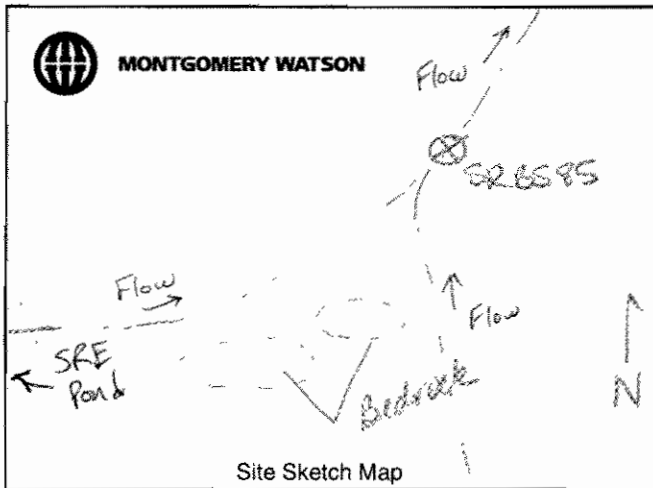
Site Sketch Map

Boring #: SRB584 MW#:	Sheet 1 of
Project: Grouple Data Gap	
Job #:	Site:
Logged By:	Reviewed By: SRE-SPL
Drilling Contractor:	
Drill Rig Type/Method:	
Drillers Name:	
Borehole Diam./Drill Bit Type: 4"	Total Depth 1.5' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 4/11/00 Drill Finish Time/Date:
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date:
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
	X			X			0.5		Surface 20°-30° Slope grassy 1-2' tall vegitation	-	10	20	40	30
							1		SILTY SAND 10 YR 4/4 moist soft					
							2		Refusal @ 1.5 Chatsworth Fm					
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MONTGOMERY WATSON



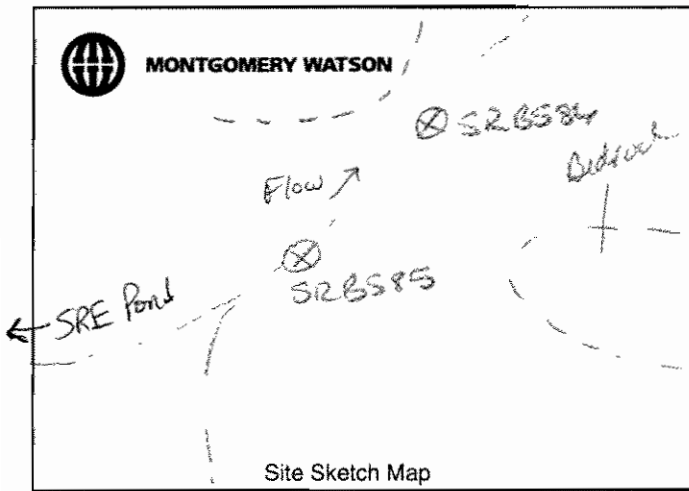
Site Sketch Map

Boring #: SRE85 MW#:	Sheet 1 of
Project:	
Job #:	Site: SRE - SSFL
Logged By: BS NJD	Reviewed By: T. Burton
Drilling Contractor:	
Drill Rig Type/Method: grab sample w/ jar	
Drillers Name:	
Borehole Diam./Drill Bit Type:	Total Depth 0.5 / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 4/12/00 Drill Finish Time/Date: 4/12/00
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date:
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
	X			X					Surface: cut bank along wet drainage downslope from SRE Pond	—	5	30	30	35
							1		Silty sand (SM), moist, loose, very dark grayish brown (10YR4/2), vf-med sands, some coarse sand + organics					
							2							
							3							
							4		Note: bedrock exposed in bottom of drainage; no ashy or charred material sampled					
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MONTGOMERY WATSON



Site Sketch Map

Boring #: SRBS86 MW#: Sheet 1 of 1

Project:

Job #: Site: SRE-SSFL

Logged By: BSITD Reviewed By: T. Burton

Drilling Contractor:

Drill Rig Type/Method: grab sample w/ jar

Drillers Name:

Borehole Diam./Drill Bit Type: Total Depth 0.5

Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Depth to other Water Bearing Zones:

Drill Start Time/Date: 4/12/00 Drill Finish Time/Date: 4/12/00

Well Completion Time/Date:

Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
	X			X					Surface: cut bank along wet drainage dwnslp from SRE Pond			—	80	20
							1		Approx. 1-1.5' of soil/seds in bank material					
							2		Silty sand (SM), very dark grayish brown (10YR 4/2), moist, loose, vf-med sand					
							3							
							4		Note: bedrock exposed along drainage; no ashy or charred material sampled					
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MONTGOMERY WATSON

Boring #: SR8587 MW#: Sheet 1 of 1

Project:

Job #: Site: SRE - SSFL

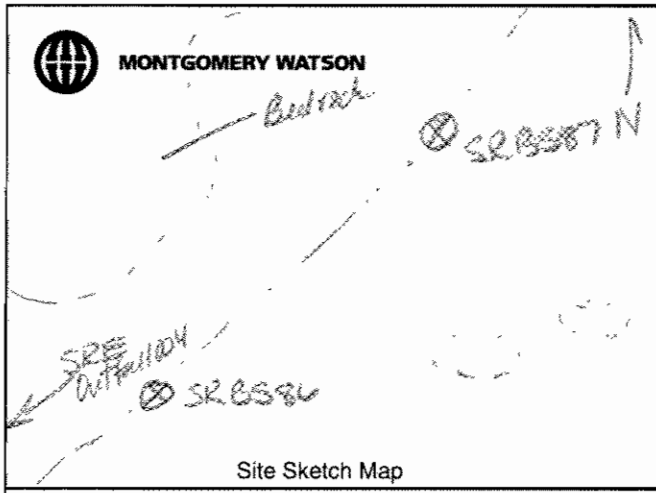
Logged By: BS/JD Reviewed By: T Burton

Drilling Contractor:

Drill Rig Type/Method: grab sample w/jar

Drillers Name:

Borehole Diam./Drill Bit Type: Total Depth 0.5 / Ref. Elev. —



Site Sketch Map

Sampler Type:

Depth to 1st Water (▽): Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Depth to other Water Bearing Zones:

Drill Start Time/Date: 4/12/02 Drill Finish Time/Date: 4/12/02

Well Completion Time/Date:

Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
	X			X			0		Surface: cut bank along drainage downstream from SRE Pond	—	5	20	40	35
							1		Silty sand (SM), dark grayish brown (10YR 5/2), moist, loose, fine - med sands; some gravel + inorganics					
							2							
							3							
							4		Note: bedrock exposed within + along drainage; No ashy or charred material was sampled.					
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MONTGOMERY WATSON

Boring #: SRBS88 MW#: Sheet 1 of 1

Project:

Job #: Site: SRE-35FL

Logged By: BS/JD Reviewed By: T. Burton

Drilling Contractor:

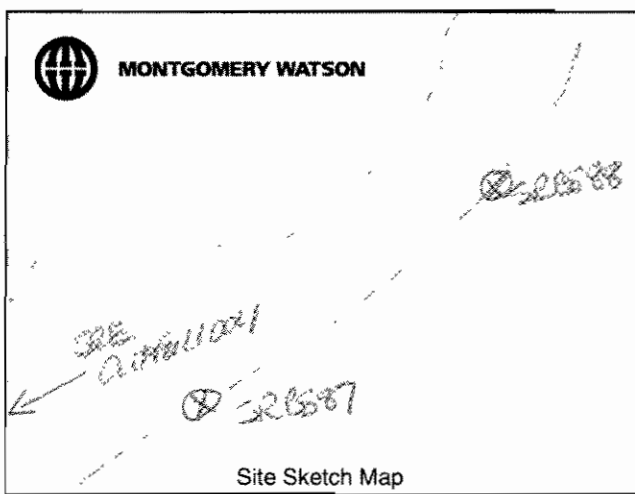
Drill Rig Type/Method: grab sample w/ jar

Drillers Name:

Borehole Diam./Drill Bit Type: Total Depth 0.5

Ref. Elev.

Site Sketch Map



Sampler Type:

Depth to 1st Water (▽): Time/Date:

Drill Start Time/Date: 4/12/00 Drill Finish Time/Date: 4/12/00

Depth to Water After Drilling (▼): Time/Date:

Well Completion Time/Date:

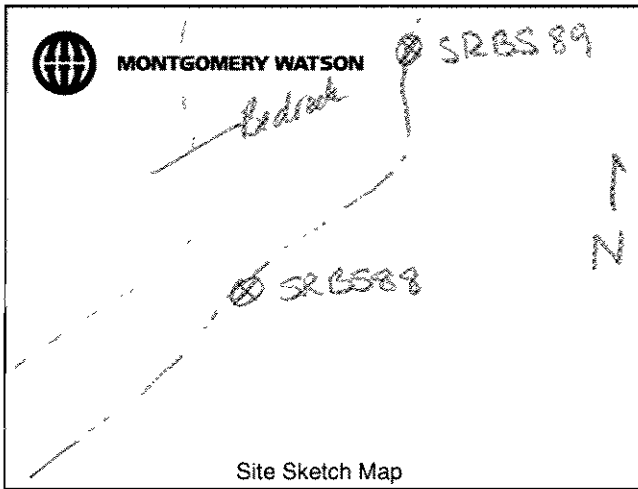
Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
	X			X					Surface: cut bank, 1.5' thick soil/seds, along wet drainage	tr	5	30	35	30
							1		Silty sand (SM), dark grayish					
							2		brown (10YR4/2), moist, loose, fine-med gr., trace coarse sand + pebble,					
							3		some organics.					
							4		Note: Bedrock crops out in					
							5		and along drainage; no ash or charred material sampled					
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MONTGOMERY WATSON



Site Sketch Map

Boring #: SRBS89 MW#: — Sheet 1 of

Project:

Job #: Site: SRE-35FL

Logged By: BS JD Reviewed By: T. Burton

Drilling Contractor:

Drill Rig Type/Method: grab sample w/ jar

Drillers Name:

Borehole Diam./Drill Bit Type: Total Depth 0.5

Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): Time/Date:

Depth to Water After Drilling (▼): Time/Date:

Depth to other Water Bearing Zones:

Drill Start Time/Date: 4/12/06 Drill Finish Time/Date: 4/12/06

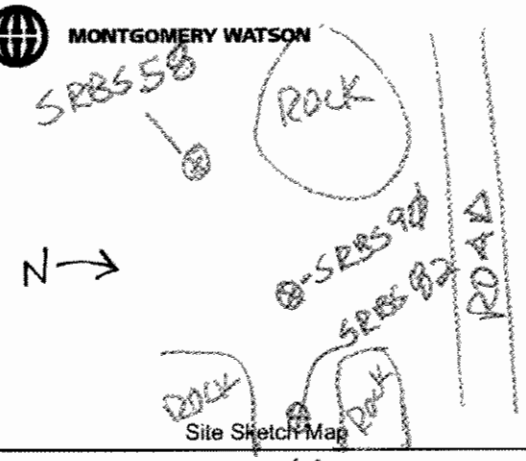
Well Completion Time/Date:

Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
	X			X					Surface: cut bank along wet drainage (sample @ base)	—	5	20	55	20
							1		Silty sand (SM), very dk. grayish brown, loose, moist, vf-med. gr, some coarse sand & organics					
							2							
							3		Note: bedrock crops out in & along drainage; no ashy or charred material sampled.					
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MONTGOMERY WATSON



Site Sketch Map

Boring #: SRBS90 MW#: — Sheet 1 of 1

Project: Group 6 Data Gaps

Job #: Site: SRE

Logged By: E. VanderVelde Reviewed By:

Drilling Contractor: —

Drill Rig Type/Method: Hand collected

Drillers Name: Eric VanderVelde

Borehole Diam./Drill Bit Type: — Total Depth 0.5ft Ref. Elev.

Sampler Type: trowel

Depth to 1st Water (▽): NA Time/Date:

Drill Start Time/Date: 1242 Drill Finish Time/Date: 1244

Depth to Water After Drilling (▼): NA Time/Date:

Well Completion Time/Date: NA

Depth to other Water Bearing Zones: NA

Soil Boring Backfill Time/Date: NA

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
NA	↓	↓	NA	X	NA	NA		SM	Silty Sand, dark yellowish brown (10yr 3/4), Silt 20	5	5	10	50	30
							1		coarse grain sand, poorly graded, minor gravel, fine clean to subrounded, dry no odor.					
							2							
							3							
							4		Total Depth 0.5 ft					
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

OGDEN

FIELD LOG OF BORING

BORING NUMBER SRSSØ1

SHEET 1 OF 1

PROJECT NAME: Rocketdyne	PROJECT NUMBER: 313150002	ELEVATION AND DATUM: Sunny	LOCATION: SRE POND ULS 3
DRILLING COMPANY	DRILLER: T.B	DATE AND TIME STARTED: 12/2/97 1430	DATE AND TIME COMPLETED: 12/2 1455
DRILLING EQUIPMENT	DRILLING METHOD: Push	COMPLETION DEPTH: 3"	TOTAL NO. OF SAMPLES: 2
SIZE AND TYPE OF BIT	HOLE DIAMETER: 2"	NO. OF SAMPLES: BULK / SS	DRIVE / PITCHER
DRILLING FLUID	DRILLING ANGLE	WATER LEVEL: FIRST —	AFTER _____ HOURS
SAMPLE HAMMER TYPE / DRIVING WT. / DROP		HYDROGEOLOGIST / DATE: T. Burton 12/2/97	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0.25	X			Surface: cement drainage, moist	SM	30	50	20	@ 1445
	0.5				seds (5" deep)					SRSSØ1SØ1DØ
	0.75				Silty sand w/gravel (SM), black (10YR2/1), wet, very loose, med.					No H.S taken
	1				sand, angular gravels (¼"), micaceous					Full Sleeves
					debris (glass)					
					T.D. 3"					
	2									

OGDEN

Surface and Shallow Soil Sample Log

Project Number	Project Name	Date	Time
313150002R	ROCKETDYNE SSFL	6/30/00	1000

Sample Identification Number and Time	Checked by
SRSSØ2SØ1 @ 1005	T. Burton 8/14/00

Sampled by	Recorded by
STM	STM 6/30/00

Method of Collection: SLEEVE (SCOOP)

Surface Description: NEXT TO WOODEN PLANK, VEGETATION & ORGANIC MATER IN DRAINAGE

Notes:

Soil Sample Data

Location: SRE AREA IV AOC, ULS 25

Coordinates	Elevation

Lithology	Depth (in.)	Soil Description	Est. % of G	S	F	Comments
	1	Silty Sand (SM) 2.5YR, 6/6 Olive	Ø	85	15	SRSSØ2SØ1
	2	Yellow, DRY, LOOSE, FINE TO				PID = Ø ppm
	3	medium.				ULS = 25

OGDEN

Surface and Shallow Soil Sample Log

Project Number	Project Name	Date	Time
313150002	ROCKETDYNE SSFL	6/30/00	1020

Sample Identification Number and Time	Checked by
SRSSØ35Ø1 @ 1020	T. Burton 8/14/00
Sampled by	**Recorded by**
STM	STM 6/30/00

Method of Collection: Sleeve

Surface Description: DRAINAGE, VEGETATIVE DEBRIS

Notes:

Soil Sample Data

Location: SRE AREA II AOC, ULS=26

Coordinates	Elevation

Lithology	Depth (in.)	Soil Description	Est. % of G	S	F	Comments
	1	SILTY SAND (SM) 2.5Y 6/6, olive	Ø	85	15	PID = Ø ppm
	2	yellow, DRY, LOOSE, FINE TO				
	3	medium.				

OGDEN

Surface and Shallow Soil Sample Log

Project Number	Project Name	Date	Time
313150002	~~DOE~~ Rocketdyne	6/30/00	1115

Sample Identification Number and Time	Checked by
SRSS04 S01 DP @ 1120	

Sampled by	Recorded by
T. Burton	T. Burton

Method of Collection: Scoop

Surface Description: dry, flat, w/ dry brush + leaves

Notes: UCS # 27

Soil Sample Data

Location: SRE drainage N of fmr. Bldg 163

Coordinates	Elevation

Lithology	Depth (in.)	Soil Description	Est. % of G	S	F	Comments
	1	Sandy silt (ML), dk. grayish brown (10YR 4/2), dry, loose, non-plastic, vf sand	—	30	70	
		T.D. 1" bgs				

OGDEN

Surface and Shallow Soil Sample Log

Project Number	Project Name	Date	Time
313150002	ROCKETDYNE SSFL	~~6/12~~ 6/30/00	1140

Sample Identification Number and Time	Checked by
SRSSØ55Ø1 @	T. Burton 8/14/00

Sampled by	Recorded by
STM	STM

Method of Collection: Sleeve

Surface Description: Trees, Vegetation, Sticks on Ground

Notes:

Soil Sample Data

Location: ~~FAA~~ SRE Area IV AOC, GLS = 28

Coordinates	Elevation

Lithology	Depth (in.)	Soil Description	Est. % of G	Est. % of S	Est. % of F	Comments
	1	Silty Sand (SM), 2.5Y 6/6 olive	Ø	85	15	PID = Ø ppm
	2	yellow, Dry, Loose, fine to medium.				
	3					

OGDEN — Surface and Shallow Soil Sample Log

Project Number	Project Name	Date	Time
213/50002	~~DOE~~ RocketdyneⓇ	6/30/00	1000

Sample Identification Number and Time	Checked by
SRSUØ1SØ1 D8.5 @1050	

Sampled by	Recorded by
T. Burton	T. Burton

Method of Collection: Hand Auger / slide hammer

Surface Description: Leaves (1") @ bottom of ~~8~~ 8', Deep, Corrugated metal sump?

Notes: VLS #16

Soil Sample Data

Location: SRE, W of Pond

Coordinates: | Elevation:

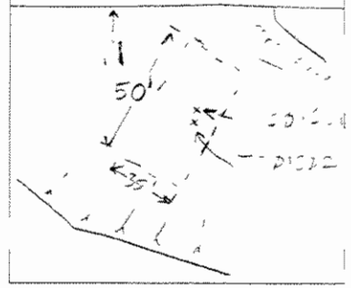
Lithology	Depth (in.)	Soil Description	Est. % of G	S	F	Comments
leaves	8'0"	~~Sandy silt~~ (ML) Silt w/ sand, wet,				
	8' 1"	dk. grey – dk. yellowish brown (mottled), no plasticity, v. loose, sandier from 2-4"				
	2					PID: Ø ppm
			–	~~40~~ 60	60 40	No effervescence
	3	Sandy silt 2"–4"				
	4		–	25	75	
↑ retained. ↓	5					
	8' 6"					@1050
						SRSUØ1SØ1 D8.5'
	7	Silt w/ sand (ML), as above, gray (N3),	–	25	75	* RE-SAMPLED
		no mottling				7/6/00 @0900 FOR
	8					UCS. RS519
	9	Total Depth 8.75'				
		Chatsworth Fm ~~sandstone~~ bedrock refusal				

FIELD TRENCH LOG

Trench Number: SR TS01	Project Number: 313150002	Elevation/Datum	Location: AREA IV	Sheet ____ of ____
Equipment Supplier	Operator	Date and Time Started	Date and Time Completed	Refusal? (Circle One) Yes No — If Yes Depth =
Equipment Type	Trench Orientation: N23E	Total Depth	Total Number of Samples	Photo (Circle One) Yes No — No
Bucket Width	Trench Length: ~50'	Trench Width: ~3'	No. of Samples: Bulk / Grab	Drive / Hand Auger	% Man-Made Debris
Geologist or Hydrogeologist/Date		Checked by/Date		Wall of Trench Shown (Circle One) N S E W NE NW (SE) SW

OGDEN

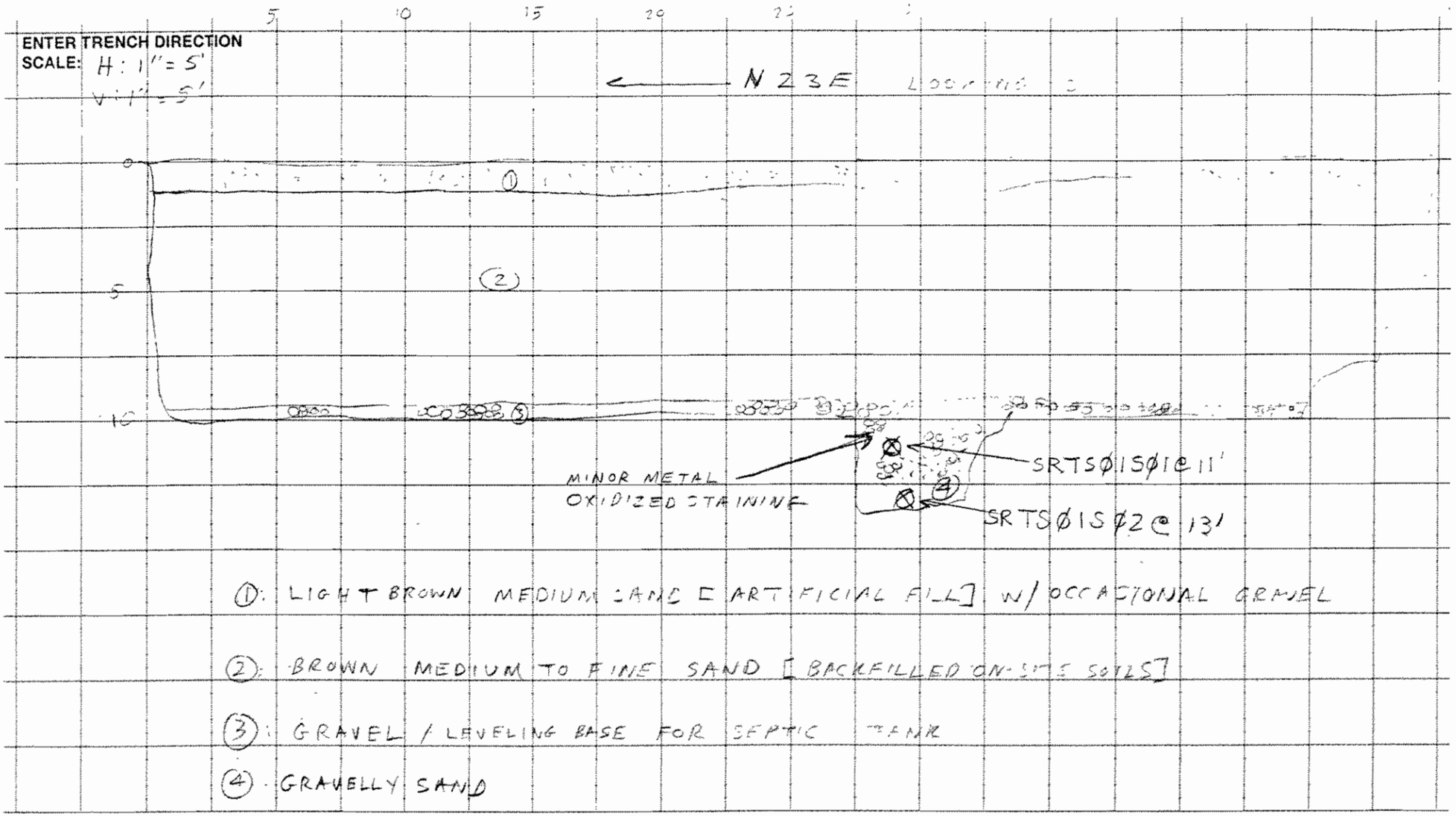
Plan View-Site Location
(Provide Sketch)



LENGTH (FEET)

DEPTH (FEET)

ENTER TRENCH DIRECTION
SCALE: H: 1"=5'
V: 1"=5'



① LIGHT BROWN MEDIUM SAND [ARTIFICIAL FILL] W/ OCCASIONAL GRAVEL

② BROWN MEDIUM TO FINE SAND [BACKFILLED ON-SITE SOILS]

③ GRAVEL / LEVELING BASE FOR SEPTIC TANK

④ GRAVELLY SAND

EXPLANATION

- SOIL TYPE CONTACT (SHARP)
- OTHER CONTACT (AS INDICATED ON LOG)
- FILL/NATIVE BOUNDARY
- X — ANALYICAL SAMPLE LOCATION (WRITE SAMPLE NUMBER OUT TO SIDE)
- G — GEOTECHNICAL SAMPLE LOCATION (WRITE SAMPLE NUMBER OUT TO SIDE)
- SHADING TO DENOTE STAINING
- BASE OF EXCAVATION
- SHOW LOCATIONS AND TYPES OF ALL MAJOR DEBRIS

Project Name: Rocketdyne / DOE							**FIELD TRENCH LOG**	
Trench Number: SRTS02	Project Number:	Elevation and Datum:					Location: Leachfield	Sheet 1 of 1
Equipment Supplier:	Operator:	Date and Time Started: 11-2-00 —			Date and Time Completed: 11-2-00 —		Refusal? (Circle One) Yes No	If Yes Depth =
Equipment Type:	Trench Orientation: N 20 E →	Total Depth: 4'			Total Number of Samples: 2		Photo? (Circle One) Yes No	No.
Bucket Width:	Trench Length: 50'	Trench Width: 5'	No. of Samples: 2	Bulk:	Grab:	Drive:	Hand Auger:	% Man-Made Debris
Geologist or Hydrogeologist/Date: DAH 11-2-00		Checked by/Date:						Wall of Trench Shown (Circle One) N S E W NE NW SE SW

LENGTH (FEET)

ENTER TRENCH DIRECTION
SCALE: 1" = 5'

DEPTH (FEET)

0'

4'

CONCRETE

30'

38'

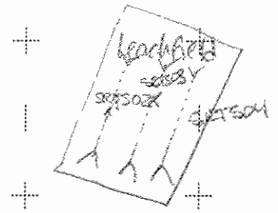
SAMPLE SRTS02SO11-0' RJ7186

SAMPLE SRTS02SO12-0 RJ7190

4" "TAR PIPE" - POSSIBLY CONTAINING ASBESTOS - WILL BE TESTED
- SOME SECTIONS MISSING
- POSSIBLY OVER 50 YEARS OLD
- UNDERLAIN W/ WOOD

(A) WELL-GRADED SAND W/ SILT & GRAVEL; 35% GRAVEL, 60% SAND, 5% FINES, BROWN (7.5 YR 5/3) DRY LOOSE, POORLY SORTED, CONTAINING GNEISS GRAVEL & CONCRETE (1 x 1) [7186]

Plan View-Site Location
(Provide Sketch)



EXPLANATION

- SOIL TYPE CONTACT (SHARP)
- OTHER CONTACT (AS INDICATED ON LOG)
- FILL/NATIVE BOUNDARY
- X — ANALYTICAL SAMPLE LOCATION (WRITE SAMPLE NUMBER OUT TO SIDE)
- G — GEOTECHNICAL SAMPLE LOCATION (WRITE SAMPLE NUMBER OUT TO SIDE)
- SHADING TO DENOTE STAINING
- BASE OF EXCAVATION
- SHOW LOCATIONS AND TYPES OF ALL MAJOR DEBRIS

FIELD TRENCH LOG

Project Name: Rocketdyne /DOE					
Trench Number: SRTS Ø3	Project Number:	Elevation and Datum:	Location: Leachfield		Sheet 1 of 1
Equipment Supplier:	Operator:	Date and Time Started: 4/8/ØØ	Date and Time Completed: 4/8/ØØ		Refusal? (Circle One) Yes No — If Yes Depth =
Equipment Type:	Trench Orientation: N25E →	Total Depth: 5'	Total Number of Samples: Ø		Photo? (Circle One) Yes (No) — No.
Bucket Width: / Trench Length: 5Ø'	Trench Width: 5'	No. of Samples: Ø / Bulk: / Grab:	Drive: / Hand Auger:		% Man-Made Debris:
Geologist or Hydrogeologist/Date: DAH 11-9-ØØ	Checked by/Date:				Wall of Trench Shown (Circle One) N S E W NE NW SE SW

LENGTH (FEET)

ENTER TRENCH DIRECTION
SCALE: 1"=5' L+W

0'

5'

DEPTH (FEET)

4" PIPE

Ⓐ SILTY SAND W/ GRAVEL (SM); BROWN, DRY, LOOSE, POORLY SORTED (FINE)

Plan View-Site Location
(Provide Sketch)

EXPLANATION

- SOIL TYPE CONTACT (SHARP)
- OTHER CONTACT (AS INDICATED ON LOG)
- FILL/NATIVE BOUNDARY
- X — ANALYTICAL SAMPLE LOCATION (WRITE SAMPLE NUMBER OUT TO SIDE)
- G — GEOTECHNICAL SAMPLE LOCATION (WRITE SAMPLE NUMBER OUT TO SIDE)
- SHADING TO DENOTE STAINING
- BASE OF EXCAVATION
- SHOW LOCATIONS AND TYPES OF ALL MAJOR DEBRIS

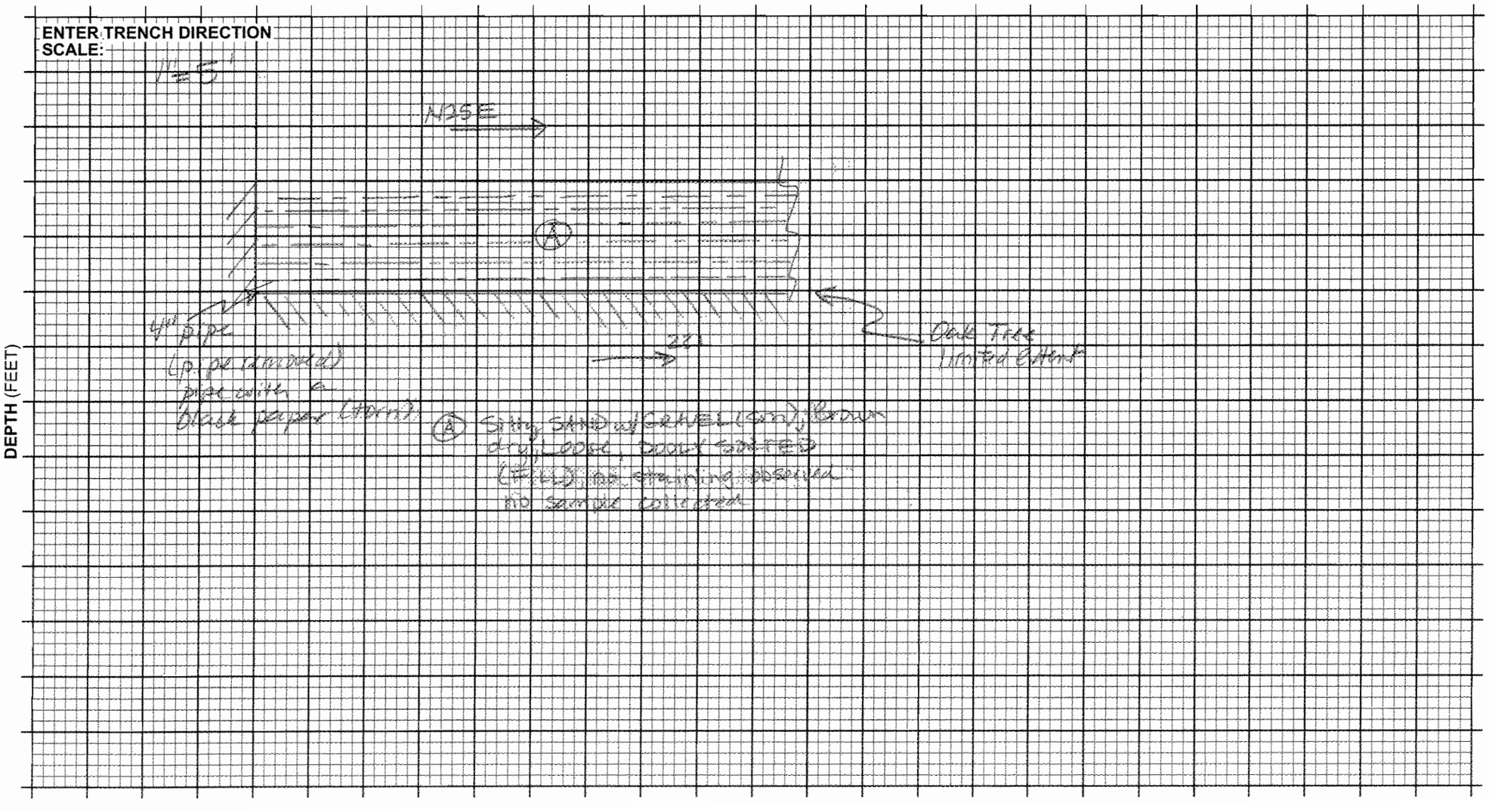
FIELD TRENCH LOG

Project Name: Rocketdyne/DOE					
Trench Number: SRTS04	Project Number:	Elevation and Datum:	Location: Leachfield		Sheet 1 of 1
Equipment Supplier:	Operator:	Date and Time Started: 11/13/00 —	Date and Time Completed: 11/13/00 —		Refusal? (Circle One) Yes No — If Yes Depth =
Equipment Type:	Trench Orientation: N25E	Total Depth: 5'	Total Number of Samples: 0		Photo? (Circle One) Yes No — No.
Bucket Width:	Trench Length: 23' / Trench Width: 5'	No. of Samples: 0 — Bulk: — Grab:	Drive: — Hand Auger:		% Man-Made Debris:
Geologist or Hydrogeologist/Date: DAH 11/13/00		Checked by/Date:			Wall of Trench Shown (Circle One) N S E W NE NW SE SW

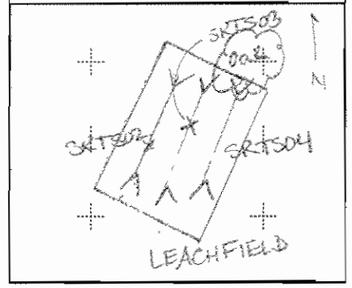
LENGTH (FEET)

DEPTH (FEET)

ENTER TRENCH DIRECTION
SCALE: 1"=5'



Plan View-Site Location
(Provide Sketch)

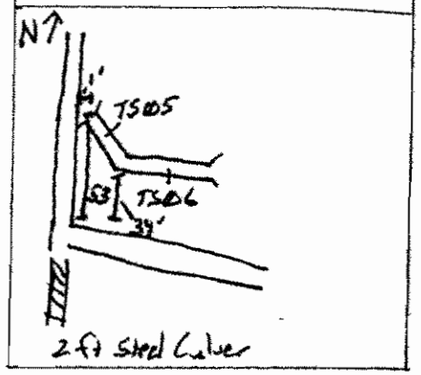


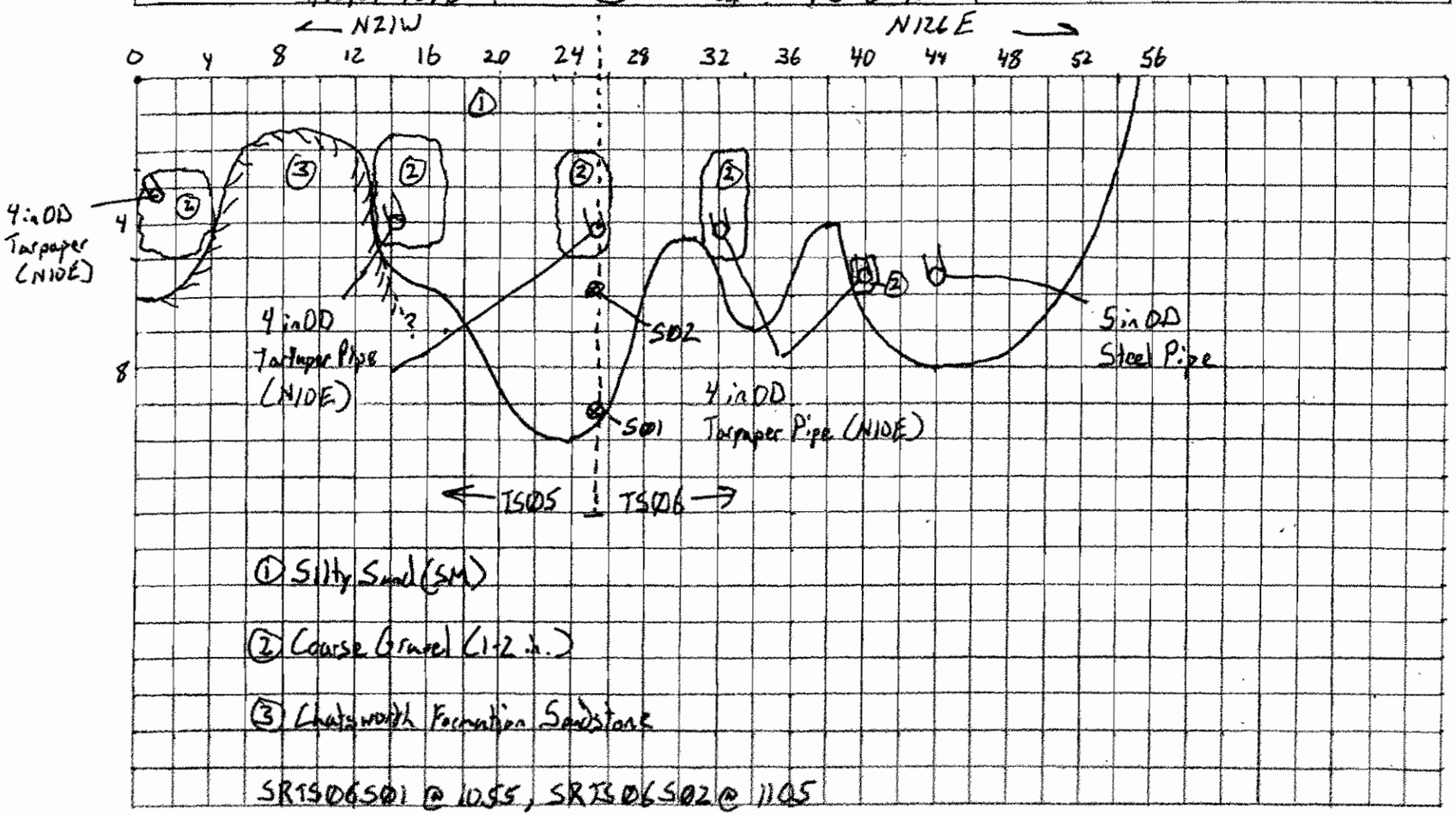
EXPLANATION

- SOIL TYPE CONTACT (SHARP)
- OTHER CONTACT (AS INDICATED ON LOG)
- FILL/NATIVE BOUNDARY
- X — ANALYTICAL SAMPLE LOCATION (WRITE SAMPLE NUMBER OUT TO SIDE)
- G — GEOTECHNICAL SAMPLE LOCATION (WRITE SAMPLE NUMBER OUT TO SIDE)
- SHADING TO DENOTE STAINING
- BASE OF EXCAVATION
- SHOW LOCATIONS AND TYPES OF ALL MAJOR DEBRIS

Trench Number: SRTS05-06	Trench Orientation: N21W	Photo (Yes) No No. 2
Location: SRE	Trench Length: 55 ft	% Manmade Debris
Operator: R. Serona	Trench Width: 4 ft (collapse)	Wall of Trench Shown N S E W (NE) NW SE SW
Geologist/Date: B. Stewart 4/18/01	Total Depth: 10 ft	
Date/Time Started: 4/18/01 0840	# of Samples: 2	
Date/Time Completed: 4/18/01 1010	Refusal? (Yes) No If yes Depth: 1.5-6 ft	

Plan View - Site Location (Provide Sketch)

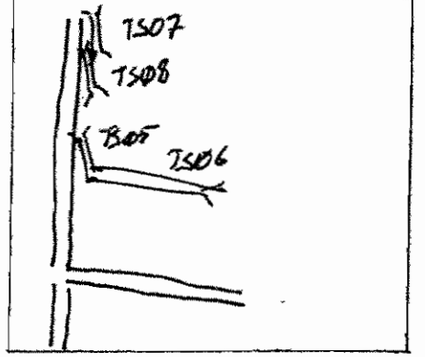


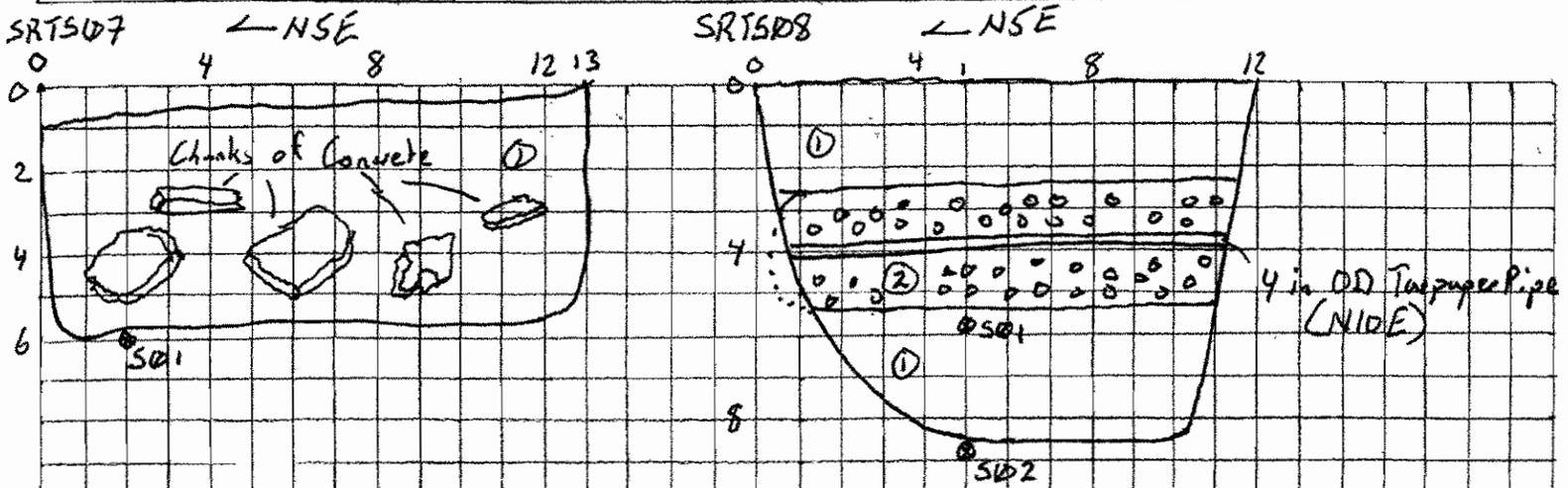


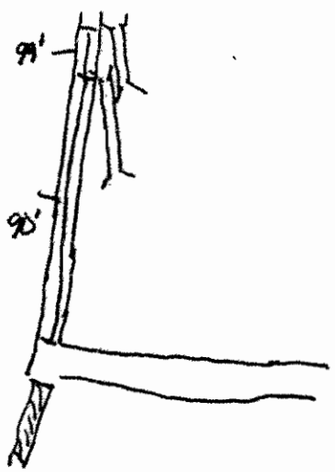
B. Stewart 4/01

Trench Number: SRTS07-08	Trench Orientation: N5E	Photo (Yes) No No. 2
Location: SRE	Trench Length	% Manmade Debris: 25%
Operator: R. Serena	Trench Width	Wall of Trench Shown: N S (E) W NE NW SE SW
Geologist/Date: B. Stewart	Total Depth	
Date/Time Started	# of Samples: 3	
Date/Time Completed	Refusal? Yes (No) If yes, Depth:	

Plan View - Site Location (Provide Sketch)







① Silty Sand (SM), tr/65/35, dry, brown

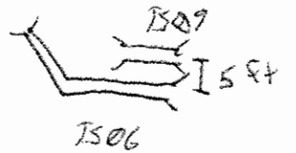
② Coarse Gravel (1-2 in)

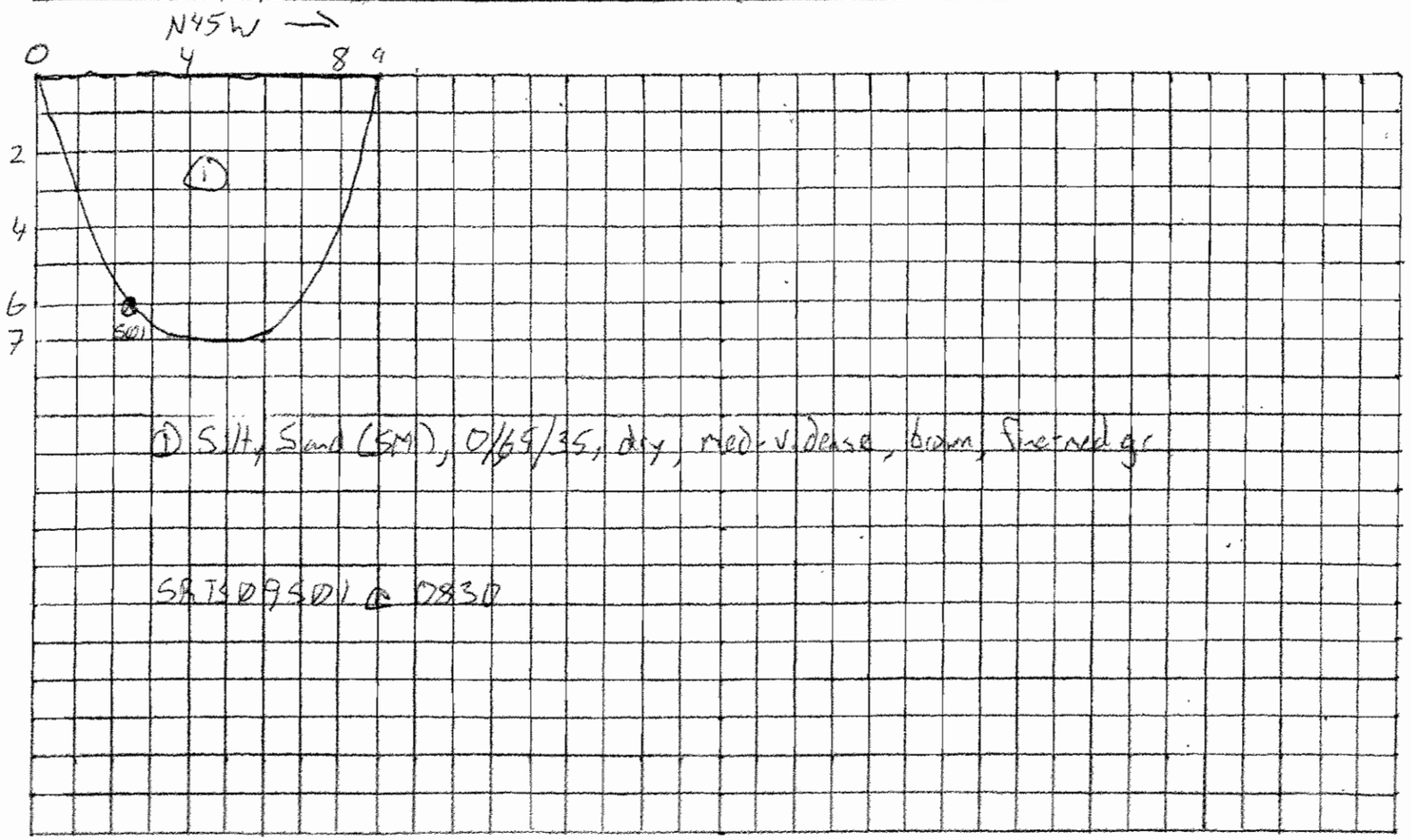
SRTS07SO1 @ 1335, SRTS08SO1 @ 1315, SRTS08SO2 @ 1325

B. Stewart 4/01

Trench Number SRTS09	Trench Orientation N45W	Photo (Yes) No No. 1
Location SRE	Trench Length 9 ft.	% Manmade Debris
Operator R. Serena	Trench Width 2 ft.	Wall of Trench Shown N S E W NE NW SE (SW)
Geologist / Date B. Stewart 4/25/01	Total Depth 7 ft.	
Date/Time Started 4/25/01 0805	# of Samples 1	
Date/Time Completed 4/25/01 0825	Refusal? Yes (No) If yes Depth:	

Plan View - Site Location (Provide Sketch)





① Silt, Sand (SM), 0/69/35, dry, med-vldense, brown, fine-med gr

SRTS09SS01 @ 0830

B. Stewart 4/01

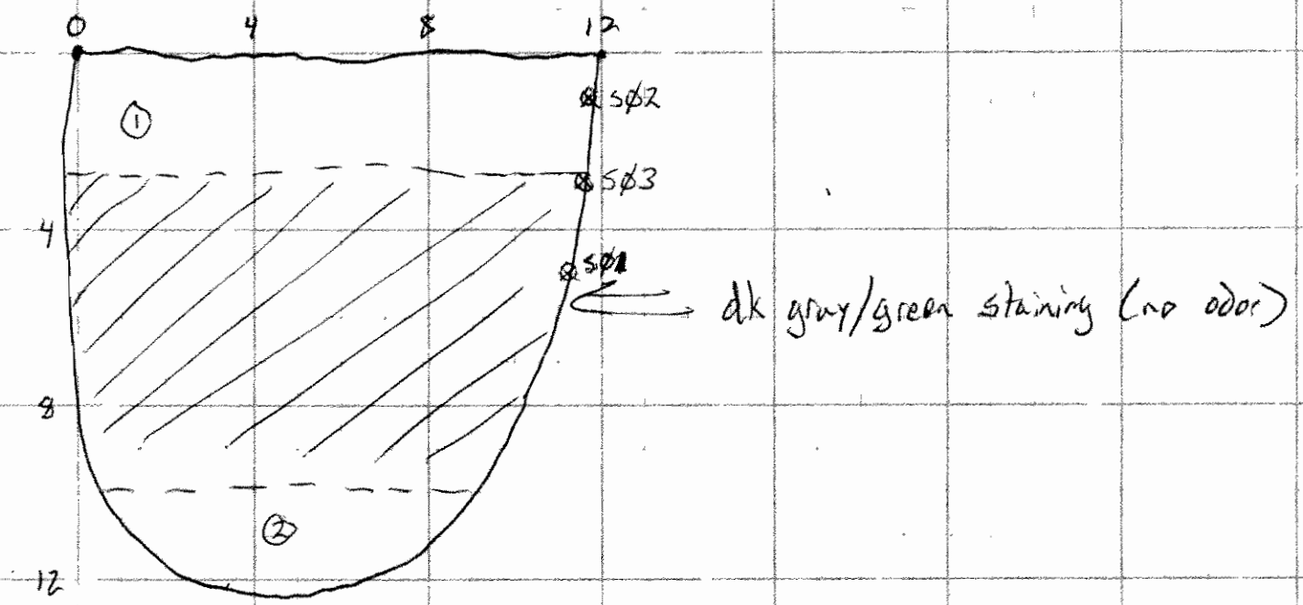
EN 3A-12/93

Trench No. SRTS10	Date/Time Started 8/2/01 0835	Trench Width 1.5 ft	Photo Yes (No) #
Location SRE	Date/Time Completed 8/2/01 0850	Total Depth 12 ft	% Manmade Debris
Operator R. Selena	Trench Orientation	# of Samples 3	Wall of Trench Shown N S E W
Geologist/Date B. Stewart/8/2/01	Trench Length 12 ft	Refusal Yes (No) Depth:	NE (NW) SE SW

MONTGOMERY WATSON

BY _____ DATE _____ CLIENT _____ SHEET _____ OF _____

CHKD. BY _____ DESCRIPTION _____ JOB NO. _____



① Silty Sand w/ Gravel (non-native backfill)

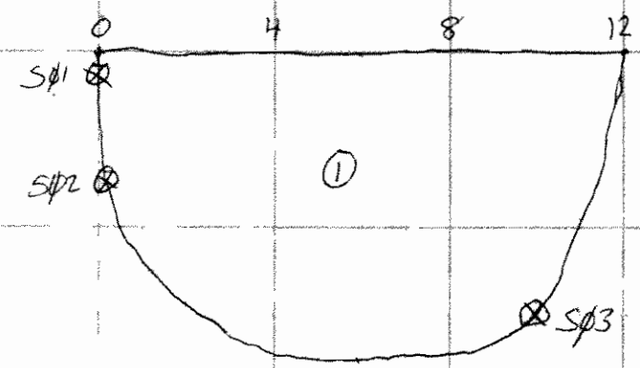
② Silty Sand

SRTS10SØ1 @ 0820, SØ2 @ 0840, SØ3 @ 0845

Note: Boundary b/t backfill and silty sand unclear due to staining.

EN 3A-1283

Trench No. SRTS11	Date/Time Started 8/2/01 0910	Trench Width	1.5 ft	Photo Yes (No) #	
Location SRE	Date/Time Completed 8/2/01 0930	Total Depth	7 ft	% Manmade Debris	
Operator R. Serena	Trench Orientation	# of Samples	3	Wall of Trench Shown	N S E W
Geologist/Date B. Stewart 8/2/01	Trench Length 12 ft	Refusal Yes (No) Depth:			NE NW (SE) SW



① Silty Sand w/ Gravel (non-native backfill)

SRTS11 SØ1 @ 0915, SØ2 @ 0920, SØ3 @ 0925

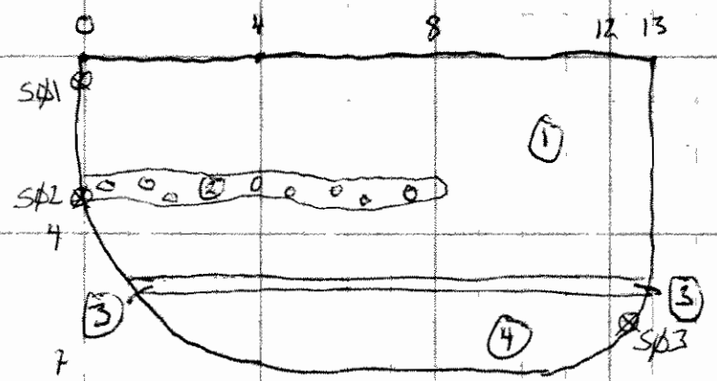
MONTGOMERY WATSON

BY _____ DATE _____ CLIENT _____ SHEET _____ OF _____

CHKD. BY _____ DESCRIPTION _____ JOB NO. _____

EN 3A-1293

Trench No. SRTS12	Date/Time Started 8/2/01 0948	Trench Width 1.5 ft	Photo Yes (No) #		
Location SRE	Date/Time Completed 8/2/01 1005	Total Depth 7 ft	% Manmade Debris		
Operator R. Serena	Trench Orientation	# of Samples 3	Wall of Trench Shown	N	S E W
Geologist/Date B. Stewart 8/2/01	Trench Length 13 ft	Refusal Yes (No) Depth:		(NE)	NW SE SW



① Silty Sand w/ Gravel (non-native backfill),

② Coarse Gravel (1-2 in.), non-native backfill

③ Sandstone Slab (Chatsworth Form.), fractured, weathered

④ Silty Sand

SRTS12S01 @ 0950, S02 @ 0955, S03 @ 1000

MONTGOMERY WATSON

BY _____ DATE _____ CLIENT _____ SHEET _____ OF _____

CHKD. BY _____ DESCRIPTION _____ JOB NO. _____

APPENDIX A3-3

LABORATORY ANALYTICAL DATA, DATA VALIDATION REPORTS, DATA QUALITY REPORT