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

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***VOLUME III – RFI SITE REPORTS***

***APPENDIX A4***

***BUILDING 064 DOE LEACH FIELD (AREA IV AOC)***

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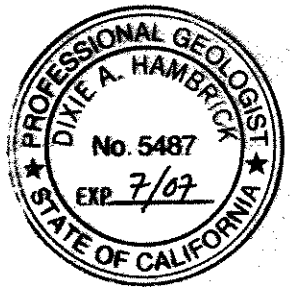


**September 2006**

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## ATTACHMENTS

# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AI | Atomics International |
| AOC | Area of Concern |
| AST | aboveground storage tank |
| bgs | below ground surface |
| BMP | best management practice |
| Boeing | The Boeing Company |
| B040 | Building 040 |
| CAS | Columbia Analytical Services |
| CF | Chatsworth formation |
| CFOU | Chatsworth Formation Operable Unit |
| CMS | Corrective Measures Study |
| COPC | contaminant of potential concern |
| CPEC | contaminant of potential environmental concern |
| DHS-RHB | Department of Health Services - Radiological Health Branch |
| 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 |
| ETEC | Energy Technology Engineering Center |
| GRC | Groundwater Resources Consultants, Inc. |
| GWCC | groundwater comparison concentration |
| HI | hazard index |
| HML | Hazardous Materials Laboratory |
| HQ | hazard quotient |
| HRA | human health risk assessment |
| HSA | historical site assessment |
| H&A | Haley & Aldrich |
| ICF | ICF Kaiser Engineers |
| 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 |
| NSGW | near-surface groundwater |
| OCY | Old Conservation Yard |
| Ogden | Ogden Environmental and Energy Services Company, Inc. |

## LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

| | |
|---|---|
| OU | operable unit |
| PAH | polynuclear aromatic hydrocarbon |
| PCB | polychlorinated biphenyl |
| pCi/g | picocuries per gram |
| QA | quality assurance |
| RCRA | Resource Conservation and Recovery Act |
| RFA | RCRA Facility Assessment |
| RFI | RCRA Facility Investigation |
| RME | reasonable maximum exposure |
| SAIC | Science Applications International Corporation |
| Sapere | Sapere Consulting, Inc. |
| SAP | Sampling Analysis Plan |
| SNAP | Systems for Nuclear Auxiliary Power |
| SPA | Storable Propellant Area |
| SRAM | Standardized Risk Assessment Methodology Work Plan |
| SRE | Sodium Reactor Experiment |
| SSFL | Santa Susana Field Laboratory |
| SQL | sample quantitation limit |
| SVOC | semivolatile organic compound |
| SWMU | Solid Waste Management Unit |
| TCE | trichloroethene |
| TCLP | Toxic Characteristic Leaching Procedure |
| TPH | total petroleum hydrocarbons |
| UCL | upper confidence limit |
| USEPA | United States Environmental Protection Agency |
| UST | underground storage tank |
| µg/kg | micrograms per kilogram |
| µg/L | micrograms per liter |
| VCEHD | Ventura County Environmental Health Department |
| 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 |

| **PCDD/PCDDs** | **Polychlorinated dibenzo-p-dioxins/dibenzofurans** |
|---|---|
| 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) |

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# SECTION A4.1
# INTRODUCTION

This appendix to the Group 6 Bundled Area Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report presents results and recommendations for the investigation conducted at the Building 064 Leach Field (B064 LF) RFI Site (Area IV Area of Concern [AOC]) at the Santa Susana Field Laboratory (SSFL). 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 B064 LF RFI Site is one of four RFI Sites included in this Group 6 RFI Report area. A RFI Site is an area that includes a Solid Waste Management Unit(s) (SMWU(s)) and/or AOC(s), and adjacent land for the purpose of characterization. The location of the B064 LF RFI Site within the SSFL and Group 6 is shown on Figure A4.1-1. The other three Group 6 RFI sites are the New Conservation Yard (NCY – SMWU 7.8), Old Conservation Yard (OCY – SWMU 7.4), and Sodium Reactor Experiment (SRE – Area IV AOCs). The B064 LF site is located in the central southern portion of SSFL Area IV, and was leased by the United States Department of Energy (DOE) from Rocketdyne International, a predecessor company of The Boeing Company (Boeing) who operated the site on behalf of 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. For purposes of characterization, the SSFL has been divided into two Operable Units (OUs): the SSFL Surficial Media Operable Unit (Surficial OU) and Chatsworth Formation Operable Unit (CFOU).

The B064 LF RFI Site characterization presented in this appendix includes investigation data from each of the OUs, and results are 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 characterization findings 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 A4.4 of this appendix. Appendix C presents the details of the risk evaluation of chemicals present in both the Surficial OU and CFOU. Potential exposures and risks from both OUs are integrated in the HRA and ERA results.

This B064 LF RFI Site Appendix provides detailed data and evaluation pertaining to the B064 LF RFI Site, which includes 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 A4.2**: Site history, chemical use, and existing conditions.
- **Section A4.3**: Nature and extent of chemical impacts.
- **Section A4.4**: HRA and ERA findings summary.
- **Section A4.5**: Corrective Measures Study recommendations.
- **Section A4.6**: References cited.

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

- **Attachment A4-1**: Site-specific regulatory agency documents and correspondence.
- **Attachment A4-2**: Subsurface investigation (utility clearance and soil boring and trench logs).
- **Attachment A4-3**: Laboratory analytical data, data validation, and data quality reports.

Information regarding characterization for the B064 LF RFI Site is contained in the following figures, tables, and Group 6 RFI Report appendices:

- **Figure A4.1-1**: Presents the location of the B064 LF RFI Site within the SSFL and the Group 6 reporting area.
- **Figure A4.2-1**: Presents a view of the B064 LF RFI Site showing chemical use areas, soil sampling locations, and nearby monitoring wells.

- **Table A4.3-2A** and **Figure A4.3-1**: Present characterization details for all soil sampling at the B064 LF RFI Site. Soil sampling results are shown on Figure A4.3-1.
- **Table A4.3-2B**: Presents a summary of groundwater characterization.

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

- **Appendix B:** Presents information regarding groundwater conditions in the Group 6 reporting area, including the B064 LF RFI Site. Information includes groundwater occurrence and quality, chemical transport, data set representativeness, and supporting data (monitoring results, time-series plots, 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 fate and transport modeling (except groundwater).
- **Appendix D:** Presents the *Soil Background Addendum Report*. 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 B064 LF RFI Site Appendix 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 protocols 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.
- NSGW 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 2003) – 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 A4.2
# SITE HISTORY, CHEMICAL USE, AND EXISTING CONDITIONS

The B064 LF RFI Site is approximately 1 acre and is located in the northeastern portion of Area IV at the SSFL, approximately 20 feet east of former Building 064. The site location within the SSFL is shown on Figure A4.1-1. This figure also shows the Group 6 Reporting Area boundary. Figure A4.2-1 provides the site layout and the relationship between chemical use areas and sample locations.

The B064 LF RFI Site is comprised of one AOC identified during the RCRA Facility Assessment (RFA), the B064 LF Area IV AOC (SAIC, 1994).

## A4.2.1 Site History and Chemical Use

Building 064 was the former Nuclear Materials Storage Facility, used for the storage of packaged source material (natural and depleted uranium, and thorium) and nuclear material (enriched uranium and U-233) (ICF, 1993). Building 064 was built in 1958, enlarged in 1968, and was used to store packaged nuclear materials. There were no process areas or sinks in the building, except in the sanitary facilities (Boeing 1999c; Sapere, 2005). Building 064 was surrounded by a concrete yard with a security fence. A 4,500-square foot concrete area along the inner eastern fenceline of Building 064 is referred to as the Building 064 Side Yard. Chemical use at the B064 LF site has not been reported.

Leach fields at the SSFL were used for sanitary waste only, and their use was discontinued in 1961 following installation of the current sanitary sewer system (ICF, 1993). Since operation of Building 064 began in 1958, the B064 LF was used for a period of about 3 years.

A summary of the site chronology, description of operations, and investigation activities for the B064 LF RFI Site is presented below. Facility correspondence, demolition decommissioning reports, investigation reports, waste disposal records, maps, drawings, photographs, and personnel interviews as cited in the references to this document were reviewed and evaluated to compile the site history information below. 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 Final Report Decontamination and Decommissioning of Final Storage Facility 4064 (Boeing, 1999c), the Area 4064, Final Status Survey Report (Boeing, 1999a), review of facility maps, and interviews with site personnel (Trippeda, 2006a).

| | |
|---|---|
| 1958 | B064 LF was built in the northeastern portion of Area IV, approximately 20 feet east of Building 064 (Boeing, 1999c). The B064 LF was reported to comprise 120 total linear feet of leach lines (SAIC, 1994), and is believed to have been arranged in parallel lines branching out from the septic tank. The number of leach lines is not reported. The B064 LF received flow from a 750-gallon septic tank that was located outside the eastern portion of Building 064. SSFL leach fields typically consisted of 4-inch diameter terra cotta clay piping surrounded by large gravel and buried at depths ranging from 2 to 6 feet below ground surface (bgs) depending on the depth of bedrock. |
| 1961 | Use of all septic systems and sanitary leach fields at the SSFL, including the B064 LF, was discontinued in 1961 following the installation of the current sanitary sewer system (ICF, 1993; Boeing, 1999c). |
| 1963 | An area of soil and concrete was discovered to have elevated levels of radioactivity, cesium 137, and cesium 134. Although the source was not discovered, it was assumed that contamination was a result of a leak from a drum containing irradiated reactor fuel pins, and soils from a 700 square feet area excavated (Sapere, 2005; Rockwell, 1990). |
| 1964 | A can of uranium carbide was found to have oxidized inside its shipping container, causing the lid of the can to blow open and the bottom of the can to warp. This resulted in increased alpha radiation levels on the concrete dock (Rockwell, 1990; Sapere, 2005). |
| 1967 | Increased alpha radioactivity was detected on vegetation in the yard adjacent to Building 064. Investigation revealed that a 55-gallon drum containing $U_3O_8$ had been opened outside on a piece of plastic sheeting. $U_3O_8$ was visible on the sheeting and it was believed that some had been dispersed by wind in the area, impacting the vegetation (Sapere, 2005). |
| 1968 | Building 064 was enlarged from 2,127 square feet to 4,418 square feet to increase storage capacity (Boeing, 1999c). |
| Mid-1970s - Early 1980s | Most of the major DOE nuclear development and reactor contracts had ended. Building 064 was used to store miscellaneous equipment and containers of radioactive waste (principally soil), because most of the nuclear development activities had ceased in Area IV (Rockwell, 1990). |

| | |
|---|---|
| 1993 | All nuclear materials were removed from Building 064 and the building was decontaminated (ICF, 1993). Soil containing elevated cesium 137 was excavated in the B064 side yard (volume not reported) (Boeing, 1999c). Waste characterization results of soil removed during this action contained low concentrations of methylene chloride (up to 40 µg/kg), acetone (at 130 µg/kg), and a few metals above background (antimony, cadmium, molybdenum, thallium, and zinc) (Boeing, 1993). |
| 1996 – 1999 | Building 064 was released for demolition by the DOE and the California Department of Health Services Radiologic Health Branch (Sapere, 2005). Building 064 was demolished and the leach field and septic tank removed in 1997 (Boeing, 1999c). Approximately 585 cubic yards of soil surrounding the septic tank and leach field were disposed of offsite in accordance with applicable regulations (Boeing, 1999c). Waste characterization of soils from the B064 demolition, including the leach field and septic tank area did not contain metals above background (Boeing, 1996). The excavation was not backfilled; rather, surrounding soils were used to fill the excavation and to regrade the area (Trippeda, 2006a). Site demolition activities were completed in 1999. |
| 2005 | The DOE released Building 064 and surrounding area for unrestricted use (Attachment A4-1). |

Additional site information is provided in the following tables:

- Building inventory – Table A4.2-1
- Fuel and solvent tank inventory – Table A4.2-2
- Transformer inventory – Table A4.2-3
- Documented chemical use – Table A4.2-4

Chemical use areas at the B064 LF RFI Site are shown on Figure A4.2-1 and described in Table A4.2-4.

### A4.2.2 Site Conditions

General Conditions and Topography

Building 064 and the associated leach field were contained in a 2-acre area located in Area IV of the SSFL. Surface topography is gently sloping 10 to 20 degrees North-Northeast, with occasional relief associated with rock outcrops.

Geology

Geologically, the site is situated on the Upper Burro Flats Member of the Upper 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. Figure 2-5 of this Group 6 RFI Report shows the geologic units represented within the RFI 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. A similar but thinner shale unit has been mapped west of the former AST earthen berms (the 'Lot Bed').

Soils

At the B064 LF RFI Site, soils consist of borrow area backfill and weathered bedrock. Soils primarily consist of silty sand with gravel comprised of weathered Chatsworth formation materials. Based on soil boring logs (Attachment A4-2), soils are generally thin at the site, ranging from 0 feet (exposed bedrock) to about 1-foot deep. Deeper soils below 1 foot consist of weathered Chatsworth formation bedrock siltstone and weathered sandstone.

Groundwater

Based on saturation status of nearby wells, and field observations, NSGW is not likely to occur within the thin alluvium cover and the weathered bedrock at the B064 LF RFI Site. The nearest NSGW piezometer to the site is PZ-113, which was typically dry during the shallow groundwater-monitoring program in 2001/2003 (MWH, 2003b).

CFOU groundwater flow in the eastern portion of Area IV, near the former B064 LF, is generally to the south. Well RD-92 is the nearest and most representative groundwater monitoring well for the B064 LF site. Depth to CFOU groundwater at Well RD-92 ranges from 55 to 65 feet bgs.

Seeps/Springs

There are no seeps or springs at the B064 LF RFI Site.

Surface Water

Surface water flow at the B064 LF RFI Site is shown on Figure 2-7B of the Group 6 RFI Report. Surface water flow in well-defined, natural drainages does not occur in the vicinity of the B064 LF RFI Site. Surface water flow at the Building 064 LF RFI Site occurs mostly via sheet flow into a concrete-lined channel that runs east to G Street (Figure 2-7B). The channel transitions to an unlined swale trending north along G Street, where a storm drain conveys flow east and under the road to the NCY RFI Site (Appendix A1). Flow discharges from a stormwater culvert pipe to soil in the northwest portion of the NCY RFI Site, trends east-northeast, and joins the asphalt-lined drainage from the OCY RFI Site (Appendix A2). This drainage runs south through the NCY RFI Site (Figure 2-7B).

Biology

Biological conditions at the B064 LF RFI Site (prior to the 2005 Topanga Fire) are shown on Figure 2-12 in this Group 6 RFI Report. Biological conditions within and near the B064 LF RFI Site are comprised of disturbed ruderal habitat, nonnative grassland, or developed land. No sensitive species have been observed at any of the DOE Leach Field RFI Sites (MWH, 2005b).

During the September/October 2005 Topanga Fire, much of the vegetation at the B064 LF RFI Site was burned, and significant ash deposited across the site. At the time of this report, the vegetation at the B064 LF 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 what was present at the time of the fire, due to the aggressiveness of some non-native species (i.e., grasslands).

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# SECTION A4.3
# 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 B064 LF RFI Site. The presentation includes sampling objectives, scope, key decision points involved in 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.

## A4.3.1 Sampling Objectives

The purpose of collecting soil and sediment samples was to characterize the extent of potential chemical impacts at the 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), and augmented with guidance from 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. 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). Based on detected site chemicals, chemical distribution, and site conditions, additional groundwater sampling and analyses were conducted as part of the RFI to complete characterization of individual sites for reporting and to provide data sufficient for risk assessment. This additional RFI sampling was performed following the protocols used for routine groundwater monitoring.

### A4.3.2 Scope

Sampling locations and analytical suites were based on DTSC-approved work plans (ICF, 1993), sampling results from previous investigations, additional facility information from site inspections, personnel interviews (Trippeda, 2006a), waste disposal characterization data (Boeing, 1993 and 1996), historical and/or aerial photographs, and DTSC site inspections and requests. Sampling schedules are presented in Tables A4.3-1A through A4.3-1C.

Both the CFOU groundwater and NSGW have been sampled and analyzed according to agency-approved work plans (GRC, 1995a and b; Ogden, 2000a; H&A, 2006a). NSGW is not present, or present very infrequently, at the B064 LF RFI Site. One monitoring well and three piezometers (PZ-112, PZ-113, and PZ-115) are located near the B064 LF (Figure A4.2-1). PZ-113 and PZ-115 are part of this Group 6 RFI Report; however, both of these piezometers are typically dry and have very limited, or no, associated monitoring data. PZ-112 is part of the Group 7 RFI Report, and did have measureable groundwater during 2001 through 2003. Therefore, Chatsworth formation Well RD-92 was used to characterize groundwater for the B064 LF RFI Site.

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 B064 LF 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, these 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 B064 LF 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, including review of original electronic instrument raw data. The results of the HML review to date has found that the data collected for the RFI meet 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 usable 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 the existing site conditions described in Section A4.2. Sampled environmental media at the site include:

- Soil vapor
- Groundwater

### A4.3.3 Key Decision Points

DTSC has been an integral part of the decision-making process during the SSFL RFI program. The B064 LF potential chemical use area was added to the program at the request of DTSC during a comprehensive SSFL RFI site review in 2000. The B064 LF was evaluated for sampling by DTSC based on review of historical operations, sampling results, and physical inspection. On the basis of this evaluation, DTSC required further investigation of site media in the leach field area. DTSC also provided ongoing review during the SSFL RFI field sampling, selected trench locations, and reviewed field sampling protocols.

Site-specific characterization decision points are listed below. These decision points represent either assumptions upon which sampling was based, decisions made during 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) Because the area had been excavated, and the waste characterization leachate results were considered acceptable (Boeing, 1996), DTSC requested that the subsurface be inspected for staining and that samples for analysis be collected if indications of impacts (staining, odiferous soils, etc.) were observed. The soil-bedrock interface was impacted and no indications of a release were identified (Attachment A4-2).

2) The B064 LF and septic tank were removed in 1997. Waste characterization sample results from this activity did not contain any metals above background (Boeing, 1996). However, previous waste characterization data from the excavated B064 LF RFI Site soils in 1993 contained a few metals above background (antimony, cadmium, molybdenum, thallium, and zinc) (Boeing, 1993). Detected concentrations above background in the 1993 soils ranged up to: antimony at 26.6 mg/kg, cadmium at 13.6 mg/kg, molybdenum at 8.4 mg/kg, thallium at 8.3 mg/kg, and zinc at 316 mg/kg. To address the uncertainty between the two sets of waste characterization data, additional samples were collected for metals.

### A4.3.4 Soil Vapor and Soil Matrix Findings

All soil sampling results and characterization findings are presented in Table A4.3-2A. The purpose of the table is to:

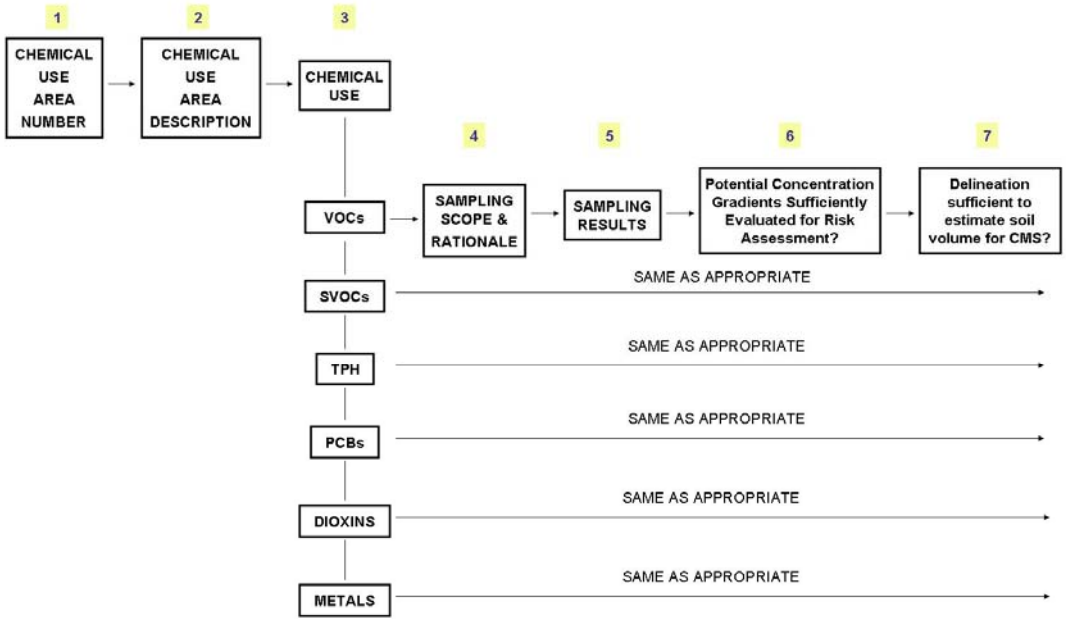
1. Present sampling results, including nature and extent.
2. Demonstrate that soil characterization is sufficient for the purposes of risk assessment.
3. Indicate soil volumes requiring further evaluation during the CMS are defined sufficiently to allow comparison of alternatives.

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 in the context of Table A4.3-2A organization.

A data quality summary for the B064 LF RFI Site is provided in Table A4.3-3.

### A4.3.4.1 Soil Data Presentation

Relevant site information, sampling rationale, results, and evaluation are presented in Table A4.3-2A. A flow chart illustrating the table structure is presented below.




**Flow diagram illustrating Table A4.3-2A process**

Reference numbers at the top of the illustration correspond to the Table A4.3-2A 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 (see Figures A4.2-1 and A4.3-1).

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 (Figure A4.3-1). Sample results are compared to established SSFL background concentrations (metals and dioxins only) and/or SSFL SRAM-based screening levels[i]. These screening levels are also displayed on the figures.

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 was generally not collected within a chemical use area unless further definition of the 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).

[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.

#### A4.3.4.2 Soil Data Summary

As detailed in Table A4.3-2A, one potential chemical use area was investigated at the B064 LF RFI Site. One soil vapor sample (collected in 1993) indicates VOCs were not detected.

Trench inspection occurred in 2000, soon after the building and leach field excavation was completed, and indicated no staining, odors, or visual impacts.

To address the uncertainty between the two sets of waste characterization data (described in detail in Section A4.3.3), two soil samples were collected in the area of the leach field soil excavation area, and one sample was collected downslope (Figure A4.3-4, Table A4.3-2A). In these samples, three metals (lead, thallium, and zinc) were detected above background, but only thallium was determined to be different than background (see Section A4.4). Thallium was detected in only one of the two samples (0.48 mg/kg) collected in the soils above the former leach field and was not detected above background downslope.

### A4.3.5 GROUNDWATER FINDINGS

Groundwater occurrence and sampling results at the B064 LF RFI Site are presented below.

#### A4.3.5.1 Groundwater Data Presentation

Groundwater sampling results and characterization findings are summarized in Table A4.3-2B. The purpose of the table is to:

1. Present groundwater sampling results.
2. Demonstrate that groundwater characterization is sufficient for the purposes of risk assessment, including:
   a) That groundwater characterization is appropriate for detected site chemical constituents.
   b) That site soil characterization is appropriate for detected groundwater chemical constituents.

Similar to Table A4.3-2A, Table A4.3-2B describes groundwater data by chemical group (metals, VOCs, SVOCs, etc.). Table A4.3-2B is organized as follows:

- Column 1 – Analytical Group
- Column 2 – Site Soil Impacts
- Column 3 – Samples Collected and Analytes Monitored
- Column 4 – 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 address comprehensively across the site the same characterization and transport and fate issues addressed in Appendix B.

#### A4.3.5.2 Groundwater Data Summary

NSGW is not present, or present very infrequently, at the B064 LF RFI Site, since near-by piezometers are typically dry. One sample from PZ-112 in 2002 did not contain detectable VOCs. Routine monitoring data is collected from the Chatsworth formation Well RD-92. VOCs are generally not detected in Well RD-92, and most dissolved metals concentrations are typically below Groundwater Comparison Concentrations (GWCC) comparison values.

Metals

Manganese was the only metal detected above GWCCs in samples collected from Well RD-92. This sample was collected March 15, 2006, and had a dissolved manganese concentration of 190 micrograms per liter (µg/L), compared to a GWCC of 150 µg/L. This sample's manganese concentration is only slightly above the GWCC, and is believed to be representative of natural conditions at the SSFL. Based on the lack of soil staining, there is no obvious indication that the occurrence of manganese in Well RD-92 groundwater samples is related to B064 LF RFI Site operations.

VOCs

The only VOCs detected in Well RD-92 groundwater samples were toluene (up to 1.8 µg/L) and acetone (up to 5 µg/L). Based on site history and lack of detected VOCs in site soils, these compounds are not considered related to the B064 LF RFI Site.

### A4.3.6 Surface Water Findings

There is no surface water consistently present at the B064 LF RFI Site. Therefore, no surface water samples were collected during the RFI.

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# SECTION A4.4
# RISK ASSESSMENT FINDINGS SUMMARY

The following sections summarize the findings of the HRA and ERA performed for the B064 LF RFI Site within the Group 6 RFI Reporting Area. The details regarding how the HRA and ERA were conducted are presented in the SRAM (MWH, 2005b) and in Appendix C of this Group 6 RFI Report.

## A4.4.1 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. Additional 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 B064 LF 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 for human risk were conservatively based on maximum levels detected at B064 LF RFI Site (for indirect pathway), or detected within the Group 6 area (direct pathway). For ecological receptors, the characterization data suggest there are no VOCs in surficial soil.

   - 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) Thallium was not selected as a COPC in soil. The thallium data set was evaluated using the Wilcoxon Rank Sum Test and was determined to be different from background. The one thallium concentration slightly above background is

actually consistent with background considering the range of analytical uncertainty and the detection of thallium in the method bank. If thallium had been included in the full risk assessment, the resultant risks would have been well within acceptable levels and would not require further action.

### A4.2.2 Human Health Risk Assessment Findings

The receptors included in the HRA 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 at the B064 LF RFI Site is presented in the following tables and figure:

- Chemicals of Potential Concern (COPC) for Human Health – Table A4.4-1
- Human Health Risk Estimates – Table A4.4-2
- Human Health Risk Assessment Uncertainty Analysis – Table A4.4-3
- Generalized Conceptual Site Model for HRA Exposures – Figure A4.4-1

A summary of the HRA findings for the B064 LF RFI Site 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 are generally considered to be acceptable for making remedial decisions (DTSC, 1992). These criteria are used to make evaluation recommendations for the CMS.

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

There were no COPCs identified in soil for quantitative analysis at the former leach field location; therefore, there are no current or future human health risks (any receptor) (see A4.4.1, number 3). Thus, the Reasonable Maximum Exposure (RME) risks presented in this section were based on indirect exposure to VOCs in groundwater due to vapor migration, and included:

- No chemicals (acetone and toluene) present in CFOU groundwater underlying B064 LF RFI Site were carcinogenic; therefore, no cancer risks were estimated for indirect exposures for all receptors at the B064 LF RFI Site. Estimated non-cancer HIs were less than 0.001 (child resident). The only chemicals contributing to these potential risks were acetone and toluene in groundwater.

Exposure through Direct Groundwater Use as Drinking Water

There were no COPCs identified in soil for quantitative analysis at the former leach field location; therefore, there are no current or future human health risks (any receptor) (see Section A4.4.2, number 3).

Thus, the RME risks presented in this section were based on direct use of CFOU groundwater as a drinking water source, and included:

- Estimated cancer risks for all receptors ranged up to $3 \times 10^{-6}$; non-cancer HIs ranged up to 8.2 (child resident). The chemical contributing most substantially 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 indirect and direct exposures to chemicals in groundwater, and included:

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

The major issues related to uncertainty and conservatism in these risk estimates are presented in Table A4.4-3.

### A4.4.3 Ecological Risk Assessment Findings

The ecological receptors representing the site are the deer mouse, the thrush, the hawk, the bobcat, and the mule deer. There were no COPCs identified in soil for quantitative analysis at the former leach field location; therefore, there are no current or future ecological risks (any receptor) (see Section A4.4.1, number 3).

Because the only source of potential impacts at the B064 LF RFI Site is CFOU groundwater present at more than 50 feet bgs, and because no soil and soil vapor impacts are present at the site, there are no significant complete exposure pathways for ecological receptors. Therefore, ecological risks are not estimated for B064 LF RFI Site.

# SECTION A4.5
# CORRECTIVE MEASURES STUDY RECOMMENDATIONS

This section presents a summary of RFI reporting requirements as they apply to the B064 LF RFI Site. Section A4.5.1 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 A4.5.2, and site action recommendations for the B064 LF RFI Site are summarized in Section A4.5.3.

## A4.5.1 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 B064 LF 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 A4.3-2A and A4.3-2B). Section A4.3 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 B064 LF RFI site (Section A4.5 and Appendix C).

4. Identifying B064 LF RFI Site areas requiring further work (this section).

## A4.5.2 BASIS FOR SITE ACTION RECOMMENDATIONS

In summary, site action recommendations included in the B064 LF 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., $1 \times 10^{-6}$, or 1 in 1,000,000) is used to ensure that a conservatively estimated areal extent is recommended for site action.

- The second step, when estimated RFI site risks are greater than 1 x $10^{-6}$ (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 B064 LF 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 A4.5-1. CMS Areas are also depicted graphically in Figure A4.5-1 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.

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 of 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).

### A4.5.3 RECOMMENDATIONS FOR THE B064 LF RFI SITE

B064 LF RFI Site action recommendations are listed in Table A4.5-1, including CMS or NFA recommendations and identification of chemical risk drivers and contributors for each exposure scenario. As appropriate, source area stabilization recommendations are also identified for some CMS Areas. Based on the evaluations described above, the entire B064 LF RFI Site is recommended for NFA.

## SECTION A4.6

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# TABLES

**Table A4.2-1**

**Building Inventory at the B064 LF RFI Site**

| Building | Current Use | Former Use | Status | DTSC Site Visit Date |
|---|---|---|---|---|
| Building 064 | None | Storage of Nuclear Materials | Removed 1997 | Removed prior to site visit |
| Building 064 LeachField | None | Septic Tank and Leach Field for B064 sanitary system | Removed 1997 | Removed prior to site visit |
| Area 864 | None | Mechanical Equipment Slab for Building 064 | Removed 1997 | Removed prior to site visit |

Sources: SAIC 1994, ICF 1993, Ogden 1996, Boeing 1999a, Sapere 2005

**Table A4.2-2**

**Fuel and Solvent Storage Tank Inventory at the B064 LF RFI Site**

| Tank Designator[(a)] | Location | Tank Size (gallons) | Contents | Operational Status | Regulatory Status |
|---|---|---|---|---|---|
| **Aboveground Tanks** | | | | | |
| None | | | | | |
| **Underground Tanks** | | | | | |
| None | | | | | |

(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.

**Table A4.2-3**

**Transformer Inventory at the B064 LF RFI Site**

| Area or Pole Number | Location | Status | Date Oil Sampled for PCBs | PCB Sampling Results | Visual Inspection Findings |
|---|---|---|---|---|---|

No transformers located at the B064 LF RFI site.

Sources: Site field inspections and facility records.

**Table A4.2-4**

**Chemicals Used at the B064 LF RFI Site**

| |
|---|
| Packaged Nuclear Source Material |
| See notes - (a, b) |

(a) Building 064 was used to store packaged nuclear source material (natural and depleted uranium, and thorium) and nuclear material (enriched uranium and U-233).

(b) All SSFL septic systems and leach fields were used for sanitary waste only; there is no documentation or environmental evidence that chemicals or process waste were released into the Building 064 Leach Field.

Sources: SAIC 1994, ICF 1993, Ogden 1996

**Table A4.3-1A (Page 1 of 1)**

**RFI Sampling Summary**
**B064 LF RFI Site**

| Sample Type | Total Number of Samples | Total QC Samples | Total Agency Samples | Total Validated Samples |
|---|---|---|---|---|
| Soil Vapor Samples (Table A4.3-1B) | 1 | 0 | 0 | 0 |
| Soil Matrix Samples (Table A4.3-1C) | 4 | 1 | 0 | 4 |

**Notes:**
1. Detailed sample and analytical program information is contained in Tables A4.3-1B and A4.3-1C 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 A4.3-1B (Page 1 of 1)**

**RFI Soil Vapor Sampling and Analytical Summary**
**B064 LF RFI Site**

| Sample Identification | EPA Identification | Date Collected | Depth (feet bgs) | Sample Type | VOC | Validated [a] | Rationale [b] | Consultant [c] | Reference Document [d] |
|---|---|---|---|---|---|---|---|---|---|
| SVLF0641 | SVLF0641 | 08/24/93 | 1.5 | Primary Sample | X | No | CCR | ICF Kaiser | ICF Kaiser, 1993 |

[a] **Validated -** if "yes"**,** indicates at least one analysis has been validated following RFI protocols; agency split samples were not validated but were reviewed for comparability. 1993 soil vapor data was collected prior to the RFI and not validated according to RFI protocols. Data quality for this sample is summarized in table A4.3-3.

[b] **Rationale** - CCR indicates the results can be found in the Current Conditions Report (ICF Kaiser, 1993). See References Cited section A4.6.

[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 A4.6).

**Sample Identification** = RFI site and sample identifier code
**EPA Identification** = Laboratory reporting code
**bgs** = below ground surface
**VOC =** volatile organic compound analyzed by EPA Method 8240

**Table A4.3-1C (Page 1 of 1)**

**RFI Soil Matrix Sampling and Analytical Summary**
**B064 LF RFI Site**

| Sample Identification | EPA Identification | Date Collected | Sample Method | Depth (feet bgs) | Sample Type | Metals | Validated [a] | Rationale [b] | Consultant [c] | Reference Document [d] |
|---|---|---|---|---|---|---|---|---|---|---|
| L4BS03S01 | | 09/13/2006 | G | 0.5 | Primary Sample | X | yes | DGA | MWH | This report |
| L4BS04S01 | | 09/13/2006 | G | 0.5 | Primary Sample | X | yes | DGA | MWH | This report |
| L4BS06S01 | | 09/13/2006 | G | 0.5 | Primary Sample | X | yes | DGA | MWH | This report |
| L4BS08S01 | | 09/13/2006 | G | 0.5 | Field Duplicate | X | yes | DGA | MWH | This report |

[a] **Validated -** if "yes"**,** 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 Gap Analysis) to delineate concentrations above comparison levels or anomalous conditions.

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

[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 A4.6).

**Sample Identification** = RFI site and sample identifier code

**EPA Identification** = Laboratory reporting code

**bgs** = below ground surface

**G** = Grab sample

**Laboratory Analytical Methods Represented (EPA Method No.)**

**Metals** = 6010B, 6020, 7471

## Table A4.3-2A (Page 1 of 1)

## Description of Chemical Use Areas at the B064 LF RFI Site and Soil Sampling Results Summary

| Map Key | Chemical Use Area Name<br>Status, How Used, and Physical Characteristics<br>(see text for Site History) | Potential Chemicals Used/ Stored | Sampling Rationale and Scope[1,5]<br>[See Figure A3.2-1 for sampling locations] | Sampling Results<br>Chemical concentrations detected above background and/or risk screening levels?[2] | Potential concentration gradients sufficiently evaluated for risk assessment?[3] | Is delineation sufficient to estimate soil volume in CMS? [4] [see Figure A2.5-1 for CMS areas] |
|---|---|---|---|---|---|---|
| 1 | **Building 064 Leach Field (B064 LF)**<br><br>The B064 LF was a total of 120 linear feet and received flow from a 750-gallon septic tank connected to B064. The leach field was located approximately 20 feet east of B064; the number of leach lines was not reported.<br><br>The B064 LF was in operation from 1958 to 1961. B064, the LF, and septic tank were removed in 1997. Import soils were not used as fill.<br><br>Area slopes to the south and west; surface water drains from area by sheet flow that enters an east-west concrete ditch, which then leads to the north along the road. The drainage becomes unlined and surface water flow is transmitted under the road by a storm water culvert to east and north of former Building 040 at the NCY RFI Site. The culvert discharges to an unlined natural drainage via a concrete ditch through the leach field area that flows east, then north. The drainage converges with a lined drainage just south of the OCY RFI Site and flows through the NCY RFI site. See Appendix A1, Table A1.3-2A for further discussion of this drainage.<br><br>Soil thickness typically is 0.5 to 1.5 feet. | **VOCs**<br>Site documentation does not indicate use, storage, or disposal of solvents or other VOCs at the B064 LF. | 1993 waste characterization results indicate VOCs detected (methylene chloride up to 40 µg/kg and acetone at 130 µg/kg).<br><br><u>Soil Vapor (1993)</u><br>Collect a vapor sample at leach field.<br><br><u>Soil Matrix (2000)</u><br>Visually inspect soil in two trenches (L4TS01, L4TS02), one at each end of the leach field; collect and analyze samples based on visual evidence of staining. | VOC sample results are shown on Figure A4.3-1.<br><br>1993 waste characterization data indicate possible presence of methylene chloride and acetone. However, both compounds are considered common laboratory contaminants.<br><br>VOCs were not detected in 1993 soil vapor sample, but the sample was collected at 1 foot bgs in area following excavation with limited soil.<br><br>Visual inspection of soil in trench in 2000 did not indicate the presence of VOCs (staining, odors, or impacts not observed).<br><br>Based on thin soil extent, no visual impacts, and uncertainty of laboratory results, no further delineation needed. | YES<br>VOCs not detected in targeted sample and visual observation does not indicate presence of VOCs. | YES<br>Area is not recommended for further evaluation in CMS. |
| | | **SVOCs**<br>Site documentation does not indicate use, storage, or disposal of SVOCs. | 1996 waste characterization results (TCLP) indicate SVOCs not detected.<br><br>Based on waste characterization results and no known site use, no further delineation needed. | -- | -- | -- |
| | | **Metals**<br>Site documentation does not indicate use, storage, or disposal of metals. | 1993 waste characterization results indicate antimony, cadmium, molybdenum, thallium, and zinc detected above background, suggesting metals above background are possibly present in remaining site soil. However, there were no metals detected above background in additional waste characterization data collected in 1996. To address this uncertainty, collect two samples in the area of the leach field soil excavation area, and one sample downslope. | Three metals (thallium, lead, and zinc) were detected above background in two samples.<br>• Thallium detected at 0.48 mg/kg, just above the maximum background level (0.46 mg/kg). in a sample within the former leach field area (L4BS04). Thallium not detected either downslope or in second leach field sample.<br>• Two metals detected above maximum background levels in a sample downslope, near the drainage adjacent to the road: lead at 40 mg/kg (background =34 mg/kg) and zinc at 120 mg/kg (background = 110 mg/kg).<br>Representative locations sampled, results at or near background, no further delineation needed. | YES<br>Metals at or near background at representative locations. | YES<br>Area is not recommended for further evaluation in CMS. |

Sources: SAIC, 1994; ICF, 1993; Ogden, 1996; Boeing, 1993, 1996, 1999a; Sapere, 2005; Trippeda, 2006a.

**ACRONYMS**

B064 = Building 064
bgs = below ground surface
CMS = Corrective Measures Study
DTSC = Department of Toxic Substance Control
LF = leach field
mg/kg = milligrams per kilogram
ng/kg = nanograms per kilogram
RFI = Resource Conservation and Recovery Act (RCRA) Facility Investigation
SVOC = Semi volatile Organic Compounds
TCLP = Toxicity Characteristic Leaching Procedure
µg/kg = micrograms per kilogram
VOC = Volatile Organic Compound

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**Notes:**

[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 A4.3-2A.

[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. For the purposes of characterization, metal-background comparisons are made using the Background Comparison Level defined in the SRAM (MWH, 2005).

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

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

[5] Additional samples were collected at representative locations and put on hold pending review of site conditions and/or analytical results.

**Table A4.3-2B (Page 1 of 1)**
**Summary and Evaluation of Groundwater Sampling Results**
**B064 LF RFI Site**

| Analytical Group | Site Soil Impacts? (Summary of Relevant Impacts) [See Table A2.3-2A for a complete summary of soil impacts] | Monitored in GW? Number of samples/Date Range [See Figure A2.2-1 for monitoring locations] | Constituents Detected in GW? Above GWCC or Regulatory Criteria?* [see Appendix B for Groundwater Results (Current Conditions)] | Site Related? (Describe Transport & Fate) | Groundwater Characterized Sufficiently for Risk Assessment? |
|---|---|---|---|---|---|
| VOCs | VOCs not detected in B064 leach field. | YES<br><br>Two samples were collected and analyzed for VOCs in 2004 at RD-92. | YES<br>Two VOCs were detected in RD-92, but are below respective regulatory criteria (MCLs).<br>• Toluene detected once (1.8 µg/L) in RD-92 in 2004. Subsequent sample nondetect.<br>• Acetone was detected once in RD-92 at 5 µg/L in 2004. | NO<br>Site history and uncertainty of results for typical laboratory contaminants do not suggest groundwater impacted by site use. | YES<br>• 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. |
| Metals | Metals detected just at or near background comparison levels | YES<br>A total of 3 samples were collected and analyzed for metals between 2004 and 2006 at RD-92. | YES<br>One metal (manganese) detected in RD-92 above GWCC (150 µg/L) at 190 µg/L in 2006.<br><br>All other metals results were below GWCCs.<br><br>See Group 6 RFI Report Appendix B (Section 3 and Table B-16) for detailed groundwater metals results. | NO<br>Site soils are at or near background and the manganese concentration in groundwater is considered to be naturally occuring. | YES<br>• 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 were not analyzed in surficial media samples at B064 LF. | YES<br>A total of 2 samples were collected in 2004 at RD-92. | Perchlorate was not detected in either sample. | -- | YES |
| Inorganics | Inorganic constituents have no known related chemical use, storage, or discharge at site and were not analyzed in surficial media samples at NCY RFI site. | YES.<br>A total of 3 samples were collected and analyzed for inorganics between 2004 to 2006 in RD-92. | YES.<br>Six inorganics were detected in RD-92. Fluoride, potassium, sodium, and sulfate have established GWCCs, and were detected below these comparison levels. Chloride (up to 18 mg/L) and nitrate (up to 7.2 mg/L) were also detected.<br><br>Total dissolved solids ranged from 300-310 mg/L. | -- | YES |

**Acronyms**

| | | | | | |
|---|---|---|---|---|---|
| µg /kg | micrograms per kilogram | CMS | corrective measures study | TCE | trichloroethene |
| µg/L | micrograms per liter | EcoRBSL | Ecological risk-based screening level | TCLP | Toxicity Characteristic Leaching Procedure |
| mg/kg | milligrams per kilogram | OCY | Old Conservation Yard | TEQ | 2,3,7,8-tetrachlorodibenzo-p-dioxin toxicity equivalency quotient |
| AI | Atomics International | PCB | polychlorinated biphenyls | TPH | total petroleum hydrocarbons |
| AST | aboveground storage tank | ResRBSL | residential risk-based screening level | VOC | volatile organic compounds |
| BG | background | SVOC | semivolatile organic compounds | | |

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

**Table A4.3-3A**
**B064 LF RFI Report**
**Analytical Data Quality for Soil Vapor VOCs**
**Page 1 of 1**

**Table A4.3-3A**

| Constituent | units | Screening Levels [1] | | Area IV AOC - B064 Leachfield RFI Site Data | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 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 | Data Issue | Issue Resolution[2] |
| 1,1,1-Trichloroethane | µg/L | 640 | | 1 | 0 | | | 1 | 5 | 5 | 0 | | -- | -- |
| 1,1,2-Trichloroethane | µg/L | 0.17 | | 1 | 0 | | | 1 | 5 | 5 | 1 | | Elevated DLs | e |
| 1,1,2-Trichlorotrifluoroethane | µg/L | 8800 | | 1 | 0 | | | 1 | 5 | 5 | 0 | | -- | -- |
| 1,1-Dichloroethane | µg/L | 1.7 | | 1 | 0 | | | 1 | 5 | 5 | 1 | | Elevated DLs | e |
| 1,1-Dichloroethene | µg/L | 58 | | 1 | 0 | | | 1 | 5 | 5 | 0 | | -- | -- |
| 1,2-Dichloroethane | µg/L | 0.13 | | 1 | 0 | | | 1 | 5 | 5 | 1 | | Elevated DLs | e |
| 1,2-Dichloroethene (total) | µg/L | | | 1 | 0 | | | 1 | 5 | 5 | | | -- | -- |
| 2-Butanone | µg/L | 1500 | | 1 | 0 | | | 1 | 5 | 5 | 0 | | -- | -- |
| Acetone | µg/L | 920 | | 1 | 0 | | | 1 | 5 | 5 | 0 | | -- | -- |
| Benzene | µg/L | 0.095 | | 1 | 0 | | | 1 | 5 | 5 | 1 | | Elevated DLs | e |
| Carbon tetrachloride | µg/L | 0.063 | | 1 | 0 | | | 1 | 5 | 5 | 1 | | Elevated DLs | e |
| Chlorobenzene | µg/L | | | 1 | 0 | | | 1 | 5 | 5 | | | -- | -- |
| Chloroform | µg/L | 0.5 | | 1 | 0 | | | 1 | 5 | 5 | 1 | | Elevated DLs | e |
| Ethylbenzene | µg/L | 290 | | 1 | 0 | | | 1 | 5 | 5 | 0 | | -- | -- |
| Methylene chloride | µg/L | 2.7 | | 1 | 0 | | | 1 | 5 | 5 | 1 | | Elevated DLs | e |
| Tetrachloroethene | µg/L | 0.45 | | 1 | 0 | | | 1 | 5 | 5 | 1 | | Elevated DLs | e |
| Toluene | µg/L | 110 | | 1 | 0 | | | 1 | 5 | 5 | 0 | | -- | -- |
| Trichloroethene | µg/L | 1.4 | | 1 | 0 | | | 1 | 5 | 5 | 1 | | Elevated DLs | e |
| Trichlorofluoromethane | µg/L | 200 | | 1 | 0 | | | 1 | 5 | 5 | 0 | | -- | -- |
| Vinyl chloride | µg/L | 0.035 | | 1 | 0 | | | 1 | 5 | 5 | 1 | | Elevated DLs | e |
| Xylenes (total) | µg/L | | | 1 | 0 | | | 1 | 5 | 5 | | | -- | -- |

**Notes:** All data were nondetect. Analyte detection limits as reported by (ICF, 1993) were 2 to 5 ug/L. The detection limit was taken at the conservative upper range, 5 ug/L for all analytes.

-- Indicates no elevated detection limit.

[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 $1 \times 10^{-6}$ 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 A4.3-3G**
**B064 RFI Report**
**Analytical Data Quality for Metals**
**Page 1 of 1**

**Table A4.3-3G**

| Constituent | units | Background/ Screening Levels[1] | | | Area IV AOC - B064 Leachfield RFI Site Data | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 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 | Data Issue | Issue Resolution[3] |
| Aluminum | mg/kg | 20000 | 75000 | 14 | 4 | 4 | 11000 | 14000 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Antimony | mg/kg | 8.7 | 30 | 0.096 | 4 | 2 | 0.16 | 0.16 | 2 | 0.098 | 0.12 | 0 | 0 | 2 | -- | -- |
| Arsenic | mg/kg | 15 | 0.095 | 0.34 | 4 | 4 | 1.8 | 3.4 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Barium | mg/kg | 140 | 15000 | 15 | 4 | 4 | 69 | 79 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Beryllium | mg/kg | 1.1 | 150 | 5.7 | 4 | 4 | 0.39 | 0.56 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Boron | mg/kg | 9.7 | 15000 | 6.3 | 4 | 4 | 2.4 | 3.5 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Cadmium | mg/kg | 1 | 2.6 | 0.0031 | 4 | 4 | 0.094 | 0.39 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Chromium | mg/kg | 36.8 | 3400 | 940 | 4 | 4 | 15 | 24 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Cobalt | mg/kg | 21 | 1500 | 10 | 4 | 4 | 5.6 | 6.5 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Copper | mg/kg | 29 | 3000 | 1.1 | 4 | 4 | 9.6 | 15 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Iron | mg/kg | 28000 | NA | NA | 4 | 4 | 17000 | 19000 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Lead | mg/kg | 34 | 150 | 0.063 | 4 | 4 | 6 | 40 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Lithium | mg/kg | 37 | NA | NA | 4 | 4 | 22 | 24 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Manganese | mg/kg | 495 | 9500 | 63 | 4 | 4 | 280 | 290 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Mercury | mg/kg | 0.09 | 23 | 0.89 | 4 | 4 | 0.0089 | 0.024 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Molybdenum | mg/kg | 5.3 | 380 | 0.11 | 4 | 0 | | | 4 | 0.43 | 0.68 | 0 | 0 | 4 | -- | -- |
| Nickel | mg/kg | 29 | 1500 | 0.1 | 4 | 4 | 10 | 14 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Potassium | mg/kg | 6400 | NA | NA | 4 | 4 | 2900 | 3600 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Selenium | mg/kg | 0.655 | 380 | 0.18 | 4 | 2 | 0.26 | 0.26 | 2 | 0.4 | 0.81 | 1 | 0 | 2 | Elevated DL | c, d, e, and f; (d - Selenium had one elevated DL in a downslope sample. Selenium was not detected in any samples throughout the B064 leach field area. Other metals detected in that sample were considered at or near background.) |
| Silver | mg/kg | 0.79 | 380 | 0.55 | 4 | 4 | 0.044 | 0.15 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Sodium | mg/kg | 110 | NA | NA | 4 | 4 | 45 | 87 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Thallium | mg/kg | 0.46 | 6.1 | 3.2 | 4 | 4 | 0.27 | 0.48 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Vanadium | mg/kg | 62 | 76 | 1.6 | 4 | 4 | 27 | 36 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Zinc | mg/kg | 110 | 23000 | 22 | 4 | 4 | 41 | 120 | 0 | NA | NA | NA | NA | NA | -- | -- |
| Zirconium | mg/kg | 8.6 | NA | NA | 4 | 4 | 1.8 | 2.5 | 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 4.4-1 (1 of 1)**

**Chemicals of Potential Concern for Human Health**
**Building 64 Leach Fields RFI Site**

| Chemical | Soil (0 to 2 feet bgs) | Soil (0 to 10 feet bgs) | RFI Site Chatsworth Formation Groundwater (a) | Group 6 Reporting Area Chatsworth Formation Groundwater (a) | Soil Vapor |
|---|---|---|---|---|---|
| **Inorganic Compounds** | | | | | |
| Copper | | | | X | |
| Fluoride | | | | X | |
| Nitrate | | | | X | |
| Thallium | | | | X | |
| **VOCs** | | | | | |
| 1,1-Dichloroethane | | | | X | |
| 1,2-Dichloroethane | | | | X | |
| Acetone | | | X | X | |
| Benzene | | | | X | |
| Carbon disulfide | | | | X | |
| Chloromethane | | | | X | |
| cis-1,2-Dichloroethene | | | | X | |
| Methylene chloride | | | | X | |
| Toluene | | | X | X | |
| Trichloroethene | | | | X | |
| **Total Petroleum Hydrocarbons** | | | | | |
| C14-C20(Diesel Range) | | | | X | |

Notes:
VOC - volatile organic compound
SVOC - semi-volatile organic compound
PCBs - polychlorinated biphenyls
COPC - chemical of potential concern
bgs - below ground surface

**Table A4.4-2 (Page 1 of 1)**

**Human Health Risk Estimates[1]**
**Building 64 Leach Fields RFI Site**

| Receptor | Soil Media[2] | | | | Groundwater[3] | | | | Total for Site Media | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | HI Range | CD[4] | Risk Range | CD | HI Range | CD | Risk Range | CD | HI Range | CD | Risk Range | CD |
| Adult Worker | - - - | | - - - | | <0.001 - <0.001 | | - - - | | <0.001 - <0.001 | | - - - | |
| Future Adult Recreator | - - - | | - - - | | <0.001 - <0.001 | | - - - | | <0.001 - <0.001 | | - - - | |
| Future Child Recreator | - - - | | - - - | | <0.001 - <0.001 | | - - - | | <0.001 - <0.001 | | - - - | |
| Future Adult Resident | - - - | | - - - | | 1.4 - 2.2 | a | 8E-07 - 3E-06 | a | 1.4 - 2.2 | a | 8E-07 - 3E-06 | a |
| without domestic use of groundwater[5] | NA NA | | NA NA | | <0.001 - <0.001 | | - - - | | <0.001 - <0.001 | | - - - | |
| Future Child Resident | - - - | | - - - | | 4.9 - 8.2 | a | 2E-06 - 3E-06 | a | 4.9 - 8.2 | a | 2E-06 - 3E-06 | a |
| without domestic use of groundwater[5] | NA NA | | NA NA | | <0.001 - <0.001 | | - - - | | <0.001 - <0.001 | | - - - | |

Notes:

1. Risk estimates shown are a sum of all exposure pathways per media; the range reported is for the central tendency and reasonable maximum exposures, respectively.
2. Soil media risk estimates are a sum of all direct and indirect exposure so site soil and soil vapor.
3. Groundwater media risk estimates are 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. Groundwater media risk estimates are for indirect exposure only and assume no domestic use of groundwater.

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

**Table A4.4-3 (1 of 1)**

**Human Health Risk Assessment Uncertainty Analysis**
**Building 64 Leach Fields RFI Site**

| Assessment Element | Uncertainty | Magnitude of Impact | Direction of Impact |
|---|---|---|---|
| Exposure Pathways | Risks associated with drinking of groundwater are not realistic because the groundwater beneath the SSFL is not currently used as a drinking water source and the presence of the contamination will likely require a restriction on its future use as well. | High | Conservative |
| | 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 amount of suspended solids present (i.e., total concentration). | Moderate | Realistic |
| | Future land use of the site is currently undecided but may be commercial or recreational, which have lower risks than residential. | Moderate | Uncertain |
| EPC Calculations | The maximum detected concentration of each COPC detected in groundwater was used as the EPC. | High | Conservative |
| | Information presented in the RFI report for this site indicates that no known releases occurred at the site, and no impacts have been detected in historical soil vapor samples. Therefore, exposure via soil vapor is considered likely to be an incomplete pathway. However, though considered incomplete, theoretical migration of COPCs from Chatsworth Formation groundwater beneath the site to indoor air was conservatively assessed. | 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 |
| 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:

PAH - polycyclic aromatic hydrocarbon
EPC - exposure point concentration
UCL - upper confidence limit

**Table A4.5-1 (Page 1 of 1)**
**Surficial Media Site Action Recommendations**
**B064 LF 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] |
| None[3] | -- | -- | -- | -- | -- | -- |
| Groundwater | -- | -- | • Indirect groundwater risks insignificant, do not affect surficial media CMS decisions<br>Direct groundwater risks > 1 x $10^{-6}$ may affect surficial media CMS decisions | • Indirect groundwater risks insignificant, do not affect surficial media CMS decisions<br>No direct use of groundwater | • Indirect groundwater risks insignificant, do not affect surficial media CMS decisions<br>No direct use of groundwater | • Indirect groundwater risks insignificant, do not affect surficial media CMS decisions<br>No direct use of groundwater |

**General Notes:**

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

**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. For the B064 LF RFI site, there are no surficial media areas recommended for further evaluation in the CMS.

**ACRONYMS**

AOC = Area of Concern
B064 LF = Building 064 Leach Field
CMS = Corrective Measures Study
NFA = No further action
CMS = Corrective Measures Study

# 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

Building 64 Leach Field RFI Site

UNDEVELOPED LAND

NASA PROPERTY AREA I

Area II Landfill

ELV

LOX

B-1

IEL

Area I Landfill

B204

B515 STP

Ash Pile

SRE

OCY

NCY

B021 Leach Field

B093 Leach Field

B064 Leach Field

B010 Leach Field

B030 Leach Field

SNAP

HMSA

SE Drum Storage

PDU

B008 Warehouse

Building 56 Landfill

Metals Clarifier

ECL

Silvernale

SPA

WCT

ABFF

Alfa

Bravo

LETF/CTL-I

APTF

Building 359 Area

Happy Valley

Canyon

B011 Leach Field

B100

B383 Leach Field

RIHL

EEL

B009 Leach Field

FSDF

STP Pond

Compound A

B373 Leach Field

ESADA

CDFF

Pond Dredge

B363 Leach Field

B353 Leach Field

R-1 Pond

Bowl

CTL-III

CTL-V

STL-IV

Area IV Borrow Pit

R-2 Ponds

PLF

Coca

Delta

Area I Burn Pit

Perimeter Pond

AREA IV

AREA III

AREA II (NASA)

AREA I

UNDEVELOPED LAND

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
AOC - Component Test Laboratory V (CTL-V)

**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
- RFI Boundaries
- Building
- Pond
- Drainage
- Dirt Road
- Road
- NPDES Outfall 5

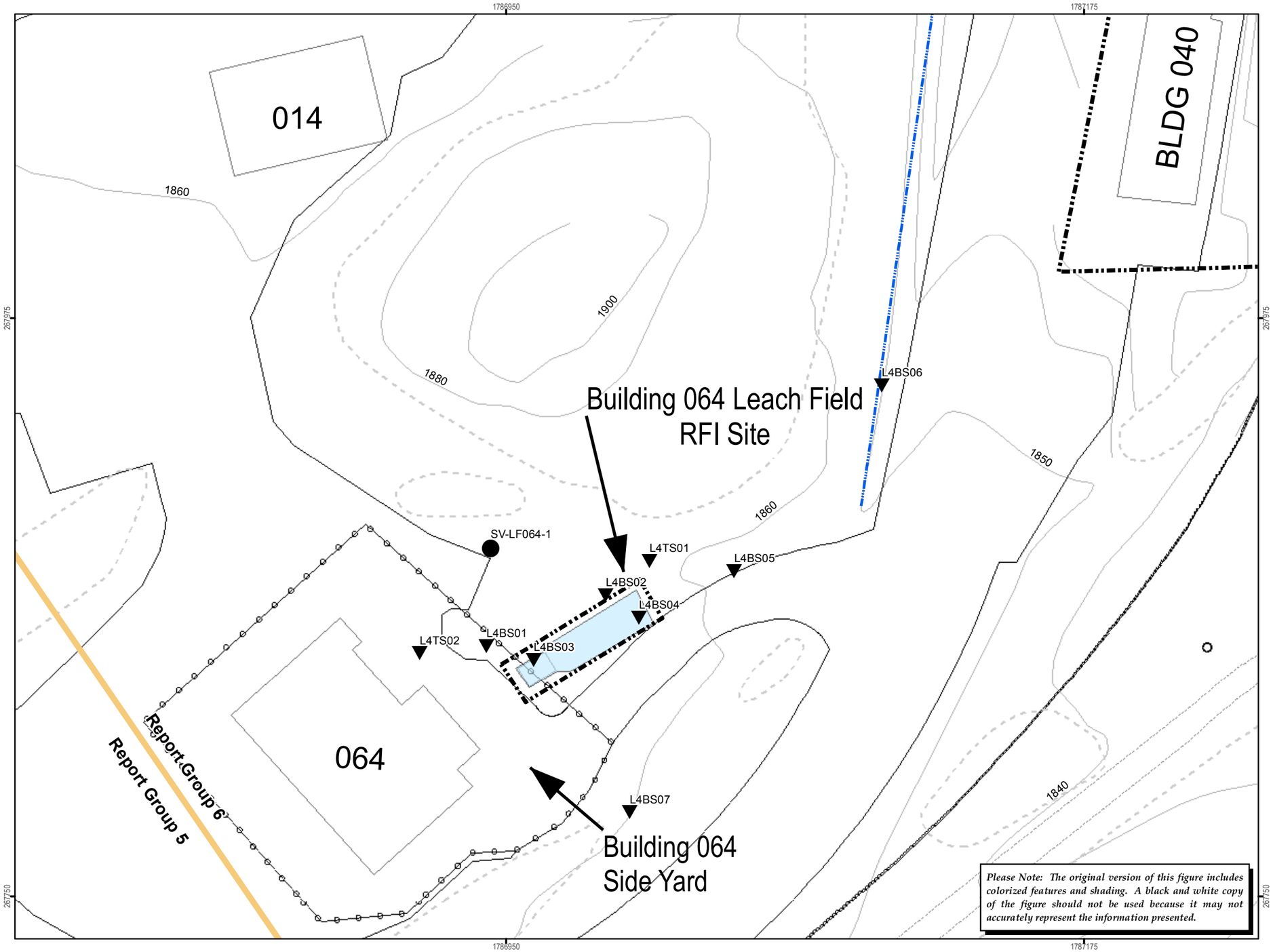
# Building 064 Leach Field RFI Site Location Map

SANTA SUSANA FIELD LABORATORY

Date: Sep 28, 2006
FILE: r:\rock\plots\arcmap\RFI-Report\RFIReport-group6\B64_RFI_Location.mxd

MWH MONTGOMERY WATSON HARZA

**FIGURE A4.1-1**




*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.*

## Base Map Legend

- Administrative Area Boundary
- RFI 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
- Pipe
- Well

## Chemical Use Areas

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

## Soil Sample Location

- Soil Matrix
- Soil Vapor

# Potential Chemical Use Areas and Sample Locations Building 064 Leach Field

Date: Sep 28, 2006

Document: RFI-Report-Group6_B64_Chemical_Use.mxd

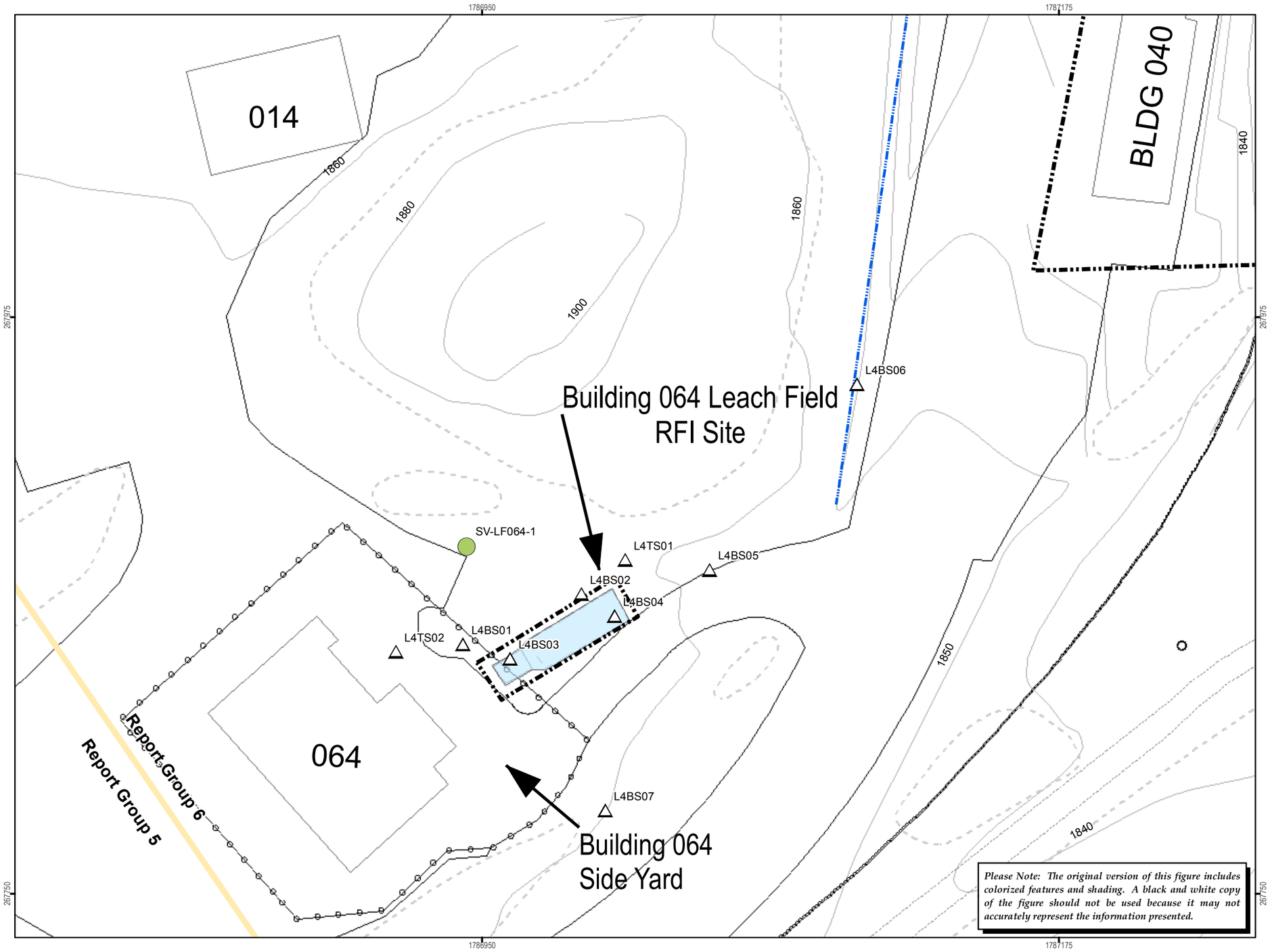
1 inch equals 40 feet

0 40 80 Feet

SANTA SUSANA FIELD LABORATORY

MWH MONTGOMERY WATSON HARZA

FIGURE A4.2-1




## Base Map Legend

- Administrative Area Boundary
- SR RFI 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

## Chemical Use Areas

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

## Soil Sample

- Soil sample location not analyzed for VOC
- Soil vapor sample location with no detected VOC

# Soil VOC Results
# Building 064 Leach Field

Date: Sep 29, 2006

Document: RFI-Report-Group6_B64_VOC.mxd

1 inch equals 40 feet

0 40 80 Feet

SANTA SUSANA FIELD LABORATORY

MWH
MONTGOMERY WATSON HARZA

FIGURE
A4.3-1

# Soil Metals Results
# Building 064 Leach Field

# Santa Susana Field Laboratory

MWH MONTGOMERY WATSON HARZA

**FIGURE A4.3-4**

## 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 |
| Chromium | 36.8 | 3400 | 940 |
| Cobalt | 21 | 1500 | 10 |
| Copper | 29 | 3000 | 1.1 |
| Iron | 28000 | - - | - - |
| Lead | 34 | 150 | 0.063 |
| Lithium | 37 | - - | - - |
| Manganese | 495 | 9500 | 63 |
| Mercury | 0.09 | 23 | 0.89 |
| Molybdenum | 5.3 | 380 | 0.11 |
| Nickel | 29 | 1500 | 0.1 |
| Potassium | 6400 | - - | - - |
| Selenium | 0.655 | 380 | 0.18 |
| Silver | 0.79 | 380 | 0.55 |
| Sodium | 110 | - - | - - |
| Thallium | 0.46 | 6.1 | 3.2 |
| Vanadium | 62 | 76 | 1.6 |
| Zinc | 110 | 23000 | 22 |
| Zirconium | 8.6 | - - | - - |

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: 092106

## Data Box Information

Sample Location ID: L4BS03 | 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

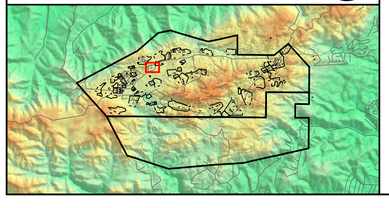
- Solvent
- Petroleum
- Oil
- Transformer
- Metal
- Debris
- Hydrazine
- Perchlorate
- Screening
- Multiple Use

## 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 29, 2006 Document: RFI-Report-Group6_B64_Metals.mxd

1 inch equals 30 feet — Feet: 0, 30, 60



| L4BS03 | 0.50 S01 |
|---|---|
| Aluminum | 11000 |
| Antimony | 0.16 J |
| Arsenic | 3 J |
| Barium | 69 J |
| Beryllium | 0.39 J |
| Boron | 3 |
| Cadmium | 0.11 J |
| Chromium | 15 J |
| Cobalt | 5.8 J |
| Copper | 9.6 J |
| Iron | 17000 |
| Lead | 6 J |
| Lithium | 22 |
| Manganese | 290 |
| Mercury | 0.0089 |
| Molybdenum | < 0.51 |
| Nickel | 10 J |
| Potassium | 3100 |
| Selenium | 0.26 J |
| Silver | 0.049 J |
| Sodium | 45 J |
| Thallium | 0.43 J |
| Vanadium | 27 J |
| Zinc | 47 J |
| Zirconium | 2.4 |

| L4BS08 | 0.50 S01 |
|---|---|
| Aluminum | 11000 |
| Antimony | < 0.098 |
| Arsenic | 3.4 J |
| Barium | 73 J |
| Beryllium | 0.42 J |
| Boron | 2.4 |
| Cadmium | 0.12 J |
| Chromium | 17 J |
| Cobalt | 6.1 J |
| Copper | 11 J |
| Iron | 18000 |
| Lead | 6 J |
| Lithium | 23 |
| Manganese | 280 |
| Mercury | 0.0095 |
| Molybdenum | < 0.43 |
| Nickel | 11 J |
| Potassium | 2900 |
| Selenium | < 0.4 |
| Silver | 0.044 J |
| Sodium | 82 J |
| Thallium | 0.27 J |
| Vanadium | 32 J |
| Zinc | 55 J |
| Zirconium | 2.3 |

| L4BS06 | 0.50 S01 |
|---|---|
| Aluminum | 13000 |
| Antimony | < 0.12 |
| Arsenic | 1.8 J |
| Barium | 79 J |
| Beryllium | 0.53 J |
| Boron | 3.5 |
| Cadmium | 0.39 J |
| Chromium | 24 J |
| Cobalt | 6.5 J |
| Copper | 15 J |
| Iron | 19000 |
| Lead | 40 |
| Lithium | 23 |
| Manganese | 290 |
| Mercury | 0.024 |
| Molybdenum | < 0.68 |
| Nickel | 14 J |
| Potassium | 3600 |
| Selenium | < 0.81 |
| Silver | 0.15 J |
| Sodium | 87 J |
| Thallium | 0.42 J |
| Vanadium | 36 J |
| Zinc | 120 J |
| Zirconium | 1.8 |

| L4BS04 | 0.50 S01 |
|---|---|
| Aluminum | 14000 |
| Antimony | 0.16 J |
| Arsenic | 3.4 J |
| Barium | 73 J |
| Beryllium | 0.56 J |
| Boron | 2.8 |
| Cadmium | 0.094 J |
| Chromium | 17 J |
| Cobalt | 5.6 J |
| Copper | 9.7 J |
| Iron | 19000 |
| Lead | 6.6 J |
| Lithium | 24 |
| Manganese | 290 |
| Mercury | 0.011 |
| Molybdenum | < 0.57 |
| Nickel | 11 J |
| Potassium | 3100 |
| Selenium | 0.26 J |
| Silver | 0.045 J |
| Sodium | 50 J |
| Thallium | 0.48 |
| Vanadium | 32 J |
| Zinc | 41 J |
| Zirconium | 2.5 |

Extent of Ashpile (approx.)

Former Document Incinerator

BLDG 040

Building 064 Leach Field RFI Site

Building 064 Side Yard

014

030

064

641

RD-92

PZ-113

Report Group 5

Report Group 6

Report Group 7

Report Group 9

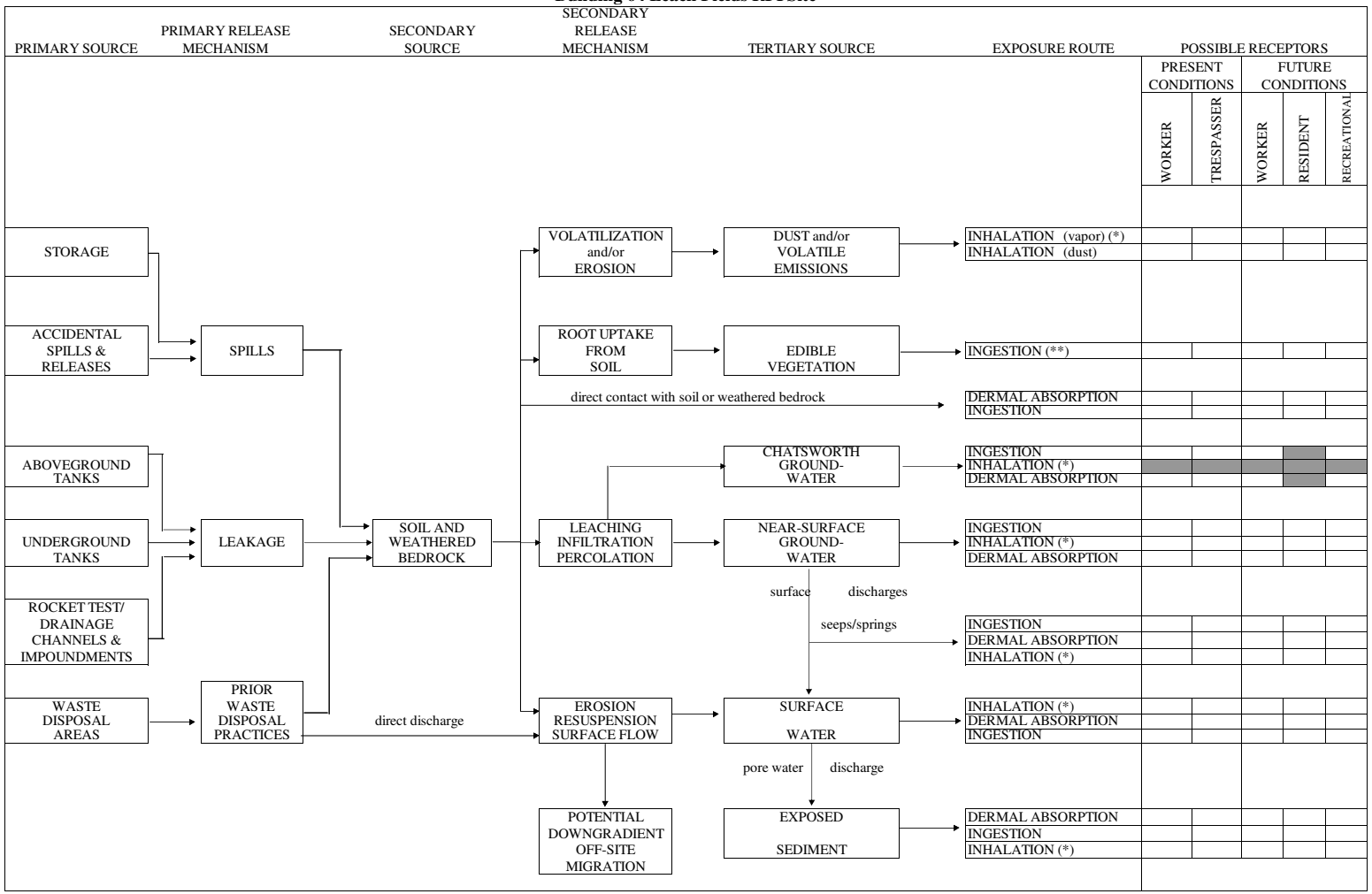
G Street

Note: Analytes detected at least once at Building 064 Leach Field 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*

**Figure A4.4-1**

**Human Health Risk Assessment Conceptual Site Model**
**Building 64 Leach Fields RFI Site**




NOTES:
As described in the SRAM (MWH 2005), note that risk estimates for the potential future recreational user (recreator) are used as surrogate risk estimates for the trespasser.
(*) Exposure limited to volatile compounds as defined in the text; residential and worker receptors include both indoor and outdoor air exposure to volatiles; non-residental and non-worker receptors include only outdoor air exposure. For workers, inhalation of volatiles from groundwater beneath the RFI site includes pathways associated with both migration to indoor air and ambient air (domestic groundwater use is an incomplete exposure pathway). For residents, exposures to reporting area Chatsworth formation groundwater includes pathways associated with both migration to indoor air and ambient air, as well as domestic use. Information presented in the RFI report for this site indicates that no known releases occurred at the site, and no impacts have been detected in historical soil vapor samples. Therefore, exposure via soil vapor is considered likely to be an incomplete pathway. However, though considered incomplete, theoretical migration of COPCs from Chatsworth Formation groundwater beanth the site to indoor air was conservatively assessed.
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

# APPENDIX A4-1

# REGULATORY AGENCY CORRESPONDENCE

96ETEC-DEP0322

**Department of Energy**
Oakland Operations Office
1301 Clay Street, N700
Oakland, CA 94612-5208

June 25, 1996

Majelle Lee
Program Manager
Environmental Programs
Energy Technology Engineering Center
Rocketdyne Division
Rockwell International Corporation
P.O. Box 7930
Canoga Park, CA 91309-7930

Subject: Demolition of Building 064

Dear Ms. Lee:

The cleanup of radioactive decontamination at Building 064 is complete. ORISE has verified the condition of the building. Consequently, approval is given for the demolition of B064. The empty site (the land) will be combined with the B064 Sideyard into one release site. This release site is expected to be ready for a release for unrestricted use in FY97, after the remediation of the Sideyard is completed.

Sincerely,

Michael Lopez

Michael Lopez
ETEC PM
Environmental
Restoration Division

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.



GA:mm
GA36W.065

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

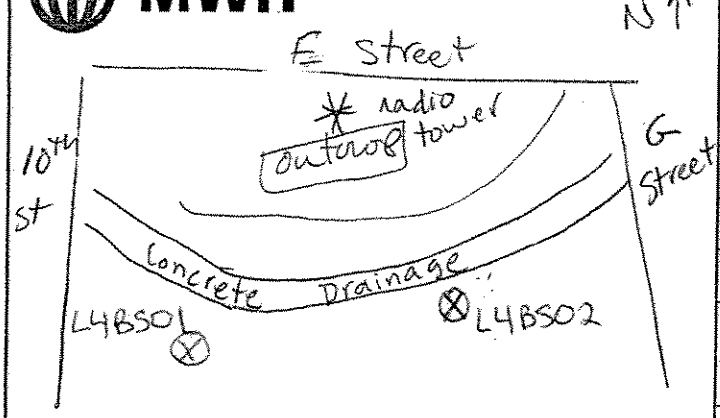
Ms. Laura Rainey
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

GA:mm
GA36W.065

# APPENDIX A4-2

# ELECTRONIC COPY OF SUBSTANCE INFORMATION (SOIL BORING AND TRENCH LOGS)

**MWH**




Site Sketch Map

Boring #: L4 BS01 MW#: L4 BS02 Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: SSFL

Logged By: J Dolmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: Hand Auger

Drillers Name: B Burton / B Stewart

Borehole Diam./Drill Bit Type: 3" Total Depth: 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: 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Building 64 Leach Field | | | | | |
| | | | | | | | | | Surface sloping 10-20° N/NE | | | | | |
| | | | | | | | 1 | SM | ash layer 0.125" dk gray NOT SAMPLED | | | | | |
| | | | | | | | | | 0 - 0.5' SILTY SAND with | 20 | 10 | 10 | 40 | 20 |
| | | | | | | | 2 | | gravel up to 2" | | | | | |
| | | | | | | | | | unable to obtain samples | | | | | |
| | | | | | | | 3 | | ~~refusal 0.5'~~ 18 | | | | | |
| | | | | | | | | | -too gravelly | | | | | |
| | | | | | | | 4 | | gravel consisting of | | | | | |
| | | | | | | | | | shale and sandstone | | | | | |
| | | | | | | | 5 | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | 6 | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | 7 | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | 8 | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | 9 | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | 10 | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | 11 | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | 12 | | | | | | | |

QA/QC

DOE

# FIELD TRENCH LOG

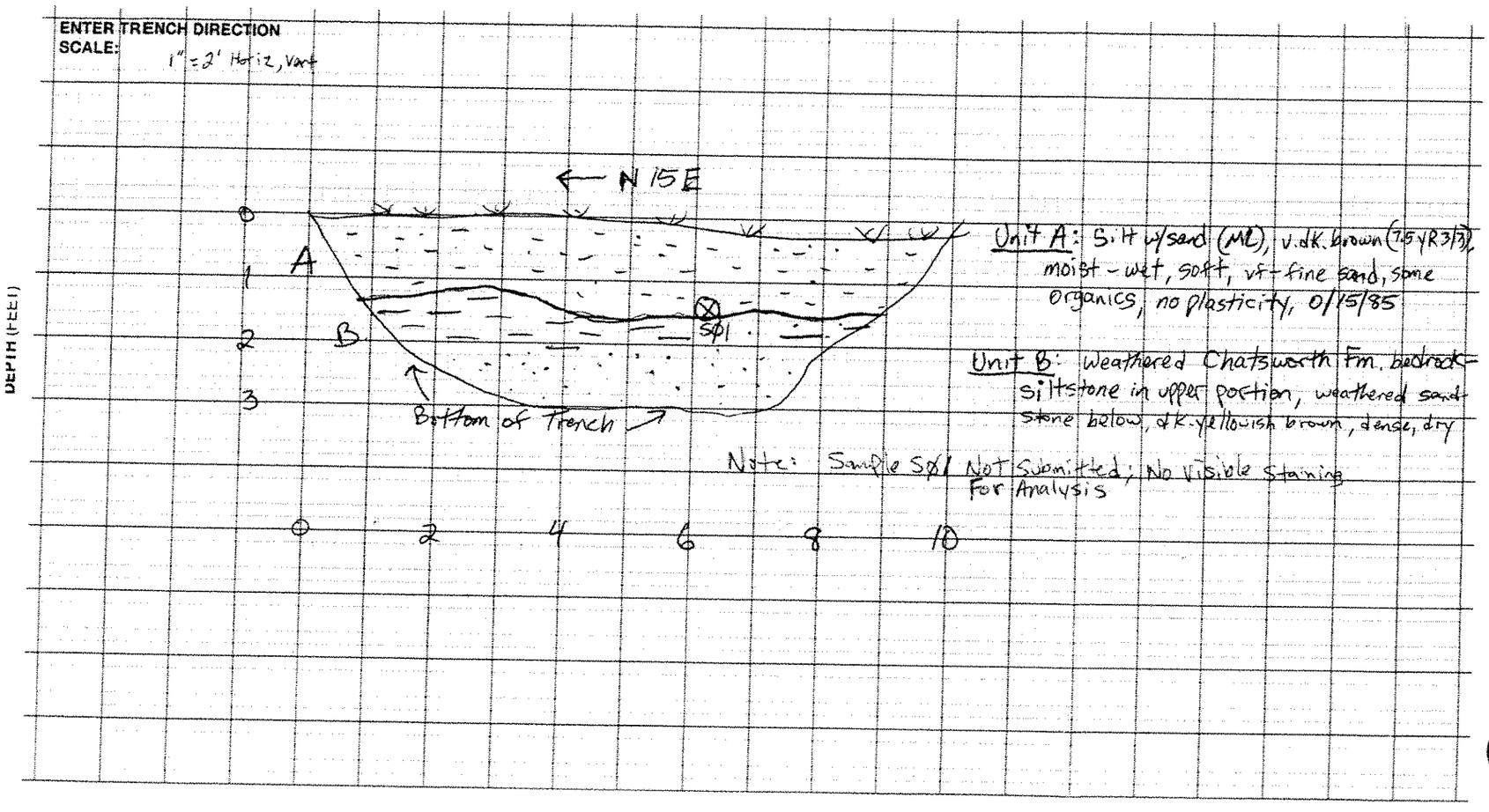
| | | | | | |
|---|---|---|---|---|---|
| Trench Number: L4TS01, L4TS02 | Project Number: 313150004 | Elevation / Datum: | Location: B064 Leach Field | Sheet 1 of 1 | |
| Equipment Supplier: Hertz | Operator: Bob Nagle | Date and Time Started: 10/10/00 1300 | Date and Time Completed: 10/10/00 1400 | Refusal? (Circle One) Yes / No | If Yes Depth = |
| Equipment Type: Case 580 L Backhoe | Trench Orientation: N15E | Total Depth: | Total Number of Samples: 1 | Photo (Circle One) Yes / No | No. |
| Bucket Width: | Trench Length: 11' | Trench Width: 2' | No. of Samples: Bulk: Grab: | Drive: 1 Hand Auger: | % Man-Made Debris: 0 |
| Geologist or Hydrogeologist/Date: | | Checked by/Date: | | Wall of Trench Shown (Circle One) N S E W NE NW SE SW | |

OGDEN

LENGTH (FEET)

DEPTH (FEET)

ENTER TRENCH DIRECTION
SCALE: 1" = 2' Horiz, Vert

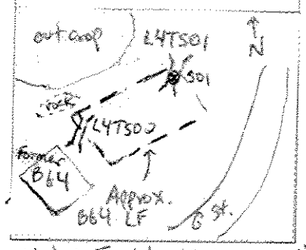



Unit A: Silt w/sand (ML), v.dk. brown (7.5YR3/3), moist - wet, soft, vf - fine sand, some organics, no plasticity, 0/15/85

Unit B: Weathered Chatsworth Fm. bedrock - siltstone in upper portion, weathered sandstone below, dk. yellowish brown, dense, dry

Note: Sample S01 Not Submitted; No Visible Staining For Analysis

Plan View-Site Location
(Provide Sketch)

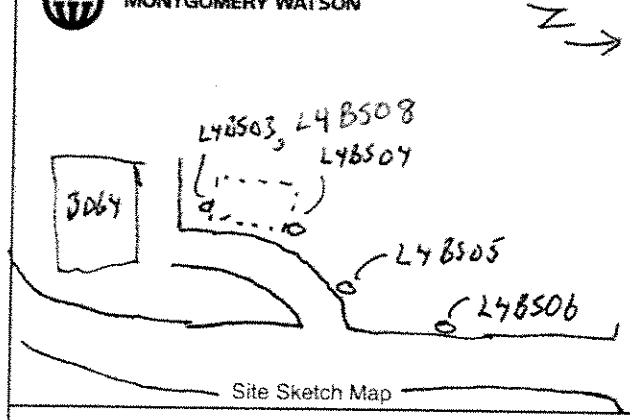



Note: Field sketch revised for Group 6 Report.

## 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

MONTGOMERY WATSON



Site Sketch Map

Boring #: L4B503-05, B508 MW#: Sheet 1 of 1

Project: SSFL

Job #: N/A Site: B064

Logged By: BFS Reviewed By:

Drilling Contractor: MWH

Drill Rig Type/Method: Hand Auger

Drillers Name: Ben Stewart

Borehole Diam./Drill Bit Type: 3-in Auger Total Depth: 0.5'

Ref. Elev.:

Sampler Type: Auger

Depth to 1st Water (▽): — Time/Date: —

Depth to Water After Drilling (▼): — Time/Date: —

Depth to other Water Bearing Zones: —

Drill Start Time/Date: 9/13/06 1250 Drill Finish Time/Date: 9/13/06 1310

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 | ■ | | ■ | | | 0 | ML | Surface: Gravelly Silt, light brown, v. cemented, dry, weathered shale | 40 | — | - | - | 60 |
| | | | | | | | 1 | | | | | | | |
| | | | | | | | 2 | | Ref. @ 0.5'; weathered shale v. compacted, entire area grubbed/irrigated | | | | | |
| | | | | | | | 3 | | | | | | | |
| | | | | | | | 4 | | | | | | | |
| | | | | | | | 5 | | For L4B503-05, same lithology for each. All refusal @ 0.5'. | | | | | |
| | | | | | | | 6 | | Sample L4B508 is a duplicate of L4B503 | | | | | |
| | | | | | | | 7 | | | | | | | |
| | | | | | | | 8 | | | | | | | |
| | | | | | | | 9 | | | | | | | |
| | | | | | | | 10 | | | | | | | |
| | | | | | | | 11 | | | | | | | |
| | | | | | | | 12 | | | | | | | |

GW08

**MONTGOMERY WATSON**

Boring #: L4B506 MW#: Sheet 1 of 1

Project: SSFL

Job #: N/A Site: BD64

Logged By: BFS Reviewed By:

Drilling Contractor: MW11

Drill Rig Type/Method: Hand Auger

Drillers Name: Ben Stewart

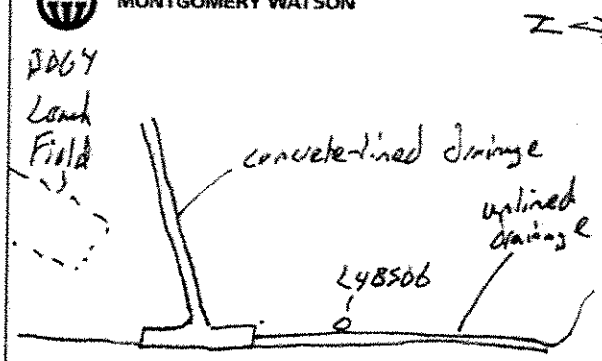
Borehole Diam./Drill Bit Type: 3-in Auger Total Depth: 0.5' Ref. Elev.:

Sampler Type:

Drill Start Time/Date: 9/13/06 1220 Drill Finish Time/Date: 9/13/06 1230

Well Completion Time/Date: —

Soil Boring Backfill Time/Date: —




Site Sketch Map

Depth to 1st Water (▽): — Time/Date: —

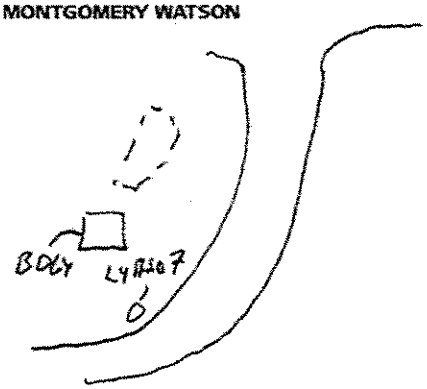
Depth to Water After Drilling (▼): — Time/Date: —

Depth to other Water Bearing Zones: —

| 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 | | | | | | 0 | ML | Surface: unlined drainage ditch, Gravelly silt, light brown, silt and shale gravel, v. cemented, dry, weathered shale | 30 | — | — | 10 | 60 |
| | | | | | | | 1 | | | | | | | |
| | | | | | | | 2 | | | | | | | |
| | | | | | | | 3 | | Ref. @ 0.5', weathered shale v. compacted | | | | | |
| | | | | | | | 4 | | | | | | | |
| | | | | | | | 5 | | | | | | | |
| | | | | | | | 6 | | | | | | | |
| | | | | | | | 7 | | | | | | | |
| | | | | | | | 8 | | | | | | | |
| | | | | | | | 9 | | | | | | | |
| | | | | | | | 10 | | | | | | | |
| | | | | | | | 11 | | | | | | | |
| | | | | | | | 12 | | | | | | | |

DAQC

MONTGOMERY WATSON



Site Sketch Map

Boring #: L4B507 MW#: Sheet 1 of 1

Project: SSFL

Job #: N/A Site: BOGY

Logged By: BFS Reviewed By:

Drilling Contractor: MWH

Drill Rig Type/Method: Hand Auger

Drillers Name: Ben Stewart

Borehole Diam./Drill Bit Type: 3-in Auger Total Depth 0.5'

Ref. Elev.

Sampler Type: Auger

Depth to 1st Water (▽): — Time/Date: —

Depth to Water After Drilling (▼): — Time/Date: —

Depth to other Water Bearing Zones: —

Drill Start Time/Date: 9/13/06 1410 Drill Finish Time/Date: 9/13/06 1420

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 Filter | Depth (Feet) | USCS Soil Type | Soil Description | Estimated % Of: Gravel | Sand: Coarse | Sand: Medium | Sand: Fine | Silt/clay |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X | | | | | | 0 | GP | Surface: Silty Gravel, light brown, v. cemented, Dry, weathered shale | 60 | — | — | — | 40 |
| | | | | | | | 1 | | | | | | | |
| | | | | | | | 2 | | Ref. @ 0.5', weathered shale v. compacted | | | | | |
| | | | | | | | 3 | | | | | | | |
| | | | | | | | 4 | | * (collo) sample for L4B503-06 | | | | | |
| | | | | | | | 5 | | | | | | | |
| | | | | | | | 6 | | | | | | | |
| | | | | | | | 7 | | | | | | | |
| | | | | | | | 8 | | | | | | | |
| | | | | | | | 9 | | | | | | | |
| | | | | | | | 10 | | | | | | | |
| | | | | | | | 11 | | | | | | | |
| | | | | | | | 12 | | | | | | | |

QA/QC

# APPENDIX A4-3

## LABORATORY ANALYTICAL DATA, DATA VALIDATION REPORTS, DATA QUALITY REPORT

# BUILDING 064 LEACH FIELD (AREA IV AOC)
# RCRA FACILITY INVESTIGATION REPORT
# SANTA SUSANA FIELD LABORATORY
# VENTURA COUNTY, CALIFORNIA

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***VOLUME III – RFI SITE REPORTS***

***APPENDIX A4, ATTACHMENT 3***

***LABORATORY DATA QUALITY***

**Prepared For:**

**THE UNITED STATES DEPARTMENT OF ENERGY**

**Prepared By:**

**MEC$^X$, LLC**
**12269 East Vassar Drive**
**Aurora, Co 80014**

**Elizabeth Wessling**
**Program QA / QC Manager**

**Patti Meeks, Ph.D.**
**Project Chemist**

**September 2006**

## TABLE OF CONTENTS

## ACRONYMS

| | |
|---|---|
| B064 | Building 064 |
| CCB | Continuing Calibration Blank |
| GC/MS | Gas Chromatography/Mass Spectrometry |
| MDL | Method Detection Limit |
| MS/MSD | Matrix Spike/Matrix Spike Duplicate |
| MWH | Montgomery Watson Harza |
| NELAP | National Environmental Laboratory Accreditation Program |
| PARCC | Precision, Accuracy, Representativeness, Completeness and Comparability |
| QA | Quality Assurance |
| QAPP | Quality Assurance Project Plan |
| QC | Quality Control |
| RCRA | Resource Conservation and Recovery Act |
| RFI | RCRA Facility Investigation |
| SOP | Standard Operating Procedure |
| SSFL | Santa Susana Field Laboratory |
| USEPA | United States Environmental Protection Agency |

## 1.0 OVERALL QUALITY ASSURANCE PROGRAM

This document has been prepared by MEC$^X$, LLC (MEC$^X$) for presentation in the Group 6 RFI Report Appendix A4 Building 064 Leach Field (B064 Leach Field) prepared by Montgomery Watson Harza (MWH) on behalf of The Boeing Company.

The Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at the Santa Susana Field Laboratory (SSFL) includes soil, groundwater, surface water, and biota sampling and analysis, as well as passive and active soil gas sampling and analysis following agency-approved work plans (Ogden 1996, 2000). Samples are analyzed for a variety of compounds including those analyzed in the Group 6 sampling effort: metals. The resulting data was validated by qualified chemists following United States Environmental Protection Agency (USEPA) guidelines as described in the RFI Quality Assurance Plans (QAPPs) and data validation standard operating procedures (SOPs). These data validation procedures are based on the National Functional Guidelines for Inorganic Data Review (February 1994).

The Group 6 sampling effort collected and analyzed soil samples following RFI protocols. Field Quality Control (QC) samples provide a means of evaluating the quality of field sampling procedures, the effectiveness of equipment decontamination procedures, and the potential for introduction of contaminants unrelated to the project. Field QC samples collected during the project included an equipment rinsate and a field duplicate. Unless otherwise noted, field QC samples were collected according to the Santa Susana Field Laboratory RFI QAPPs (Ogden 1996 and 2000).

Data from all samples collected in support of the Group 6 sampling effort were subsequently validated at either USEPA Level IV or V by MEC$^X$. The analyses reviewed were metals analyses. The associated data validation report, annotated laboratory result forms, and data tables are attached to this summary (Attachments C2 and C3).

According to the established data validation protocols, analytical results were annotated following validation with the following qualifications: “U” (non detected), “J” (estimated), “UJ”

(estimated non detect), “N” (tentative identification), “NJ” (estimated and tentatively identified), and “R” (rejected). Data with “U,” “J,” “UJ,” ”NJ,” or “N” qualifiers are usable; data with an “R” qualifier are unusable for any purpose. The data are additionally annotated with codes indicating the reason for the qualification. The following items were reviewed during the Level V validation process: sample management (collection techniques, sample containers, preservation, handling, transport, chain-of-custody, holding times); method blank sample results; blank spike and laboratory control sample results; surrogate recoveries, if applicable; matrix spike/matrix duplicate recoveries and precision; laboratory duplicate precision, if applicable; serial dilution precision, if applicable; field quality assurance / quality control (QA/QC) sample results; and other QC indicators as applicable. Level IV validation included review of the following: sample management, Gas Chromatography /Mass Spectrometry (GC/MS) instrument performance, initial and continuing calibration, method blank results, continuing calibration blank results, matrix spike sample results, surrogate results, laboratory and field QC sample results, internal standard performance, target compound identification, compound quantification, reported detection limits, and a definitive review of the raw data.

As the Group 6 sampling effort was not a complete field project, but an action intended to eliminate gaps in the B064 Leach Field data set, a precision, accuracy, representativeness, completeness, and comparability (PARCC) parameter assessment was not performed.

As discussed below in Sections 2 and 3, the Group 6 B064 Leach Field data quality is acceptable for the purposes of the RFI, with qualifications as needed based on review by MEC$^{X}$.

## 2.0 QUALITY ASSURANCE FINDINGS FOR HISTORIC DATA

Soil samples were collected for metals analyses from B064 and/or the B064 Leach Field for waste characterization purposes in 1991 and 1993. The resulting data were not validated and are, therefore, of unknown quality. After this data gap was identified, several samples were collected from the B064 Leach Field and the validated results are presented in the following section of this laboratory data quality report.

## 3.0 QUALITY ASSURANCE FINDINGS FOR THE BUILDING 064 LEACH FIELD GROUP 6 SAMPLES

Soil samples collected as part of the Group 6 sampling effort in the B064 Leach Field include three samples collected for metals. One equipment rinsate and one field duplicate sample were collected in association with the metals. No field split samples were collected for the B064 Leach Field.

### 3.1 METALS

Del Mar analyzed three soil samples, one field duplicate, and an equipment rinsate sample by EPA SW-846 Methods 6010B, 6020, 7470, and 7471 for 25 metal analytes. All data are useable as no results were rejected.

Most metal analytes were detected in the soil samples. Due to matrix interference, two samples had elevated method detection limits (MDLs) for the metals analyzed by USEPA SW-846 6020 (antimony, arsenic, barium, beryllium, cadmium, cobalt, copper, lead, molybdenum, nickel selenium, silver, thallium, vanadium, and zinc). Molybdenum detected in all samples, lithium detected in one sample, and antimony detected in one sample were qualified as nondetects due to method blank or continuing calibration blank (CCB) contamination. All sodium detects were qualified as estimated detects due to negative method blank contamination. Except for lead and thallium, all USEPA SW-846 6020 analytes were qualified as estimated detects and nondetects due to low MS/MSD recoveries. Sodium detected in one sample was qualified as estimated due

to a low reporting limit check standard recovery. Additionally, all antimony, copper and zinc and most lead and thallium detects were qualified as estimated detects due to equipment rinsate contamination. One field duplicate sample was collected and analyzed for metals. All detects were in common and all relative percent differences (RPDs) were less than 100%. The pair was considered to be in agreement.

## 4.0 REFERENCES

MWH. 2004. RCRA Facility Investigation Program Report, Santa Susana Field Laboratory, Ventura County. July.

Ogden Environmental and Energy Services, Company, Inc. (Ogden). 1996. RCRA Facility Investigation Work Plan Addendum, Santa Susana Field Laboratory, Ventura County, California. September 1996.

Ogden Environmental and Energy Services, Company, Inc. (Ogden). 2000. RCRA Facility Investigation Work Plan Addendum Amendment, Santa Susana Field Laboratory, Ventura County, California. June.

United States Environmental Protection Plan (USEPA). 1994. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. February.

# ATTACHMENT A4-3
# Electronic Copy of Validation Reports, COCs, and Case Narratives
# Readme File

This Readme file contains information and instructions regarding the use of electronic copies of validation reports, chain-of-custody forms, case narratives, and data tables included in Attachment A4-3 of the *Group 6-Northeastern Portion Area IV RCRA Facility Investigation (RFI) Report Santa Susana Field Laboratory* (MWH 2006), and is provided electronically on the compact disc (CD) provided in this attachment.

This section provides a read-only CD that contains a summary data table and electronic copies of validation reports, chain-of-custody (COC) forms, and the case narratives of the samples that were collected at the Building 064 Leach Field (B064 LF) RFI Site (Area IV Area of Concern [AOC]). All data in the tables and documents included in this section were used for the RFI characterization and/or risk assessment of B064 LF in Appendix A4 of the Group 6-Northeastern Area IV Bundle Report.

There are three main components to this section (two folders and one summary data table):

## 1. Soil and SW

This folder contains sampling and analytical information for soil and surface water samples collected at B064 LF. The folder is subdivided into two additional folders:

- **COC – Case Narratives:** This subfolder contains COCs, analytical request change forms (where applicable), and analytical report case narratives that are presented as electronic files. The electronic files are scanned images of hard copy documents presented in Portable Document Format (PDF) files, which can be viewed using Adobe Acrobat software. The electronic files are grouped and are organized in this subfolder by the sample delivery group (SDG) number, a tracking and reporting number used by the laboratory to group up to 20 samples upon receipt.

  The COCs were generated in the field at the time of sample collection to document the handling and change of custody of the samples.

  The case narrative is text typically found at the beginning of the laboratory report. Laboratories use the case narrative to describe any deviation from standard handling or analytical procedures for a sample or SDG. Information regarding lab certification and lab qualification codes can also be found in the case narrative files.

  Change Forms are generated for samples subsequent to shipment to the laboratory. Generally, change forms were generated when changes or corrections to a COC were needed (e.g., when additional analyses were requested for a sample).

  **Validation Reports:** Validation reports include laboratory results and a data assessment form completed by AMEC Earth and Environmental, Inc. (AMEC) or

MEC$^X$, LLC (MEC$^X$) data validators. The validation report summaries identify the analytical method and target compounds for each sample. Additionally, the report indicates whether each compound was detected, the concentration (or detection limit if not detected), and applicable laboratory and data validation qualifiers. With the exception of field QC samples (field blanks, equipment rinsates), all analytical data generated from background field samples were validated by AMEC or MEC$^X$. Data validation report PDFs are sorted by their validation report numbers, which can be associated with results of interest in the B064 LF Data Table (see description in section 3A below).

## 2. Soil Vapor

The Soil Vapor folder contains sampling and analytical information for soil vapor samples collected at B064 LF. The folder contains one subfolder:

- **Not Validated:** Results that have not been validated do not have accompanying validation reports. Laboratory backups for these results can be found in PDF format in this folder and are organized by SDG number. The backups consist of the "Form 1", a summary page provided by the laboratory.

## 3. B064 LF Data Table

This table is a sampling and analytical results table for B064 LF samples included in the B064 LF RFI characterization. The table is provided in PDF format. The data was queried from the SSFL database, which has been maintained throughout the history of the RFI program. The table is sorted by sample identification, then by analytical method, then by analyte, then by EPA number (where applicable).

Results included in the B064 LF RFI risk assessment are populated with a "yes" in the 'Included in Risk Assessment' column of the table.

This table can be used as a correlation look-up table to make documents in this appendix easier to access. The structure and directions for use of this table is described below.

A. Table Structure

- **EPA Number** – Unique identifier assigned in the field to samples to identify analytical laboratory and facilitate database management. EPA_NOs were not assigned to samples collected after June 15, 2006. The EPA_NO column is blank for samples collected after this date.
- **Sample Identification** –Identification assigned to sample to denote RFI site, sample collection method and sample matrix type, sample location, and sample number. Naming conventions are described in Table 4-1 of the Program Report (MWH 2004).
- **Analytical Method** – Analytical method use to analyze sample.
- **Analyte** – Chemical for which the sample is analyzed.

- **Concentration** – The concentration of a detected analyte or, if the analyte was not detected, the detection limit.
- **Units** – Unit of measurement for analyte (e.g., milligrams per kilogram [mg/kg]).
- **Reviewer Qualifier** – Review Qualifier code assigned by data reviewer at AMEC or MEC$^X$ during the validation process. These codes are defined in Table 1.2 of Appendix A of the Program Report. Reviewer qualifiers with an '*' were not validated. The qualifier code preceding the asterisk was usually provided by the analytical laboratory.
- **Detection Limit**– Minimum reportable concentration of an analyte as determined by the laboratory.
- **Matrix** – Surficial sample matrix. See Sample Collection and Matrix Type section of Table 4-1 of the Program Report (MWH 2000).
- **Collection Date** – Date of sample collection.
- **Depth (ft bgs)** – Sample depth (feet below ground surface).
- **Sample Type** – Sample type indicates whether the samples is a primary, field duplicate, or split sample. A more detailed description of the different sample types can be found in the Quality Assurance Project Plan (QAPP) (Ogden 2000a).
- **SDG Number** – SDG number assigned by the laboratory upon receipt of samples. A single SDG number is assigned to all samples on one COC form (up to 20 samples), and each laboratory report includes one SDG.
- **Excavated** – Indicates whether the soil from which the sample was collected has been excavated. If the sample was excavated, this column is populated with "yes". Samples that have not been excavated are designated with "no" in this column.
- **Contained or Transformer** – Indicates the sample was collected from a contained unit if there is a 'C' in this field. 'A' indicates aerial photo site. 'T' indicates samples collected at or near transformers. 'R' indicates soil associated with sample that has been excavated (for samples collected prior the start of RFI program sampling in May 22, 1996). 'LF' indicates 'Leach Field' samples (applies only to pre-RFI samples).
- **Analytical Laboratory** – Analytical laboratory where the sample was analyzed.
- **Laboratory Sample Number** – Unique identifier assigned by the analytical laboratory to field samples and laboratory QC samples for internal use and reporting purposes.
- **Validation Report Number** – Tracking number assigned by AMEC or MEC$^X$. The validation report number provides a system to associate the data in the RFI database with the hard copy version of the validation report. Validation report number assignments and method associations are defined in Table B-1-2 of Appendix B-1in the Program Report.
- **Northings and Eastings** – Map Coordinates (State Plane, NAD 27 Zone V).
- **Publication** – Document reference for samples whose results were discussed in a previously published document. Used mainly for pre-RFI samples.
- **Included in Risk Assessment** – Populated with either a "yes" or a "no". A "yes" in this column indicates the result was included in the risk assessment for B064 LF. A

"no" in this column indicates the result was not included in the risk assessment for B064 LF. See Appendix C of the Group 6 Bundle Report for more information regarding risk assessments.

- **Rationale for Risk Exclusion –** provides justification for not including a result in the risk assessment for B064 LF. This applies only to samples that were not included in the risk assessment. Results with no value in this column were included in the risk assessment. See Appendix C of the Group 6 Bundle Report for more information regarding risk assessments.

B. Instructions for use as look-up tables

These tables are configured to facilitate the search for a document in any of the folders described above. To locate documents for samples associated with a particular result:

1. Using the table's sorting priority described earlier in this section Locate the sample identification and laboratory method.

2. Scroll right to the SDG and validation report number columns.

3. Note the appropriate SDG and validation report number.

Locate the document of interest under the appropriate folder as described above. The folders containing COCs, case narratives, and results that were not validated are organized by SDG number. Validation reports are organized by the validation report numbers.

**Building 064 Leach Field (Area IV Area of Concern)**
**Sampling and Analytical Results Summary**
**Santa Susana Field Laboratory**



| EPA Number | Sample Identification | Analytical Method | Analyte | Concentration | Units | Reviewer Qualifier | Detection Limit | Matrix | Collection Date | Depth (ft bgs) | Sample Type | SDG Number | Excavated | Contained or Transformer | Analytical Laboratory | Laboratory Sample Number | Validation Report Number | Northings | Eastings | Publication | Consultant | Included in Risk Assessment | Rationale for Risk Exclusion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L4BS03S01 | 6010B | Aluminum | 11000 | mg/kg | | 5.1 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6010B | Boron | 3 | mg/kg | | 1 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6010B | Iron | 17000 | mg/kg | | 1.5 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6010B | Lithium | 22 | mg/kg | | 0.91 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6010B | Manganese | 290 | mg/kg | | 0.81 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6010B | Potassium | 3100 | mg/kg | | 40 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6010B | Sodium | 45 | mg/kg | J | 15 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6010B | Zirconium | 2.4 | mg/kg | | 1.5 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Antimony | 0.16 | mg/kg | J | 0.03 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Arsenic | 3 | mg/kg | J | 0.25 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Barium | 69 | mg/kg | J | 0.081 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Beryllium | 0.39 | mg/kg | J | 0.04 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Cadmium | 0.11 | mg/kg | J | 0.02 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Chromium | 15 | mg/kg | J | 0.3 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Cobalt | 5.8 | mg/kg | J | 0.02 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Copper | 9.6 | mg/kg | J | 0.2 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Lead | 6 | mg/kg | J | 0.02 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Molybdenum | 0.51 | mg/kg | UJ | 0.51 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Nickel | 10 | mg/kg | J | 0.2 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Selenium | 0.26 | mg/kg | J | 0.2 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Silver | 0.049 | mg/kg | J | 0.02 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Thallium | 0.43 | mg/kg | J | 0.1 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Vanadium | 27 | mg/kg | J | 0.4 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 6020 | Zinc | 47 | mg/kg | J | 0.51 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS03S01 | 7471 | Mercury | 0.0089 | mg/kg | | 0.0081 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-01 | B5MT36 | 267841.791 | 1786960.867 | | MWH | yes | |
| | L4BS04S01 | 6010B | Aluminum | 14000 | mg/kg | | 5.1 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6010B | Boron | 2.8 | mg/kg | | 1 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6010B | Iron | 19000 | mg/kg | | 1.5 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6010B | Lithium | 24 | mg/kg | | 0.91 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6010B | Manganese | 290 | mg/kg | | 0.81 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6010B | Potassium | 3100 | mg/kg | | 40 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6010B | Sodium | 58 | mg/kg | J | 15 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6010B | Zirconium | 2.5 | mg/kg | | 1.5 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Antimony | 0.16 | mg/kg | J | 0.03 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Arsenic | 3.4 | mg/kg | J | 0.25 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Barium | 73 | mg/kg | J | 0.081 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Beryllium | 0.56 | mg/kg | J | 0.04 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Cadmium | 0.094 | mg/kg | J | 0.02 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Chromium | 17 | mg/kg | J | 0.3 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Cobalt | 5.6 | mg/kg | J | 0.02 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Copper | 9.7 | mg/kg | J | 0.2 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Lead | 6.6 | mg/kg | J | 0.02 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Molybdenum | 0.57 | mg/kg | UJ | 0.57 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Nickel | 11 | mg/kg | J | 0.2 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Selenium | 0.26 | mg/kg | J | 0.2 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Silver | 0.045 | mg/kg | J | 0.02 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Thallium | 0.48 | mg/kg | | 0.1 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Vanadium | 32 | mg/kg | J | 0.4 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 6020 | Zinc | 41 | mg/kg | J | 0.51 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS04S01 | 7471 | Mercury | 0.011 | mg/kg | | 0.0081 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-02 | B5MT36 | 267858.356 | 1787001.758 | | MWH | yes | |
| | L4BS06S01 | 6010B | Aluminum | 13000 | mg/kg | | 5.1 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6010B | Boron | 3.5 | mg/kg | | 1 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6010B | Iron | 19000 | mg/kg | | 1.5 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6010B | Lithium | 23 | mg/kg | | 0.91 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6010B | Manganese | 290 | mg/kg | | 0.81 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6010B | Potassium | 3600 | mg/kg | | 41 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6010B | Sodium | 87 | mg/kg | J | 15 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6010B | Zirconium | 1.8 | mg/kg | | 1.5 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Antimony | 0.12 | mg/kg | UJ | 0.12 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Arsenic | 1.8 | mg/kg | J | 1 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Barium | 79 | mg/kg | J | 0.33 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Beryllium | 0.53 | mg/kg | J | 0.16 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Cadmium | 0.39 | mg/kg | J | 0.081 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |

**Building 064 Leach Field (Area IV Area of Concern)**
**Sampling and Analytical Results Summary**
**Santa Susana Field Laboratory**



| EPA Number | Sample Identification | Analytical Method | Analyte | Concentration | Units | Reviewer Qualifier | Detection Limit | Matrix | Collection Date | Depth (ft bgs) | Sample Type | SDG Number | Excavated | Contained or Transformer | Analytical Laboratory | Laboratory Sample Number | Validation Report Number | Northings | Eastings | Publication | Consultant | Included in Risk Assessment | Rationale for Risk Exclusion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L4BS06S01 | 6020 | Chromium | 24 | mg/kg | J | 1.2 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Cobalt | 6.5 | mg/kg | J | 0.081 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Copper | 15 | mg/kg | J | 0.81 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Lead | 40 | mg/kg | | 0.081 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Molybdenum | 0.68 | mg/kg | UJ | 0.68 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Nickel | 14 | mg/kg | J | 0.81 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Selenium | 0.81 | mg/kg | UJ | 0.81 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Silver | 0.15 | mg/kg | J | 0.081 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Thallium | 0.42 | mg/kg | J | 0.41 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Vanadium | 36 | mg/kg | J | 1.6 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 6020 | Zinc | 120 | mg/kg | J | 2 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS06S01 | 7471 | Mercury | 0.024 | mg/kg | | 0.0081 | S | 9/13/2006 | 0.5 | Primary Sample | IPI1167 | no | | DELMAR | IPI1167-04 | B5MT36 | 267948.786 | 1787096.272 | | MWH | yes | |
| | L4BS08S01 | 6010B | Aluminum | 11000 | mg/kg | | 5.1 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6010B | Boron | 2.4 | mg/kg | | 1 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6010B | Iron | 18000 | mg/kg | | 1.5 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6010B | Lithium | 23 | mg/kg | | 0.91 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6010B | Manganese | 280 | mg/kg | | 0.81 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6010B | Potassium | 2900 | mg/kg | | 40 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6010B | Sodium | 82 | mg/kg | J | 15 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6010B | Zirconium | 2.3 | mg/kg | | 1.5 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Antimony | 0.098 | mg/kg | UJ | 0.098 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Arsenic | 3.4 | mg/kg | J | 0.51 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Barium | 73 | mg/kg | J | 0.16 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Beryllium | 0.42 | mg/kg | J | 0.081 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Cadmium | 0.12 | mg/kg | J | 0.04 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Chromium | 17 | mg/kg | J | 0.61 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Cobalt | 6.1 | mg/kg | J | 0.04 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Copper | 11 | mg/kg | J | 0.4 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Lead | 6 | mg/kg | J | 0.04 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Molybdenum | 0.43 | mg/kg | UJ | 0.43 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Nickel | 11 | mg/kg | J | 0.4 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Selenium | 0.4 | mg/kg | UJ | 0.4 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Silver | 0.044 | mg/kg | J | 0.04 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Thallium | 0.27 | mg/kg | J | 0.2 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Vanadium | 32 | mg/kg | J | 0.81 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 6020 | Zinc | 55 | mg/kg | J | 1 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| | L4BS08S01 | 7471 | Mercury | 0.0095 | mg/kg | | 0.0081 | S | 9/13/2006 | 0.5 | Field Duplicate | IPI1167 | no | | DELMAR | IPI1167-06 | B5MT36 | 267841.791 | 1786960.867 | | MWH | no | duplicate result |
| SVLF0641 | SVLF0641 | 8240 | VOC in vapor screen (All ND) | 5 | ug/L | U* | 5 | Vapor | 8/24/1993 | 1.5 | Primary Sample | IPI1167 | no | LF | DELMAR | VOA0834 | | 267885.4688 | 1786944 | CCR (10/93) | ICF Kaiser | no | data not validated |

**Units**
µg/L = micrograms per liter
mg/kg = milligrams per kilograms

**Reviewer Qualifier**
U = not detected
J = estimated detect
* = estimated detect

ft bgs = feet below ground surface

IP1167

# CHAIN OF CUSTODY RECORD

COC # MWH2006091301BFS

LAB SDG #

BOEING

Page: 1 of 1

| Customer Information | | Project Information | | Project Information | |
|---|---|---|---|---|---|
| Site: | Boeing-SSFL | Client: | DOE | Sampler: | BFS |
| Company: | MWH | Sampling Event: | Group 6 Data Gaps | Contact #: | |
| Report to: | Lisa Tucker | Project. No. | -Area IV AOC - B064 Leachfield | Requested Analyses | Instructions/TAT |
| Address: | 9444 Farnham Street, Suite 300<br>San Diego, CA 92123 | Project Manager: | Dixie Hambrick | | |
| | | PM Contact # | 6265686364 | | |
| | | Field Contact: | Ben Stewart | | |
| Email: | boeingedms@ch2m.com | Field Contact # | 8182661378 | | |
| | | Lab Contact/PM: | Michele Chamberlin/Test America | | |
| | | Lab Address: | 17461 Derian Avenue Suite 100 | | |
| | | Lab Phone: | | | |

| No. | Sample ID | Description (for MWH use only) | Matrix | Date | Time | Preserv. | Cont. Type | No. of Containers | Field Filtered? | VOC by 5030B/SW8260B | Metals by 6010/6020/7471A* | Fish Bioassay | % Solids | PCB COMP (3X) by SW8082 | SVOCs by SW8270C | NDMA by SW8270C SIM | TPH by SW8015BM | PCB by SW8082 | Acetone by SW8260B | Formaldehyde by SW8315 | pH by SW9045C | HOLD | Instructions/TAT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | L4BS03S01 | D=0.5' | S | 9/13/2006 | 11:00 | None | Sleeve | 2 | No | | X | | | | | | | | | | | | 24 Hour |
| 2 | L4BS04S01 | D=0.5' | S | 9/13/2006 | 11:30 | None | Sleeve | 2 | No | | X | | | | | | | | | | | | 24 Hour |
| 3 | L4BS05S01 | D=0.5' | S | 9/13/2006 | 12:10 | None | Sleeve | 2 | No | | X | | | | | | | | | | | | HOLD |
| 4 | L4BS06S01 | D=0.5' | S | 9/13/2006 | 12:40 | None | Sleeve | 2 | No | | X | | | | | | | | | | | | 24 Hour |
| 5 | L4BS07S01 | Control; D=0.5' | S | 9/13/2006 | 14:20 | None | Sleeve | 2 | No | | X | | | | | | | | | | | | HOLD |
| 6 | L4BS08S01 | D=0.5' | S | 9/13/2006 | 11:00 | None | Sleeve | 2 | No | | X | | | | | | | | | | | | 24 Hour |
| 7 | L4QW01E01 | | QW | 9/13/2006 | 13:00 | HNO3 | 500 mL Poly | 1 | No | | X | | | | | | | | | | | | 24 Hour |
| 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | |

ER to 1915

3°C

| 1. Relinquished by: | Date: 9/13/06 | 2. Received by: | Date: 9-13-06 | 3. Relinquished by: | Date: 9-13-06 | 4. Received by: | Date: 9-13-06 |
|---|---|---|---|---|---|---|---|
| Company: MWH | Time: 1500 | Company: TA | Time: 1600 | Company: TA | Time: 1830 | Company: TA | Time: 1830 |

Comments:
X=Requested Analysis, H=Hold Analysis, EH=Extract and Hold Analysis

*=Title 22 list plus, Al, B,Fe, Li, Mn, K, Na, Zr by 6010/6020/7471A
MS/MSD in sample ID indicates additional volume, please homogenize aliquots prior to sub sampling with the exception of Volatile Analyses.

Geotracker EDF ☐ Standard TAT ☐

Data Validation Package ☐ Level IV Rush TAT Indicate Above

Rev 7/06

193

12269 East Vassar Drive, Aurora, CO 80014
720.535.5502, Fax 720.535.7555

## DATA ASSESSMENT FORM

| | |
|---|---|
| Project Title: | Boeing SSFL RFI, Group 6 Data Gap |
| Project Manager: | D. Hambrick |
| Analysis/Method: | Metals by EPA 6010B, 6020, and 7471A |
| QC Level: | V[1] |
| SDG: | IPI1167 |
| Matrix: | Soil/Water |
| No. of Samples: | 5 |
| No. of Reanalyses: | 0 |
| Date Reviewed: | September 19, 2006 |
| Reviewer: | P. Meeks |
| Reference: | USEPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (2/94) |
| Samples Reviewed: | L4BS03S01, L4BS04S01, L4BS06S01, L4BS08S01, L4QW01E01 |

### Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The samples were received within the temperature limits of 4°±2°C, at 3°C. The COC was signed and dated by field and laboratory personnel and accounted for the samples and analyses presented in this SDG. As the sample were couriered directly from the field to the laboratory, custody seals were not necessary.<br><br>The 6-month ICP and ICP-MS metals and the 28-day mercury analytical holding times were met. | No qualifications were required. |
| 3. Method Blanks<br>6I13160-BLK1<br>6I13161-BLK1<br>6I14069-BLK1<br>6I15120-BLK1<br>6I13166-BLK1<br>6I14070-BLK1<br>6I13115-BLK1<br>6I13167-BLK1 | Lithium was detected in method blank 6I13166-BLK1 at 11.0 µg/L and sodium was reported in method blank 6I13160-BLK1 at -10 mg/kg. Molybdenum and antimony were detected in bracketing CCBs at 0.236 and 0.055 µg/L, respectively. | Lithium and molybdenum detected in L4QW01E01, molybdenum detected in all site soil samples, and antimony detected in L4BS08S01 were qualified as estimated nondetects, "UJ." Sodium detected in all soil site samples was qualified as estimated, "J." |

| | Findings | Qualifications |
|---|---|---|
| 5. LCS/BS<br>6I13160-BS1<br>6I13161-BS1<br>6I14069-BS1<br>6I15120-BS1<br>6I13166-BS1<br>6I14070-BS1<br>6I13115-BS1<br>6I13167-BS1 | All recoveries were within the laboratory-established control limits. | No qualifications were required. |
| 6. Duplicates<br>None | None | None |
| 7. MS/MSDs<br>L4BS03S01<br>L4QW01E01 | MS/MSD analyses were performed on L4BS03S01 SDG for all analyses except mercury. All recoveries were below the control limits of 75-125%, except for lead and thallium.<br><br>MS/MSD analyses were performed on L4QW01E01 for all analyses except mercury; however, as the sample was identified as a field QC sample, the results were not assessed. | Except for lead and thallium, all site soil sample 6020 results were qualified as estimated detects, "J," and nondetects, "UJ." |
| 10. Other | Sodium was not recovered in the reporting limit check standard associated with the analysis of L4BS03S01.<br><br>Due to matrix interference, metals analyzed by 6020 in L4BS06S01 were analyzed at a 4× dilution and at a 2× dilution in L4BS08S01. | Sodium detected in L4BS03S01 was qualified as estimated, "J." |
| 11. Field QC Samples<br>Field blank: N/A<br>Equipment rinsate: L4QW01E01<br>Field duplicates: L4BS03S01/L4BS08S01 | Antimony, cadmium, copper, lead, thallium, and zinc were detected in the equipment rinsate at 0.16, 0.042, 17, 4.1, 0.20, and 81 µg/L, respectively.<br><br>Selenium was detected in the primary sample, L4BS03S01 but was not detected in the field duplicate, L4BS08S01. All other detects were in common and all RPDs were less than 100%. | Antimony, copper, and zinc detected in all soil site samples were qualified as estimated detects, "J." Lead detected in L4BS03S01, L4BS04S01, and L4BS08S01 and thallium detected in L4BS03S01, L4BS06S01, and L4BS08S01 were qualified as estimated detects, "J." |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only, and raw data is not evaluated. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed. Criteria not reviewed include initial and continuing calibration, continuing calibration blanks, interference check samples (ICSA/ICSAB), and serial dilutions.

TestAmerica
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MWH-San Diego/Boeing
9444 Farnham Street, Suite 300
San Diego, CA 92123
Attention: Lisa J. Tucker

Project ID: Group 6 Data Gaps
Area IV AOC - B064 Leachfield
Report Number: IPI1167

Sampled: 09/13/06
Received: 09/13/06

## METALS

| Analyte | Method | Batch | MDL Limit | Reporting Limit | Sample Result | Dilution Factor | Date Extracted | Date Analyzed | Data Qualifiers | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample ID: IPI1167-01 (L4BS03S01 - Soil)** | | | | | | | | | | | |
| **Reporting Units: mg/kg dry** | | | | | | | | | | | |
| **Aluminum** | EPA 6010B | 6I13160 | 5.1 | 10 | **11000** | 1 | 09/13/06 | 09/14/06 | M-HA | | |
| **Antimony** | EPA 6020 | 6I13161 | 0.030 | 1.0 | **0.16** | 1 | 09/13/06 | 09/14/06 | J M2, J | | F,Q |
| **Arsenic** | EPA 6020 | 6I13161 | 0.25 | 0.51 | **3.0** | 1 | 09/13/06 | 09/14/06 | M2 | | |
| **Barium** | EPA 6020 | 6I13161 | 0.081 | 0.51 | **69** | 1 | 09/13/06 | 09/14/06 | M2 | | |
| **Beryllium** | EPA 6020 | 6I13161 | 0.040 | 0.30 | **0.39** | 1 | 09/13/06 | 09/14/06 | M2 | | |
| **Boron** | EPA 6010B | 6I13160 | 1.0 | 5.1 | **3.0** | 1 | 09/13/06 | 09/14/06 | J | | |
| **Cadmium** | EPA 6020 | 6I13161 | 0.020 | 0.51 | **0.11** | 1 | 09/13/06 | 09/14/06 | J M2, J | | Q |
| **Chromium** | EPA 6020 | 6I13161 | 0.30 | 1.0 | **15** | 1 | 09/13/06 | 09/14/06 | M2 | | |
| **Cobalt** | EPA 6020 | 6I13161 | 0.020 | 0.51 | **5.8** | 1 | 09/13/06 | 09/14/06 | M2 | | |
| **Copper** | EPA 6020 | 6I13161 | 0.20 | 1.0 | **9.6** | 1 | 09/13/06 | 09/14/06 | J M2 | | F |
| **Iron** | EPA 6010B | 6I13160 | 1.5 | 5.1 | **17000** | 1 | 09/13/06 | 09/14/06 | M-HA | | |
| **Lead** | EPA 6020 | 6I13161 | 0.020 | 0.51 | **6.0** | 1 | 09/13/06 | 09/14/06 | J J | | Q F |
| **Lithium** | EPA 6010B | 6I13160 | 0.91 | 6.4 | **22** | 1 | 09/13/06 | 09/14/06 | | | |
| **Manganese** | EPA 6010B | 6I13160 | 0.81 | 1.0 | **290** | 1 | 09/13/06 | 09/14/06 | M-HA | | |
| **Mercury** | EPA 7471A | 6I14069 | 0.0081 | 0.020 | **0.0089** | 1 | 09/14/06 | 09/14/06 | J | | |
| **Molybdenum** | EPA 6020 | 6I13161 | 0.10 | 1.0 | **0.51** | 1 | 09/13/06 | 09/14/06 | UJ M2, J | | B,Q |
| **Nickel** | EPA 6020 | 6I13161 | 0.20 | 1.0 | **10** | 1 | 09/13/06 | 09/14/06 | J M2 | | Q |
| **Potassium** | EPA 6010B | 6I13160 | 40 | 51 | **3100** | 1 | 09/13/06 | 09/14/06 | M-HA | | |
| **Selenium** | EPA 6020 | 6I13161 | 0.20 | 1.0 | **0.26** | 1 | 09/13/06 | 09/14/06 | J M2, J | | Q |
| **Silver** | EPA 6020 | 6I13161 | 0.020 | 0.51 | **0.049** | 1 | 09/13/06 | 09/14/06 | M2, J | | |
| **Sodium** | EPA 6010B | 6I13160 | 15 | 51 | **45** | 1 | 09/13/06 | 09/14/06 | J J | | Q B,*10 |
| **Thallium** | EPA 6020 | 6I13161 | 0.10 | 0.51 | **0.43** | 1 | 09/13/06 | 09/14/06 | J J | | F |
| **Vanadium** | EPA 6020 | 6I13161 | 0.40 | 1.0 | **27** | 1 | 09/13/06 | 09/14/06 | J M2 | | Q |
| **Zinc** | EPA 6020 | 6I13161 | 0.51 | 10 | **47** | 1 | 09/13/06 | 09/14/06 | J M2 | | F Q |
| **Zirconium** | EPA 6010B | 6I15120 | 1.5 | 25 | **2.4** | 1 | 09/15/06 | 09/15/06 | J | | |

pm 9/20/06

LEVEL V

**TestAmerica - Irvine, CA**
Michele Chamberlin
Project Manager

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MWH-San Diego/Boeing
9444 Farnham Street, Suite 300
San Diego, CA 92123
Attention: Lisa J. Tucker

Project ID: Group 6 Data Gaps
Area IV AOC - B064 Leachfield
Report Number: IPI1167

Sampled: 09/13/06
Received: 09/13/06

## METALS

| Analyte | Method | Batch | MDL Limit | Reporting Limit | Sample Result | Dilution Factor | Date Extracted | Date Analyzed | Data Qualifiers | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample ID: IPI1167-02 (L4BS04S01 - Soil)** | | | | | | | | | | | |
| **Reporting Units: mg/kg dry** | | | | | | | | | | | |
| **Aluminum** | EPA 6010B | 6I13160 | 5.1 | 10 | **14000** | 1 | 09/13/06 | 09/14/06 | | | |
| **Antimony** | EPA 6020 | 6I13161 | 0.030 | 1.0 | **0.16** | 1 | 09/13/06 | 09/14/06 | J | J | Q, F |
| **Arsenic** | EPA 6020 | 6I13161 | 0.25 | 0.51 | **3.4** | 1 | 09/13/06 | 09/14/06 | | | |
| **Barium** | EPA 6020 | 6I13161 | 0.081 | 0.51 | **73** | 1 | 09/13/06 | 09/14/06 | | | |
| **Beryllium** | EPA 6020 | 6I13161 | 0.040 | 0.30 | **0.56** | 1 | 09/13/06 | 09/14/06 | | | |
| **Boron** | EPA 6010B | 6I13160 | 1.0 | 5.1 | **2.8** | 1 | 09/13/06 | 09/14/06 | | J | |
| **Cadmium** | EPA 6020 | 6I13161 | 0.020 | 0.51 | **0.094** | 1 | 09/13/06 | 09/14/06 | J | J | Q |
| **Chromium** | EPA 6020 | 6I13161 | 0.30 | 1.0 | **17** | 1 | 09/13/06 | 09/14/06 | | | |
| **Cobalt** | EPA 6020 | 6I13161 | 0.020 | 0.51 | **5.6** | 1 | 09/13/06 | 09/14/06 | | | |
| **Copper** | EPA 6020 | 6I13161 | 0.20 | 1.0 | **9.7** | 1 | 09/13/06 | 09/14/06 | J | | F |
| **Iron** | EPA 6010B | 6I13160 | 1.5 | 5.1 | **19000** | 1 | 09/13/06 | 09/14/06 | | | |
| **Lead** | EPA 6020 | 6I13161 | 0.020 | 0.51 | **6.6** | 1 | 09/13/06 | 09/14/06 | J | | Q, F |
| **Lithium** | EPA 6010B | 6I13160 | 0.91 | 6.4 | **24** | 1 | 09/13/06 | 09/14/06 | | | |
| **Manganese** | EPA 6010B | 6I13160 | 0.81 | 1.0 | **290** | 1 | 09/13/06 | 09/14/06 | | | |
| **Mercury** | EPA 7471A | 6I14069 | 0.0081 | 0.020 | **0.011** | 1 | 09/14/06 | 09/14/06 | | J | |
| **Molybdenum** | EPA 6020 | 6I13161 | 0.10 | 1.0 | **0.57** | 1 | 09/13/06 | 09/14/06 | UJ | J | Q, B |
| **Nickel** | EPA 6020 | 6I13161 | 0.20 | 1.0 | **11** | 1 | 09/13/06 | 09/14/06 | J | | Q |
| **Potassium** | EPA 6010B | 6I13160 | 40 | 51 | **3100** | 1 | 09/13/06 | 09/14/06 | | | |
| **Selenium** | EPA 6020 | 6I13161 | 0.20 | 1.0 | **0.26** | 1 | 09/13/06 | 09/14/06 | J | J | Q |
| **Silver** | EPA 6020 | 6I13161 | 0.020 | 0.51 | **0.045** | 1 | 09/13/06 | 09/14/06 | J | J | |
| **Sodium** | EPA 6010B | 6I13160 | 15 | 51 | **58** | 1 | 09/13/06 | 09/14/06 | J | | B |
| **Thallium** | EPA 6020 | 6I13161 | 0.10 | 0.51 | **0.48** | 1 | 09/13/06 | 09/14/06 | UJ | J | Q |
| **Vanadium** | EPA 6020 | 6I13161 | 0.40 | 1.0 | **32** | 1 | 09/13/06 | 09/14/06 | J | | Q |
| **Zinc** | EPA 6020 | 6I13161 | 0.51 | 10 | **41** | 1 | 09/13/06 | 09/14/06 | J | | F |
| **Zirconium** | EPA 6010B | 6I15120 | 1.5 | 25 | **2.5** | 0.995 | 09/15/06 | 09/15/06 | | J | |

PM 9/20/06

LEVEL V

**TestAmerica - Irvine, CA**
Michele Chamberlin
Project Manager

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San Diego, CA 92123
Attention: Lisa J. Tucker

Project ID: Group 6 Data Gaps
Area IV AOC - B064 Leachfield
Report Number: IPI1167

Sampled: 09/13/06
Received: 09/13/06

## METALS

| Analyte | Method | Batch | MDL Limit | Reporting Limit | Sample Result | Dilution Factor | Date Extracted | Date Analyzed | Data Qualifiers | Qual Code |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sample ID: IPI1167-04 (L4BS06S01 - Soil)** | | | | | | | | | Raw Qual | |
| **Reporting Units: mg/kg dry** | | | | | | | | | | |
| **Aluminum** | EPA 6010B | 6I13160 | 5.1 | 10 | **13000** | 1 | 09/13/06 | 09/14/06 | | |
| Antimony | EPA 6020 | 6I13161 | 0.12 | 4.1 | ND | 4 | 09/13/06 | 09/14/06 | UJ RL-1 | Q |
| **Arsenic** | EPA 6020 | 6I13161 | 1.0 | 2.0 | **1.8** | 4 | 09/13/06 | 09/14/06 | J RL-1, J | ↓ |
| **Barium** | EPA 6020 | 6I13161 | 0.33 | 2.0 | **79** | 4 | 09/13/06 | 09/14/06 | ↓ | |
| **Beryllium** | EPA 6020 | 6I13161 | 0.16 | 1.2 | **0.53** | 4 | 09/13/06 | 09/14/06 | ↓ RL-1, J | |
| **Boron** | EPA 6010B | 6I13160 | 1.0 | 5.1 | **3.5** | 1 | 09/13/06 | 09/14/06 | J | |
| **Cadmium** | EPA 6020 | 6I13161 | 0.081 | 2.0 | **0.39** | 4 | 09/13/06 | 09/14/06 | J RL-1, J | Q |
| **Chromium** | EPA 6020 | 6I13161 | 1.2 | 4.1 | **24** | 4 | 09/13/06 | 09/14/06 | ↓ | ↓ |
| **Cobalt** | EPA 6020 | 6I13161 | 0.081 | 2.0 | **6.5** | 4 | 09/13/06 | 09/14/06 | ↓ | |
| **Copper** | EPA 6020 | 6I13161 | 0.81 | 4.1 | **15** | 4 | 09/13/06 | 09/14/06 | J | ↓F |
| **Iron** | EPA 6010B | 6I13160 | 1.5 | 5.1 | **19000** | 1 | 09/13/06 | 09/14/06 | | |
| **Lead** | EPA 6020 | 6I13161 | 0.081 | 2.0 | **40** | 4 | 09/13/06 | 09/14/06 | ~~J~~ ~~UJ~~ | ~~F~~ |
| **Lithium** | EPA 6010B | 6I13160 | 0.91 | 6.4 | **23** | 1 | 09/13/06 | 09/14/06 | | |
| **Manganese** | EPA 6010B | 6I13160 | 0.81 | 1.0 | **290** | 1 | 09/13/06 | 09/14/06 | | |
| **Mercury** | EPA 7471A | 6I14069 | 0.0081 | 0.020 | **0.024** | 1 | 09/14/06 | 09/14/06 | | |
| **Molybdenum** | EPA 6020 | 6I13161 | 0.41 | 4.1 | **0.68** | 4 | 09/13/06 | 09/14/06 | UJ RL-1, J | Q, B |
| **Nickel** | EPA 6020 | 6I13161 | 0.81 | 4.1 | **14** | 4 | 09/13/06 | 09/14/06 | J | ↓ |
| **Potassium** | EPA 6010B | 6I13160 | 41 | 51 | **3600** | 1 | 09/13/06 | 09/14/06 | | |
| Selenium | EPA 6020 | 6I13161 | 0.81 | 4.1 | ND | 4 | 09/13/06 | 09/14/06 | UJ RL-1 | Q |
| **Silver** | EPA 6020 | 6I13161 | 0.081 | 2.0 | **0.15** | 4 | 09/13/06 | 09/14/06 | J RL-1, J | Q |
| **Sodium** | EPA 6010B | 6I13160 | 15 | 51 | **87** | 1 | 09/13/06 | 09/14/06 | J | B |
| **Thallium** | EPA 6020 | 6I13161 | 0.41 | 2.0 | **0.42** | 4 | 09/13/06 | 09/14/06 | J RL-1, J | F |
| **Vanadium** | EPA 6020 | 6I13161 | 1.6 | 4.1 | **36** | 4 | 09/13/06 | 09/14/06 | J | Q |
| **Zinc** | EPA 6020 | 6I13161 | 2.0 | 41 | **120** | 4 | 09/13/06 | 09/14/06 | J | ↓F |
| **Zirconium** | EPA 6010B | 6I15120 | 1.5 | 25 | **1.8** | 1 | 09/15/06 | 09/15/06 | J | |

AM 9/20/06

LEVEL V

**TestAmerica - Irvine, CA**
Michele Chamberlin
Project Manager

TestAmerica
ANALYTICAL TESTING CORPORATION
17461 Derian Avenue. Suite 100, Irvine, CA 92614 (949) 261-1022 Fax:(949) 260-3297

MWH-San Diego/Boeing
9444 Farnham Street, Suite 300
San Diego, CA 92123
Attention: Lisa J. Tucker

Project ID: Group 6 Data Gaps
Area IV AOC - B064 Leachfield
Report Number: IPI1167

Sampled: 09/13/06
Received: 09/13/06

## METALS

| Analyte | Method | Batch | MDL | Reporting Limit | Sample Result | Dilution Factor | Date Extracted | Date Analyzed | Data Qualifiers | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample ID: IPI1167-06 (L4BS08S01 - Soil)** | | | | | | | | | | | |
| **Reporting Units: mg/kg dry** | | | | | | | | | | | |
| **Aluminum** | EPA 6010B | 6I13160 | 5.1 | 10 | **11000** | 1 | 09/13/06 | 09/14/06 | | | |
| **Antimony** | EPA 6020 | 6I13161 | 0.061 | 2.0 | **0.098** | 2 | 09/13/06 | 09/14/06 | UJ RL-1, J | | Q, B |
| **Arsenic** | EPA 6020 | 6I13161 | 0.51 | 1.0 | **3.4** | 2 | 09/13/06 | 09/14/06 | J | | |
| **Barium** | EPA 6020 | 6I13161 | 0.16 | 1.0 | **73** | 2 | 09/13/06 | 09/14/06 | | | |
| **Beryllium** | EPA 6020 | 6I13161 | 0.081 | 0.61 | **0.42** | 2 | 09/13/06 | 09/14/06 | RL-1, J | | |
| **Boron** | EPA 6010B | 6I13160 | 1.0 | 5.1 | **2.4** | 1 | 09/13/06 | 09/14/06 | J | | |
| **Cadmium** | EPA 6020 | 6I13161 | 0.040 | 1.0 | **0.12** | 2 | 09/13/06 | 09/14/06 | J RL-1, J | | Q |
| **Chromium** | EPA 6020 | 6I13161 | 0.61 | 2.0 | **17** | 2 | 09/13/06 | 09/14/06 | | | |
| **Cobalt** | EPA 6020 | 6I13161 | 0.040 | 1.0 | **6.1** | 2 | 09/13/06 | 09/14/06 | | | |
| **Copper** | EPA 6020 | 6I13161 | 0.40 | 2.0 | **11** | 2 | 09/13/06 | 09/14/06 | J | | F |
| **Iron** | EPA 6010B | 6I13160 | 1.5 | 5.1 | **18000** | 1 | 09/13/06 | 09/14/06 | | | |
| **Lead** | EPA 6020 | 6I13161 | 0.040 | 1.0 | **6.0** | 2 | 09/13/06 | 09/14/06 | J | | F |
| **Lithium** | EPA 6010B | 6I13160 | 0.91 | 6.4 | **23** | 1 | 09/13/06 | 09/14/06 | | | |
| **Manganese** | EPA 6010B | 6I13160 | 0.81 | 1.0 | **280** | 1 | 09/13/06 | 09/14/06 | | | |
| **Mercury** | EPA 7471A | 6I14069 | 0.0081 | 0.020 | **0.0095** | 1 | 09/14/06 | 09/14/06 | J | | |
| **Molybdenum** | EPA 6020 | 6I13161 | 0.20 | 2.0 | **0.43** | 2 | 09/13/06 | 09/14/06 | UJ RL-1, J | | Q, B |
| **Nickel** | EPA 6020 | 6I13161 | 0.40 | 2.0 | **11** | 2 | 09/13/06 | 09/14/06 | J | | Q |
| **Potassium** | EPA 6010B | 6I13160 | 40 | 51 | **2900** | 1 | 09/13/06 | 09/14/06 | | | |
| Selenium | EPA 6020 | 6I13161 | 0.40 | 2.0 | ND | 2 | 09/13/06 | 09/14/06 | UJ RL-1 | | Q |
| **Silver** | EPA 6020 | 6I13161 | 0.040 | 1.0 | **0.044** | 2 | 09/13/06 | 09/14/06 | J RL-1, J | | |
| **Sodium** | EPA 6010B | 6I13160 | 15 | 51 | **82** | 1 | 09/13/06 | 09/14/06 | J | | B |
| **Thallium** | EPA 6020 | 6I13161 | 0.20 | 1.0 | **0.27** | 2 | 09/13/06 | 09/14/06 | J RL-1, J | | F |
| **Vanadium** | EPA 6020 | 6I13161 | 0.81 | 2.0 | **32** | 2 | 09/13/06 | 09/14/06 | J | | Q |
| **Zinc** | EPA 6020 | 6I13161 | 1.0 | 20 | **55** | 2 | 09/13/06 | 09/14/06 | J | | F |
| **Zirconium** | EPA 6010B | 6I15120 | 1.5 | 25 | **2.3** | 1 | 09/15/06 | 09/15/06 | J | | |

LEVEL V

**TestAmerica - Irvine, CA**
Michele Chamberlin
Project Manager

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MWH-San Diego/Boeing
9444 Farnham Street, Suite 300
San Diego, CA 92123
Attention: Lisa J. Tucker

Project ID: Group 6 Data Gaps
Area IV AOC - B064 Leachfield
Report Number: IPI1167

Sampled: 09/13/06
Received: 09/13/06

## METALS

| Analyte | Method | Batch | MDL Limit | Reporting Limit | Sample Result | Dilution Factor | Date Extracted | Date Analyzed | Data Qualifiers | | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample ID: IPI1167-07 (L4QW01E01 - Water)** | | | | | | | | | | | | |
| **Reporting Units: mg/l** | | | | | | | | | | | | |
| **Aluminum** | EPA 6010B | 6I13166 | 0.040 | 0.050 | **0.086** | 1 | 09/13/06 | 09/14/06 | | | | |
| Boron | EPA 6010B | 6I13166 | 0.0080 | 0.050 | ND | 1 | 09/13/06 | 09/14/06 | U | | | |
| **Iron** | EPA 6010B | 6I13166 | 0.015 | 0.040 | **0.10** | 1 | 09/13/06 | 09/14/06 | | | | |
| **Lithium** | EPA 6010B | 6I13166 | 0.0070 | 0.050 | **0.014** | 1 | 09/13/06 | 09/14/06 | UJ | B, J | | B |
| Manganese | EPA 6010B | 6I13166 | 0.0070 | 0.020 | ND | 1 | 09/13/06 | 09/14/06 | U | | | |
| Mercury | EPA 7470A | 6I14070 | 0.00015 | 0.00020 | ND | 1 | 09/14/06 | 09/14/06 | | | | |
| Potassium | EPA 6010B | 6I13166 | 0.30 | 0.50 | ND | 1 | 09/13/06 | 09/14/06 | | | | |
| Sodium | EPA 6010B | 6I13166 | 0.10 | 0.50 | ND | 1 | 09/13/06 | 09/14/06 | | | | |
| Zirconium | EPA 6010B | 6I13115 | 0.012 | 0.20 | ND | 1 | 09/15/06 | 09/15/06 | | | | |
| **Sample ID: IPI1167-07 (L4QW01E01 - Water)** | | | | | | | | | | | | |
| **Reporting Units: ug/l** | | | | | | | | | | | | |
| **Antimony** | EPA 6020 | 6I13167 | 0.050 | 2.0 | **0.16** | 1 | 09/13/06 | 09/14/06 | | J | | |
| Arsenic | EPA 6020 | 6I13167 | 0.50 | 1.0 | ND | 1 | 09/13/06 | 09/14/06 | U | | | |
| **Barium** | EPA 6020 | 6I13167 | 0.15 | 1.0 | **1.7** | 1 | 09/13/06 | 09/14/06 | | | | |
| Beryllium | EPA 6020 | 6I13167 | 0.075 | 0.50 | ND | 1 | 09/13/06 | 09/14/06 | U | | | |
| **Cadmium** | EPA 6020 | 6I13167 | 0.025 | 1.0 | **0.042** | 1 | 09/13/06 | 09/14/06 | | J | | |
| **Chromium** | EPA 6020 | 6I13167 | 0.56 | 2.0 | **0.93** | 1 | 09/13/06 | 09/14/06 | | J | | |
| **Cobalt** | EPA 6020 | 6I13167 | 0.035 | 1.0 | **0.079** | 1 | 09/13/06 | 09/14/06 | | J | | |
| **Copper** | EPA 6020 | 6I13167 | 0.25 | 2.0 | **17** | 1 | 09/13/06 | 09/14/06 | | | | |
| **Lead** | EPA 6020 | 6I13167 | 0.040 | 1.0 | **4.1** | 1 | 09/13/06 | 09/14/06 | | | | |
| **Molybdenum** | EPA 6020 | 6I13167 | 0.15 | 2.0 | **0.46** | 1 | 09/13/06 | 09/14/06 | UJ | J | | B |
| **Nickel** | EPA 6020 | 6I13167 | 0.35 | 2.0 | **0.81** | 1 | 09/13/06 | 09/14/06 | | J | | |
| Selenium | EPA 6020 | 6I13167 | 0.30 | 2.0 | ND | 1 | 09/13/06 | 09/14/06 | U | | | |
| Silver | EPA 6020 | 6I13167 | 0.025 | 1.0 | ND | 1 | 09/13/06 | 09/14/06 | U | | | |
| **Thallium** | EPA 6020 | 6I13167 | 0.15 | 1.0 | **0.20** | 1 | 09/13/06 | 09/14/06 | | J | | |
| Vanadium | EPA 6020 | 6I13167 | 0.70 | 2.0 | ND | 1 | 09/13/06 | 09/14/06 | U | | | |
| **Zinc** | EPA 6020 | 6I13167 | 1.0 | 20 | **81** | 1 | 09/13/06 | 09/14/06 | | | | |

**TestAmerica - Irvine, CA**
Michele Chamberlin
Project Manager

LEVEL V

Quantitation Report

Data File : C:\HPCHEM\1\DATA\VOA0834.D
Acq Time : 24 Aug 93 1:35 pm
Sample : SVLF064-1-1.5
Misc : 24 AUG 93 11:59 am BULB T4
Quant Time: Aug 24 15:04 1993

Operator: RAPHE PAVLICK
Inst : 5972 - In
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\HGSVOASC.M
Title : VOA Standards for 5 point calibration
Last Update : Mon Aug 23 19:46:56 1993
Response via : Multiple Level Calibration

NO COMPOUNDS DETECTED