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

VOLUME II – RFI SITE REPORTS

APPENDIX A1

NEW CONSERVATION YARD (SWMU 7.8)

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LIST OF ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
B040	Building 040
bgs	below ground surface
BMPs	Best Management Practices
Boeing	The Boeing Company
CFOU	Chatsworth Formation Operable Unit
CMS	Corrective Measures Study
COPC	Contaminant of Potential Concern
CPEC	Contaminant of Potential Environmental Concern
Dioxins/Furans	(a) - *see table below*
DTSC	Department of Toxic Substances Control
EPC	Exposure Point Concentration
ERA	Ecological Risk Assessment
GWCC	Groundwater Comparison Concentration
HML	Hazardous Materials Laboratory
HRA	Human Health Risk Assessment
HQ	Hazard Quotient
HI	Hazard Index
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 (in reference to the entire NCY RFI Site)
ND	Not detected
New Con Yard	New Conservation Yard (in reference to the salvage yard within the NCY RFI Site)
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.
OU	Operable Unit
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
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.

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

SAP	Sampling Analysis Plan
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	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TCE	Trichloroethene
TPH	Total Petroleum Hydrocarbons
UCL	Upper Confidence Limit
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
µg/Lv	micrograms per liter vapor
VOC	Volatile Organic Compound
WPA	Work Plan Addendum

(a) Definition of dioxin/furan congeners

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

SECTION A1.1
INTRODUCTION

This appendix to the Group 6 Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI) Report presents results and recommendations for the investigation conducted at the New Conservation Yard (NCY) RFI site (Area IV Solid Waste Management Unit [SWMU] 7.8) 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 NCY RFI Site is one of four RFI sites included in the Group 6 RFI report area. A RFI site is an area that includes a SWMU(s) and/or Area(s) of Concern (AOC(s)), plus some adjacent land for the purpose of characterization. The location of the NCY RFI Site within the SSFL and Group 6 area is shown on Figure A1.1-1. The other three RFI sites are the Old Conservation Yard (OCY –SWMU 7.4), Sodium Reactor Experiment (SRE – Area IV AOCs), and Building 064 Leach Field (Area IV AOC). The NCY RFI Site is located south of the northern boundary of SSFL Area IV, with the OCY and northern undeveloped land located adjacent and to the north. The NCY RFI Site is owned and was historically operated by Rocketdyne International, a predecessor company of The Boeing Company (Boeing).

The SSFL RFI was conducted to characterize the presence of facility operation-related chemicals in environmental media, estimate risks to human health and the environment (i.e., 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 NCY RFI Site characterization presented in this appendix includes investigation data from both OUs discussed together.

The Surficial OU includes soil, sediment, surface water, air, biota, and near-surface groundwater (NSGW) at the SSFL. NSGW is defined as groundwater occurring within alluvium or weathered bedrock of the Chatsworth formation. Vadose zone bedrock and deeper groundwater that occurs within unweathered Chatsworth formation bedrock is defined as the CFOU. Further details regarding NSGW and CFOU groundwater are presented in Appendix B of the Group 6 RFI report. A summary of the human health risk assessment (HRA) and ecological risk assessment (ERA) results are presented in 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 NCY RFI Site appendix provides detailed data and evaluation pertaining to the NCY RFI Site, which includes all relevant information needed to evaluate the completeness of characterization, risk assessment results, and site recommendations. This information is presented in sections organized as follows:

- Section A1.2 – Site history, chemical use, and existing conditions.
- Section A1.3 – Nature and extent of chemical impacts.
- Section A1.4 – HRA and ERA findings summary.
- Section A1.5 – Corrective Measures Study recommendations.
- Section A1.6 – References cited.

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

- Attachment A1-1 – Site-specific regulatory agency documents and correspondence.
- Attachment A1-2 – Subsurface investigation (utility clearance and soil boring and trench logs).
- Attachment A1-3 – Laboratory analytical data, data validation, and data quality reports.

Information regarding characterization for the NCY RFI Site is contained in the following figures and tables:

- **Figure A1.2-1:** Presents the location of the NCY RFI Site within the SSFL and the Group 6 reporting area.
- **Figure A1.2-2:** Presents a view of the NCY RFI Site, showing chemical use areas, soil sampling locations, and nearby monitoring wells.
- **Table A1.3-2A and Figures A1.3-1 through A1.3-4:** Present characterization details for all soil sampling at the NCY RFI Site. Soil sampling results are shown on the four maps and correlate with appropriate sections in Table A1.3-2A.
- **Table A1.3-2B:** Presents a summary of groundwater characterization.
- **Figure A1.5-1 and Table A1.5-1**: Present a summary of CMS recommendations and areas.

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 the Group 6 RFI Report and appendices. Pertinent appendices to the Group 6 RFI Report are:

- **Appendix B:** Presents information regarding groundwater conditions in the Group 6 reporting area, including the NCY RFI Site. Information includes groundwater occurrence and quality, chemical transport, dataset 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 Report Addendum*. This addendum report provides the results and interpretation of soil and ash samples collected from background sample locations and analyzed for fire-related chemicals after the September 2005 Topanga fire.

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

- *RFI Program Report* (MWH, 2004) – This report contains:
  - A general description of the SSFL facility, including an operational history, physical setting information, and regulatory programs and oversight.
  - A summary of the RCRA Corrective Action Program being conducted at the SSFL and a description of the OUs.
  - A comprehensive description of the Surficial OU field sampling program, including overall sampling scope, sampling methods and subcontractors used, and 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 Standardized Risk Assessment Methodology (SRAM) Work Plan, Revision 2* (MWH, 2005b) – This report contains:
  - Procedures for completing the HRA and ERA.
  - Background soil concentrations and groundwater comparison concentrations.
  - A biological conditions report for the SSFL.
- *RFI Work Plan Addendum and Amendments* (Ogden, 1996; 2000a; 2000b) – These reports contain:
  - Sampling procedures and rationale.
  - RFI site descriptions and operational history.
- *Near-Surface Groundwater Characterization Report* (MWH, 2003b) – This report contains:
  - Nature and extent of near-surface groundwater at the SSFL.
  - Distribution, transport, and fate of trichloroethene (TCE) and other chemicals of concern, and the relationship of NSGW to CFOU groundwater.
- *CFOU Characterization Reports* (Montgomery Watson, 2000a; MWH, 2002 and 2003a) – These reports contain:
  - Geologic framework at the SSFL and hydrogeologic conditions of both NSGW and CFOU groundwater.
  - Transport and fate of TCE, and the occurrence and transport of other chemicals of concern in the CFOU.

SECTION A1.2
SITE HISTORY, CHEMICAL USE, AND CURRENT CONDITIONS

The NCY RFI Site is approximately 2 acres and is located in the northeastern portion of Area IV at the SSFL. The site location within the SSFL is shown on Figure A1.1-1. This figure also shows the Group 6 RFI Reporting Area boundary. Figure A1.2-1 shows the site layout and the relationship between chemical use areas and sample locations.

A former salvage storage yard is located at the eastern end of the NCY RFI Site. This salvage yard, referred to as the New Conservation Yard (New Con Yard) in this appendix, was initially identified as SWMU 7.8 in the RCRA Facility Assessment (SAIC, 1994). Based on site walks, reviews of historical aerial photos and facility maps, and interviews with site personnel conducted during the RFI, the NCY RFI Site boundary was expanded to the west to include Building 040 (B040) and the adjacent ash pile.

A1.2.1 Site History and Chemical Use

A summary of the site chronology, description of operations, and investigation activities for the NCY RFI Site is presented below. Facility correspondence, 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 presented 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), a U.S. Department of Energy Historical Site Assessment (Sapere, 2005), review of facility maps, and interviews with site personnel (Lenox, 2000a).

1960 – 1997	Building 040 was constructed in 1960. It was a 2,800-square-foot structure with steel walls, a steel roof, and a concrete slab floor. Adjacent to B040 was Structure 624, a fire truck canopy. B040 housed sealed check sources and a low-background alpha/beta counting laboratory system for air and wipe samples. Sealed sources were checked annually to ensure that no leaks had occurred. There are no reported releases associated with B040 in facility records, and B040 was demolished in 1997 (Sapere, 2005).

1977 – 1983	The New Con Yard was a 0.3-acre fenced-in area used for storage of salvageable materials and equipment when operations at the Rocketdyne and AI Conservation Yards at the OCY site (SWMU 7.4) were relocated there in 1977 (Rockwell, 1990). The NCY was used for storage of excess salvageable, non-radioactive materials from facilities in Area IV, including materials from various construction, refurbishing, and dismantling phases (Sapere, 2005). The stored materials included various metal parts and equipment (GRC, 1989; SAIC, 1994).
1988	A radiological survey of the Area 583 New Con Yard (formerly Area 583 New Salvage Yard) was conducted by Boeing. The survey found ambient gamma exposure rates in the New Con Yard area to be below acceptable limits (Sapere, 2005).
1983 – 1990s	The New Con Yard was used for temporary storage of equipment (USEPA, 1997).

A document incinerator was reportedly located at or near the northeast corner of B040 (Lenox, 2000a). Ash, located in piles on the ground behind B040 and west of the New Con Yard, were from the incinerator, which is believed to have been used to burn documents and photographs according to standard practices at the time.

Additional site information is provided in the following tables:

- Building inventory – Table A1.2-1
- Fuel and solvent storage tank inventory – Table A1.2-2
- Transformer inventory – Table A1.2-3
- Documented chemical use – Table A1.2-4

Chemical use areas at the NCY RFI Site are shown on Figure A1.2-1 and described in detail in Section A1.3. Potential chemical use areas at the site include the New Con Yard and the B040 Ash Pile. The surface water drainage (asphalt lined and unlined portions) was also evaluated as a part of each chemical use area. The diesel fuel oil pipeline passing through the B040 Ash Pile area is a chemical use area assigned to Group 5. However, it was characterized as part of the OCY RFI Site sampling. Potential chemicals stored or used at the site are listed in Table A1.2-4.

A1.2.2 Site Conditions

General Conditions and Topography

The NCY RFI Site is located within the Burro Flats portion of Area IV (Figure A1.2-1). This part of the SSFL consists of a broad, generally flat plain with occasional relief associated with rock outcrops. The western portion of the NCY RFI Site (adjacent to former B040 site and containing ash piles) is a gently east-sloping area bordered by sandstone outcrops to the south and west. The eastern portion of the site contains the graded former New Con Yard, which is bordered to the north by a steep outcrop and slopes gently south toward a natural drainage. Surface elevations within the NCY RFI Site boundary range from a minimum of 1,815 feet above mean sea level (MSL) in the drainage to 1,842 feet MSL in the northwestern corner of the site, west of the B040 Ash Pile. The drainage elevation is 1,790 feet MSL near the confluence with the Storable Propellant Area (SPA) RFI (RFI Group 3) site drainage. A geologic cross-section spanning east-west through the middle of the NCY RFI Site is shown on Figure A1.2-2. Cross-section locations are shown on Figure A1.2-1.

Minor changes in surface conditions have occurred during the course of the RFI field work (1996 to the present). The asphalt and concrete surfaces at the former B040 were removed in 1977; however, no grading activities that would have significantly altered surface topography have occurred during this time.

Currently, the NCY RFI Site is an open, grassy area containing mature oak trees and sandstone outcroppings. Small mounds of ash and ashy soil are visible in the western end near the corner of former Building 040. An asphalt-lined surface water drainage that originates at the OCY to the north traverses south across the NCY RFI Site. The drainage becomes unlined as it turns east to flow along the southern NCY RFI Site boundary. The eastern area of the NCY RFI Site is a flat, gravel-covered, fenced area (the former salvage yard). Erosion control measures have been implemented at the B040 Ash Pile and in down-slope and down-drainage locations (MWH, 2006).

Geology

The site is situated on the Upper Burro Flats Member of the Chatsworth formation (MWH, 2002). The Upper Chatsworth formation is a series of interbedded sandstone and shale units that generally strike North 70 degrees East and dip between 20 and 30 degrees Northwest. The Upper Burro Flats Member is comprised of fine to medium-grained

sandstone. Figure 2-5 of the Group 6 RFI Report main text shows the geologic units represented within the NCY RFI Site.

Soils

At the NCY RFI Site, soils consist primarily of weathered products of Chatsworth formation bedrock and ash colluvium, with native soils comprised mostly of silty sand in the east to sandy silt in the west. The finer-grained soils in the western portion of the site also contain ash associated with the B040 Ash Pile. The lined drainage contains sediment washed down from areas within and upgradient of the NCY RFI Site (including the OCY RFI site to the north). These sediments are typically sandy silts and silty fine to medium sands. Based on soil boring logs (Attachment A1-2), the thickness of the alluvium/fill ranges from less than 1-foot near outcrops to approximately 13 feet beneath the B040 Ash Pile (in sample NCBS07; location shown on Figure A1.2-1).

Groundwater

Monitoring wells and piezometers at the NCY RFI Site area indicate two zones of groundwater: one near-surface and one in the deeper CFOU. Details of the groundwater system and monitoring network in RFI Group 6 (including the NCY RFI Site) are presented in Group 6 RFI Report, Appendix B. In that appendix, Figure B-1 shows wells and piezometers that monitor groundwater at the NCY RFI Site. NSGW is monitored at the site by piezometer PZ-115 and east of the site by PZ-056. CFOU groundwater is monitored in wells RD-15 (to the east) and RD-92 (to the south). NSGW occurs periodically within weathered bedrock at depths ranging from 14 to 24 feet below ground surface (bgs) in PZ-056. PZ-115 has been dry since it was installed in 2001 (MWH, 2003b). Depths to CFOU groundwater range from 25 to 78 feet bgs in well RD-15, and approximately 60 feet bgs in RD-92 (H&A, 2006a). The shallowest depths to groundwater coincide with El Nino events (e.g., in 1993 and 1998); other than these years, high water (in winter) generally ranges from 35 to 52 feet bgs.

Groundwater gradients are generally flat in the area of the NCY RFI Site, which is situated within an east-west trending groundwater divide. At the OCY RFI site, north of NCY RFI Site, groundwater flows to the north, into Simi Valley. In the vicinity of the (Storable Propellant Area) SPA RFI site, south of NCY RFI Site, groundwater flows to the south and east. Additional groundwater information is provided in Section 2 and Appendix B of the Group 6 RFI Report.

Seeps/Springs

There are no seeps or springs at the NCY RFI Site.

Surface Water

Surface water flow at the NCY RFI Site is shown on Figure 2-7B of the Group 6 RFI Report. Surface water flow originates at the OCY RFI site (Appendix A2) and enters the NCY RFI Site from the north through a metal culvert under E Street that discharges to an asphalt-lined drainage. Upstream of the culvert was a former pipeline (now removed) that discharged water pumped from the Sodium Reactor Experiment (SRE) Pond. Thus, surface water entering the NCY RFI Site contains discharge from both the southwestern portion of the OCY RFI Site but also from the SRE Pond at the SRE RFI Site. Water flows along the lined portion south through the NCY RFI Site. Surface water flow from the Building 064 Leach Field (B064 LF) RFI Site (Appendix A4) also enters the NCY RFI Site. Flow from the B064 LF RFI Site discharges from a stormwater culvert near the northwest corner of the NCY RFI Site. It enters a natural drainage that joins the asphalt-lined drainage leading from the OCY RFI Site.

The combined flow continues through the NCY RFI Site, and the drainage becomes unlined and flows east along rock outcrops along the southern site boundary (Figure A1.2-1). The drainage meets another small tributary drainage from the OCY RFI Site, and then another from RFI Group 3, before flowing south to Silvernale Reservoir (SWMU 6.8). Silvernale, in turn, discharges to the R-2 Ponds (SWMU 5.26) and eventually off site to Bell Creek – a tributary of the Los Angeles River.

Biology

Biological conditions at the NCY RFI Site, including vegetation types and sensitive species, are shown on Figure 2-12 of the Group 6 RFI Report. The western portion of the site is mainly coast live oak woodland, and nonnative grassland exists along the slope between the salvage yard and the surface water drainage (MWH, 2005b). The drainage contains mulefat scrub in places; and Venturan coastal sage scrub and chaparral are found to the northeast and southeast of the NCY RFI Site, respectively. During the September/October 2005 Topanga Fire, much of the vegetation at the NCY RFI Site was burned and significant ash from the fire was deposited, especially in drainages. In areas with limited vegetation (e.g., the former New Con Yard), effects of the fire were minimal. Areas with more vegetation, including the surface water drainage, were impacted significantly by burning and ash deposition.

During the September/October 2005 Topanga Fire, much of the vegetation at the NCY RFI Site was burned, and significant ash deposited across the site. At the time of this report, the vegetation at the NCY 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).

SECTION A1.3
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 NCY RFI Site. The presentation includes sampling objectives, scope, key decision points related to characterization activities, and findings.

Transport and fate evaluations are discussed in:

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

A1.3.1 Sampling Objectives

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

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

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

- Additional information regarding site use and observed site conditions.
- Site sampling results and data trends.
- Knowledge of chemical properties (e.g., mobility, volatility, association with other chemicals, etc.).
- SSFL metals and dioxin background concentrations.
- SSFL SRAM-based screening concentrations for human health and ecological receptors.
- Risk assessment results and knowledge of areas recommended to require further evaluation during the CMS.

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

A1.3.2 Scope

A total of 48 soil matrix samples were collected between August 1988 and April 2006 to assess potential impact associated with the two chemical use areas at the NCY RFI Site. Sampling locations and analytical suites were based on DTSC-approved work plans (ICF, 1993; Ogden, 1996), sampling results from previous investigations, additional facility information from site inspections or personnel interviews (Lenox, 2000a), historical and/or aerial photos, and DTSC site inspections and requests. Sampling schedules are presented in Tables A1.3-1A through A1.3-1C.

Both the CFOU and NSGW have been sampled and analyzed according to agency approved work plans (GRC, 1995a, and 1995b; Ogden, 2000a and b). Three monitoring wells or piezometers were used to characterize groundwater specifically at the NCY 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 NCY 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, 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 NCY RFI site are described by media in the sections below.

As an ongoing, additional QA measure, DTSC Hazardous Materials Laboratory (HML) is performing an independent, data validation of 5 to 10 percent of the surficial media analyses performed for the RFI, including review of original electronic instrument raw data. To date, the HML review 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 all media sampled at the NCY RFI Site, including:

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

A1.3.3 Key Decision Points

DTSC has been an integral part of the decision-making process during the SSFL RFI program. Initially, only the New Con Yard was proposed for RFI sampling, but the B040 Ash Pile and surrounding areas were added to the investigation based on a Boeing site inspection in 1997, and additional sampling was directed by DTSC during a site walk in

1999. All NCY RFI Site chemical use areas were evaluated for sampling by DTSC in site visits throughout the RFI process. DTSC also provided ongoing review during the SSFL RFI field sampling, selected additional step-out sample locations, reviewed field sampling protocols, and collected agency split samples.

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

1) The New Con Yard chemical use area was targeted due to storage of salvageable materials and equipment. Metals and pH analysis was proposed along the southern fence line of the yard, based on observations of metal debris in a May 1996 site visit.

2) The B040 Ash Pile was targeted to test for chemicals associated with document burning activities.

3) Metals results were used as a surrogate to screen for potential dioxin-impacted areas within and around the B040 Ash Pile, as well as in the down slope area. The presence of dioxins is assumed to be linked to burning activities that resulted in the Ash Pile. Barium, lead, silver, and zinc were used as an indicator for dioxins and the extent of transport from the Ash Pile. Dioxin samples were collocated with metals samples in areas of high concentrations at the Ash Pile, and were located down slope (north, south, and east) to confirm the decreasing concentration gradient suggested by the metals.

4) Soil samples were collected north and west of the B040 Ash Pile to assess potential air dispersion of metals and dioxins. Silver was analyzed in soil from these locations as a tracer for all the Ash Pile-released chemicals (metals and dioxins). Silver was selected because it has very low background levels, which makes any impacts easier to detect. Silver was detected within background; therefore, impacts from the ash pile are not indicated, and dioxins were not analyzed at these locations.

5) Potential B040 ash impacts in the drainage channels were considered in the selection of sampling locations and depths of soil/sediment samples collected for dioxin and polynuclear aromatic hydrocarbon (PAH) analyses. Soil samples within drainages were collected according to procedures outlined in the *Soil Background Report Addendum*, presented as Appendix D of this Group 6 RFI Report. To avoid fire impacts, overlying ash materials, pebbles, visible vegetation, charred twigs, and leaves were carefully removed by scraping them aside with a pre-cleaned trowel. Samples were then collected from the underlying soil.

A1.3.4 Soil Matrix Findings

All soil sampling results and characterization findings are presented in Table A1.3-2A. The goals of the table are to:

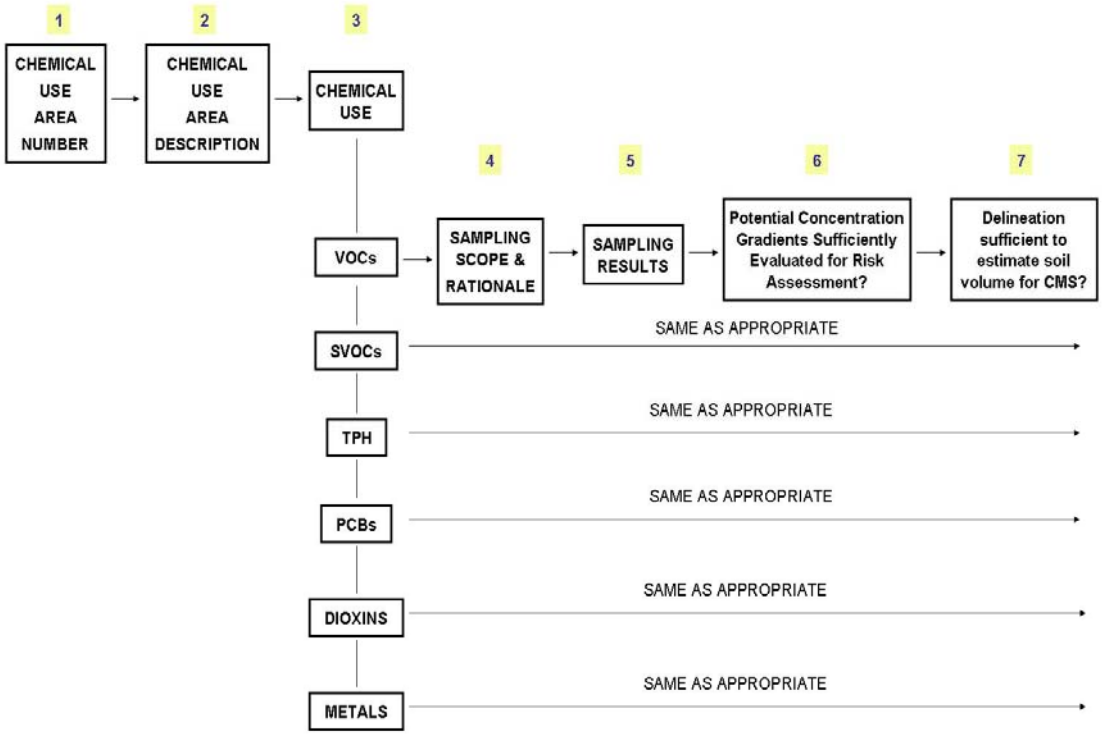
1. Present sampling results, including nature and extent.
2. Demonstrate that soil characterization is sufficient for the purposes of risk assessment.
3. Indicate soil volumes requiring further evaluation during the CMS are defined sufficiently to allow comparison of alternatives.

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

Data quality summaries for the NCY RFI Site are provided in Tables A1.3-3A through A1.3-3G.

A1.3.4.1 Soil Data Presentation

Relevant site information, sampling rationale, analytical results, and evaluation of results are presented in Table A1.3-2A. A flow chart illustrating the table structure is presented below.



Flow diagram illustrating Table A1.3-2A process

Reference numbers at the top of the illustration correspond to the Table A1.3-2A columns and text descriptions provided below. Sampling results have been organized by row for each chemical use area category and chemical group subcategory:

1 Chemical use area map number (Figures A1.2-1, and A1.3-1 through A1.3-4).

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

3 Chemical group (Metals, Dioxins, etc.).

4 Sampling scope and rationale for each chemical group.

5 Sampling results provide Sample identification numbers and other descriptions that direct the reader's attention to locations on data maps (Figures A1.3-1 through A1.3-4). 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 Figures A1.3-1 through A1.3-4.

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

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

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

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

A1.3.4.2 Soil Data Summary

As detailed in Table A1.3-2A, two chemical use areas were investigated at the NCY RFI Site; the New Con Yard and the B040 Ash Pile. Sampling results are provided on Figures A1.3-1 through A1.3-4. A brief summary is provided below.

<u>New Con Yard</u>

A total of six samples were collected at three locations within the New Con Yard and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and total petroleum hydrocarbons (TPH). Toluene was detected in one shallow (1.5 feet bgs) sample at a concentration of 110 micrograms per kilogram; toluene was not detected in the deeper (4 feet bgs) sample at this location. No other VOCs, SVOCs or TPH were detected in these samples.

A total of 12 samples were collected from six locations within the New Con Yard, and analyzed for metals. Eight metals were detected above background levels in two shallow (0 to 0.5 feet bgs) samples, including cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc. All metals concentrations decreased to below background in deeper (5 to 6 feet

[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.

bgs) samples. Metals concentrations in lateral step-out samples within approximately 10 feet of the drainage channel also decreased to below background.

Ash Pile

Dioxins, metals, and SVOCs were analyzed in soils beneath the B040 Ash Pile, as well as down slope and in adjacent drainage soils. Polychlorinated biphenyls (PCBs) were also analyzed in the drainage soils. Dioxins and four metals (barium, lead, silver, and zinc) were detected above background levels in soil beneath the Ash Pile and downslope. Dioxin Total Equivalency Quotients (TEQs) were detected at up to 66 nanograms per kilogram (ng/kg) beneath the Ash Pile, and decreased to 2.4 ng/kg near the adjacent drainage. A list of the different dioxin congeners is provided in the acronym list of this report. Dioxins above background (TEQs up to 664 ng/kg) were detected in all the drainage samples collected downstream of the NCY RFI Site.

The potential contribution of the Topanga Fire to dioxins and metals concentrations in soil have been considered for the characterization of the nature and extent of chemical impacts at the NCY RFI site. For the NCY RFI Site, 12 post-fire soil samples were analyzed for metals and 14 samples were analyzed for dioxins. One lead result in post-fire samples is noteworthy and may be considered in the CMS (NCSS06).

A1.3.5 Groundwater Findings

Groundwater occurrence at the NCY RFI Site is described below.

A1.3.5.1 Groundwater Data Presentation

Groundwater sampling results and characterization findings are summarized in Table 1.3-2B and described in Appendix B. The purpose of the table is to:

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

- Site soil characterization is appropriate for detected groundwater chemical constituents.

Similar to Table A1.3-2A, Table A1.3-2B describes groundwater data by chemical group (metals, VOCs, SVOCs, etc.). Table A1.3-2B is organized as follows:

- Column 1 – Analytical Group
- Column 2 – Site Soil Impacts
- Column 3 – Samples Collected and Analytes Monitored
- Column 4 – Constituents Detected in Groundwater Above Comparison Criteria
- Column 5 – Groundwater Concentrations Site Related
- Column 6 – Groundwater Characterized Sufficiently for Risk Assessment

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

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

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

A1.3.5.2 Groundwater Data Summary

Four metals were detected above Groundwater Comparison Concentrations (GWCCs) in samples collected from NCY RFI Site monitoring wells and piezometers: manganese, molybdenum, selenium, and thallium. These concentrations were either similar to GWCCs (manganese and molybdenum), below GWCCs in recent samples (selenium), or considered anomalous (thallium), which is further explained in Table 3-2B. In addition, none of the four metals were detected above background levels in site soil samples. An evaluation of all RFI Group 6 groundwater metals results is provided in Appendix B of this Group 6 RFI Report.

SVOCs were not detected in groundwater.

VOCs were detected in groundwater, including TCE (up to 1 microgram per liter [µg/L]), toluene (up to 1.8 µg/L) and acetone (up to 15 µg/L). Based on site history and lack of detected VOCs in site soils, these compounds are not considered related to the NCY RFI Site.

PCBs were not analyzed in NCY RFI Site wells. PCBs were analyzed in one well and one piezometer adjacent to the highest PCB concentrations detected in Group 6 soils (RD-14 and PZ-114 at the OCY RFI Site). PCBs were not detected.

Dioxins were detected in a sample collected from PZ-056. These detected groundwater concentrations are not considered related to dioxins detected in nearby drainage sediments because the presence of dioxins in the groundwater sample is likely related to suspended solids in the sample, as described further in Table A1.3-2B and in the Groundwater Appendix B of the Group 6 RFI Report.

A1.3.6 Surface Water Findings

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

SECTION A1.4
RISK ASSESSMENT FINDINGS SUMMARY

The following sections summarize findings of HRAs and ERAs performed for the NCY 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.

A1.4.1 Key Decision Points

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

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

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

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

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

   - Soil EPCs were based on maximum concentrations (either detected or the detection limit if sufficient evidence that the chemical is present) unless there were sufficient data to calculate a statistical upper bound estimate of the concentration.

3) Large home range receptors were assumed to live only in source areas within the NCY RFI Site. Risks for these receptors using home range adjusted exposures were calculated for the purpose of comparing to the RFI site only risks. Large home range receptor cumulative risk across the SSFL will be presented later in a Site-Wide Large Home Range Receptor Risk Assessment Report.

A1.4.2 Human Heath 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 is presented in the following tables and figure:

- Chemicals of Potential Concern (COPCs) for Human Health – Table A1.4-1
- Human Health Risk Estimates – Table A1.4-2
- Human Health Risk Assessment Uncertainty Analysis – Table A.4-3
- Generalized Conceptual Site Model of HRA Exposures – Figure A1.4-1

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

Exposure to Surficial Media Plus Indirect Groundwater Exposure

The Reasonable Maximum Exposure (RME) risks presented in this section were based on exposures to all relevant surficial media, plus indirect exposure to VOCs in groundwater via vapor migration, and included:

- Estimated cancer risks for all receptors ranged up to 7×10^{-5}; HIs ranged up to 0.8 (child resident). The chemicals contributing to these potential risks were dioxins in soil and TCE in groundwater.

- Estimated blood lead levels associated with soil exposures were less than 10 µg/dl for all receptors. Estimated blood lead levels for a child resident ranged up to 4.8 µg/dl.

Exposure through Direct Groundwater Use as Drinking Water

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

Total Exposure From All Potential Exposures

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

- Estimated cancer risks for all receptors ranged up to 7 x 10^{-5}; HIs ranged up to 9.0 (child resident). The chemicals contributing to these potential risks were cadmium and dioxins/furans in soil and TCE in groundwater.

The major issues related to uncertainty and conservatism in these risk estimates are presented in Table A1.4-3.

A1.4.3 Ecological Risk Assessment Findings

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

- Chemicals of Potential Ecological Concern (CPEC) – Table A1.4-4
- Risk Estimates for Ecological Receptors – Table A1.4-5
- Ecological Risk Assessment Uncertainty Analysis – Table A1.4-6.
- Ecological Risk Assessment Conceptual Site Model – Figure A1.4-2.

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

- Estimated HIs for all receptors, except the bobcat, ranged up to greater than 100 at the NCY RFI Site, with the thrush having the highest estimated HI. These estimated HIs are primarily associated with metals (barium, cadmium, copper, lead, molybdenum, nickel, selenium, silver, and zinc) and dioxins for all the terrestrial ecological receptors evaluated at NCY RFI Site.

- The deer mouse burrow air inhalation pathway does not contribute significantly to their risks, compared to the risks from other non-volatile constituents.
- The major items related to uncertainty and conservatism in these risk estimates are presented in Table A1.4-6.

SECTION A1.5
CORRECTIVE MEASURES STUDY RECOMMENDATIONS

This section presents a summary of RFI reporting requirements as they apply to the NCY RFI Site. Section A1.5.1 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 A1.5.2, and site action recommendations for the NCY RFI Site are summarized in Section A1.5.3.

A1.5.1 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 NCY 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 A1.3-2A and A1.3-2B). Section A1.3 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 NCY RFI site (Section A1.5 and Appendix C).

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

A1.5.2 Basis for Site Action Recommendations

In summary, site action recommendations included in the NCY 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 x 10^{-6}, or 1 in 1,000,000) is used to conservatively estimate the areal extent 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 NCY 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 A1.5-1. CMS Areas are also depicted graphically in Figure A1.5-1 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).

A1.5.3 Recommendations for the NCY RFI Site

NCY RFI Site action recommendations are listed in Table A1.5-1 and presented on Figure A1.5-1. Table A1.5-1 lists CMS or NFA recommendations and includes identification of chemical risk drivers and contributors for each exposure scenario. Source area stabilization recommendations are also identified for some CMS Areas as noted. CMS Areas shown on Figure A1.5-1 are approximate and represent evaluations inclusive of all potential receptors. As noted above, recommendations reported in this document will be reviewed upon completion of the site-wide groundwater report and large-home range receptor evaluations, and updates to this report prepared as needed.

NCY RFI Site areas recommended for further evaluation in the CMS and for surficial soil source stabilization measures are summarized below. Portions of the NCY RFI Site outside these areas are recommended for NFA.

- Four CMS Areas, including the New Con Yard (metals), the B040 Ash Pile, downslope, and down-drainage areas (dioxins, PAHs, metals).
- Three Stabilization Areas, including the B040 Ash Pile, down-slope, and down-drainage areas (dioxins, PAHs, metals). Source stabilization measures are currently present at each of these areas (MWH, 2006).

SECTION A1.6
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[1] References cited in this appendix are sequentially identified (e.g., 1999a, 1999b), the same as in Volume I.

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TABLES

Table A1.2-1

Building Inventory at the NCY RFI Site

Building	Current Use	Former Use	Status	DTSC Site Visit Date
Building 040	None	Protective Services	Removed 1997	Observed during site visits (June 1999)
Building 624	None	Fire Truck Canopy	Removed	Observed during site visits (June 1999)
Area 583	None	Salvage Yard	Inactive	Observed during site visits (June 1999)
Area 540	None	B040 Parking Lot	Inactive	Observed during site visits (June 1999)

Table A1.2-2

Fuel and Solvent Storage Tank Inventory at the NCY RFI Site

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

Notes:
(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 A1.2-3

Transformer Inventory at the NCY RFI Site

Area or Pole Number	Location	Status	Date Oil Sampled for PCBs	PCB[(a)] Sampling Results	Visual Inspection Findings

No transformers located at the NCY RFI site.

Notes:
(a) PCBs = Polychlorinated Biphenyls

Sources: Site field inspections and facility records.

Table A1.2-4

Chemicals Used at the NCY RFI Site

Scrap metal waste [(a)]
Ash [(b)]

Notes:
(a) The NCY RFI site was used to store salvageable materials and equipment in drums (SAIC 1994; ICF 1993; Ogden 1996).
(b) Ash noted outside of northeast corner of Building 40. (Lenox, 2000a)

Sources: SAIC 1994, ICF 1993, Ogden 1996, GRC 1989, Lenox 2000a

Table A1.3-1A (Page 1 of 1)

RFI Sampling Summary
NCY RFI Site

Sample Type	Total Number of Samples	Total QC Samples	Total Agency Samples	Total Validated Samples
Soil Vapor Samples (Table A1.3-1B)	0	0	0	0
Soil Matrix Samples (Table A1.3-1C)	56	0	0	56

Notes:
1. Detailed sample and analytical program information is contained in Tables A1.3-1B through Tables A1.3-1C 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 A1.3-1B (Page 1 of 1)

RFI Soil Vapor Sampling and Analytical Summary
NCY RFI Site

Soil Vapor Sampling Summary
No soil vapor sampling locations are located at the NCY RFI site.

RFI Soil Matrix Sampling and Analytical Summary
NCY RFI Site

Sample Identification	EPA Identification	Date Collected	Sample Method	Depth (feet bgs)	Sample Type	pH	PCB	Dioxin	VOC	SVOC	TPH	Metals	Lead	Mercury	Silver	Hex Chrome	Validated [a]	Rationale [b]	Consultant [c]	Reference Document [d]
NEWCONS1	NEWCONS1	8/24/1988	B	2	Primary Sample	X			X	X	X						yes	Soil & NSGW Investigation	GRC	GRC, 1989[e]
NEWCONS1	NEWCONS1	8/24/1988	B	4	Primary Sample	X			X	X	X						yes	Soil & NSGW Investigation	GRC	GRC, 1989[e]
NEWCONS2	NEWCONS2	8/24/1988	B	1.5	Primary Sample	X			X	X	X						yes	Soil & NSGW Investigation	GRC	GRC, 1989[e]
NEWCONS2	NEWCONS2	8/24/1988	B	4	Primary Sample	X			X	X	X						yes	Soil & NSGW Investigation	GRC	GRC, 1989[e]
NEWCONS3	NEWCONS3	8/24/1988	B	1.5	Primary Sample	X			X	X	X						yes	Soil & NSGW Investigation	GRC	GRC, 1989[e]
NEWCONS3	NEWCONS3	8/24/1988	B	3.8	Primary Sample	X			X	X	X						yes	Soil & NSGW Investigation	GRC	GRC, 1989[e]
NCBS02S01	RF242	11/11/1997	GP	0.5	Primary Sample	X						X					yes	WP	Ogden/AMEC	This report
NCBS02S02	RF243	11/11/1997	GP	6	Primary Sample	X						X					yes	WP	Ogden/AMEC	This report
NCBS03S01	RF244	11/11/1997	GP	0.5	Primary Sample	X						X					yes	WP	Ogden/AMEC	This report
NCBS03S02	RF245	11/11/1997	GP	5	Primary Sample	X						X					yes	WP	Ogden/AMEC	This report
NCSS01S01	RF713	10/28/1997	G	0	Primary Sample	X						X					yes	DTSC	Ogden/AMEC	This report
NCSS02S01	RF714	10/28/1997	G	0	Primary Sample	X						X					yes	DTSC	Ogden/AMEC	This report
NCBS01S01	RF879	11/17/1997	HA	0.5	Primary Sample	X						X					yes	WP	Ogden/AMEC	This report
NCBS04S01	RS546	12/11/1997	HA	0.5	Primary Sample							X					yes	STEP	Ogden/AMEC	This report
NCBS05S01	RS547	12/11/1997	HA	0.5	Primary Sample							X					yes	STEP	Ogden/AMEC	This report
NCBS06S01	RS548	12/11/1997	HA	0.5	Primary Sample							X					yes	STEP	Ogden/AMEC	This report
NCBS07S01	RS549	12/11/1997	HA	5	Primary Sample							X					yes	DTSC	Ogden/AMEC	This report
NCBS08S01	RS550	12/11/1997	HA	0.5	Primary Sample							X					yes	DTSC	Ogden/AMEC	This report
NCBS08S02	RS551	12/11/1997	HA	4	Primary Sample							X					yes	DTSC	Ogden/AMEC	This report
NCBS09S01	RS552	12/11/1997	HA	0.5	Primary Sample							X					yes	DTSC	Ogden/AMEC	This report
NCBS10S01	RS679	1/27/1998	HA	0.5	Primary Sample							X					yes	DTSC	Ogden/AMEC	This report
NCBS11S01	RS680	1/27/1998	HA	0.5	Primary Sample							X					yes	DTSC	Ogden/AMEC	This report
NCBS02S01	RS681	1/27/1998	HA	0.5	Primary Sample											X	yes	WP	Ogden/AMEC	This report
NCBS11S02	RS763	4/9/1998	HA	3	Primary Sample							X					yes	DTSC	Ogden/AMEC	This report
NCBS12S01	RS764	4/9/1998	HA	0.5	Primary Sample							X					yes	DTSC	Ogden/AMEC	This report
NCBS13S01	RS765	4/9/1998	HA	0.5	Primary Sample												yes	DTSC	Ogden/AMEC	This report
NCSS01S02	RS888	9/22/1999	G	0	Primary Sample			X									yes	DTSC	Ogden/AMEC	This report
NCSS03S01	RJ011	6/29/2000	G	0	Primary Sample			X									yes	DTSC	Ogden/AMEC	This report
NCSS04S01	RJ012	6/29/2000	G	0	Primary Sample			X									yes	DTSC	Ogden/AMEC	This report
NCSS05S01	RJ013	6/29/2000	G	0	Primary Sample									X			yes	DTSC	Ogden/AMEC	This report
NCBS11S01	RJ014	6/29/2000	HA	0.5	Primary Sample			X		X							yes	DTSC	Ogden/AMEC	This report
NCBS07S01	MJ610	2/13/2006	HA	5	Primary Sample			X		X							yes	DGA	MWH	This report
NCBS07S02	MJ608	2/13/2006	HA	0.5	Primary Sample					X							yes	DGA	MWH	This report
NCBS10S01	MJ618	2/14/2006	G	0.5	Primary Sample			X									yes	DGA	MWH	This report
NCBS12S01	MJ617	2/14/2006	G	0.5	Primary Sample			X									yes	DGA	MWH	This report
NCBS14S01	MJ611	2/13/2006	G	0.5	Primary Sample							X					yes	DGA	MWH	This report
NCBS15S01	MJ612	2/13/2006	G	0.5	Primary Sample							X					yes	DGA	MWH	This report
NCBS16S01	MJ614	2/13/2006	G	0.5	Primary Sample							X					yes	DGA	MWH	This report
NCBS17S01	MJ616	2/14/2006	G	0.5	Primary Sample							X					yes	DGA	MWH	This report
NCBS18S01	MJ775	4/10/2006	HA	0.5	Primary Sample		X	X									yes	DGA	MWH	This report
NCBS19S01	MJ724	4/10/2006	HA	0.5	Primary Sample		X	X									yes	DGA	MWH	This report

Table A1.3-1C (Page 2 of 2)

RFI Soil Matrix Sampling and Analytical Summary
NCY RFI Site

Sample Identification	EPA Identification	Date Collected	Sample Method	Depth (feet bgs)	Sample Type	pH	PCB	Dioxin	VOC	SVOC	TPH	Metals	Lead	Mercury	Silver	Hex Chrome	Validated [a]	Rationale [b]	Consultant [c]	Reference Document [d]
NCBS19S02	MJ727	4/10/2006	HA	2.5	Primary Sample			X									yes	DGA	MWH	This report
NCBS20S01	MJ725	4/10/2006	HA	0.5	Primary Sample			X									yes	DGA	MWH	This report
NCBS21S01	MJ726	4/10/2006	HA	0.5	Primary Sample			X									yes	DGA	MWH	This report
NCBS22S01	MJ729	4/10/2006	HA	0.5	Primary Sample			X					X				yes	DGA	MWH	This report
NCBS23S01	MJ730	4/10/2006	HA	0.5	Primary Sample			X					X				yes	DGA	MWH	This report
NCBS24S01	MJ732	4/10/2006	HA	0.5	Primary Sample			X									yes	DGA	MWH	This report
NCBS26S01	MJ740	4/11/2006	HA	0.5	Primary Sample										X		yes	DGA	MWH	This report
NCBS27S01	MJ741	4/11/2006	HA	0.5	Primary Sample										X		yes	DGA	MWH	This report
NCBS28S01	MJ742	4/11/2006	HA	0.5	Primary Sample										X		yes	DGA	MWH	This report
NCBS29S01	MJ743	4/11/2006	HA	0.5	Primary Sample										X		yes	DGA	MWH	This report
NCSS06S01	MJ620	2/14/2006	G	0.5	Primary Sample			X		X		X					yes	DGA	MWH	This report
NCSS06S01	MJ734	4/10/2006	HA	0	Primary Sample		X						X				yes	DGA	MWH	This report
NCSS07S01	MJ619	2/14/2006	G	0.5	Primary Sample		X	X		X		X					yes	DGA	MWH	This report
NCSS07S01	MJ728	4/10/2006	HA	0	Primary Sample		X										yes	DGA	MWH	This report
NCSS08S01	MJ621	2/14/2006	G	0.5	Primary Sample			X		X		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 Gaps Analysis) to delineate concentrations above comparison levels or anomalous conditions.

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

[c] **Consultant -** indicates contractor responsible for sampling and reporting for each location.

[d] **Reference Document** indicates where data are published; "This report" includes the RFI site appendix and the Group 6 RFI Report (See References, Section A2.6).

[e] **GRC, 1989-** Phase II Investigation of Soil and Groundwater Conditions- Area IV

Sample Identification = RFI site and sample identifier code

EPA Identification = Laboratory reporting code

bgs = below ground surface

B = Boring sample

HA = Hand Auger sample

GP = Geoprobe soil boring sample

G = Grab sample

PCB = Polychlorinated biphenyls

VOC = Volatile Organic Compound

SVOC = Semivolatile Organic Compound

TPH = Total Petroleum Hydrocarbons

Hex Chr = Hexavalent chromium

Laboratory Analytical Methods Represented (EPA Method No.)

pH = 9045C

PCB = 8082, 1668

Dioxin = 8290

VOC = 8021, 8240, 8260

SVOC = 8270, 8270SIM, 429M

TPH = 8015

Metals = 6010B/7000

Lead = 6020

Mercury = 7471A

Silver = 6020

Hex Chrome = 7196

Table A1.3-2A (Page 1 of 5)

Description of Chemical Use Areas at the NCY RFI Site and Soil Sampling Results Summary

Map Key	**Chemical UseArea Name** Status, How Used and Physical Characteristics (see text for Site History)	**Potential Chemicals Used / Stored**	**Sampling Scope and Rationale**[1] [See Figure A1.2-1 for sampling locations]	**Sampling Results** Chemical concentrations detected greater than background and/or risk screening levels?[2]	**Potential concentration gradients sufficiently evaluated for risk assessment?**[3,4]	**Is delineation sufficient to estimate soil volume in CMS?**[5] [see Figure A1.5-1 for CMS areas]
1	**New Conservation Yard (New Con Yard)** Storage of non-radioactive salvageable materials from Area IV construction and refurbishing activities. Drum storage of solvents and fuel not indicated in historical records. Approximately 100 feet by 200 feet fenced-in yard. New Con Yard flat with slope to east towards drainage. The asphalt lined drainage originates at Old Conservation Yard (OCY) [SWMU 7.4], flows south through NCY RFI site, and discharges into an unlined drainage south of the NCY RFI site. The drainage intersects two drainages before reaching Silvernale Reservoir. Erosion control measures installed at the drainage to control potential contaminant migration. *Inactive since approximately 1995.*	**VOCs**: Site documentation does not indicate use or storage of solvents or other VOCs at the New Con Yard.	New Con Yard screened for VOCs to confirm no solvent impacts. Collect and analyze three shallow (1.5 feet bgs) and three deep (4 feet bgs) soil samples at representative locations (NEWCONS-1, NEWCONS-2, NEWCONS-3).	VOC results are shown on Figure A1.3-1. Toluene detected at 110 µg/kg in one of six samples (NEWCONS-3 at 1.5 feet bgs) less than the EcoRBSL (2,700 µg/kg) and ResRBSL (300 µg/kg); toluene not detected at 4 feet bgs. No other VOCs were detected, and VOCs were not detected in other samples. Based on site history and VOC/TPH/SVOC results, further delineation of VOCs is not required.	YES One VOC (toluene) detected in one shallow sample within area recommended for CMS based on metals as described below.	YES Detected VOCs limited, and associated risks do not drive CMS recommendation.
		SVOCs: Site documentation does not indicate use or storage of SVOCs at the New Con Yard.	New Con Yard screened for SVOCs in representative locations based on possible equipment storage and associated used-oil related SVOCs. Collect and analyze shallow (1.5 feet bgs) and deep (4 feet bgs) soil samples at representative locations (NEWCONS-1, NEWCONS-2, NEWCONS-3).	SVOC results are shown on Figure A1.3-2. No SVOCs detected. Detection limits for SVOCs are elevated greater than ResRBSLs. However, site documentation does not indicate use or storage of SVOCs. Since potential SVOCs associated with used oils, the lack of TPH impacts (below) suggests that these compounds are not likely present. Therefore, further delineation of SVOCs is not required.	YES Three sample locations in representative locations adequate to assess potential SVOC impacts. Area recommended for CMS based on metals as described below.	YES SVOCs not detected. CMS recommendation based on metals as described below.
		TPH: Site documentation does not indicate use or storage of hydrocarbons at the New Con Yard.	New Con Yard screened for TPH in representative locations based on possible equipment storage. Collect and analyze shallow (1.5 feet bgs) and deep (4 feet bgs) soil samples at representative locations (NEWCONS-1, NEWCONS-2, NEWCONS-3).	TPH results are shown on Figure A1.3-2. No TPH detected in representative locations. No further delineation needed.	YES Three sample locations in representative locations adequate to assess potential TPH impacts. Area recommended for CMS based on metals as described below.	YES TPH not detected. CMS recommendation based on metals as described below.

Table A1.3-2A (Page 2 of 5)

Description of Chemical Use Areas at the NCY RFI Site and Soil Sampling Results Summary

Map Key	**Chemical UseArea Name** Status, How Used and Physical Characteristics (see text for Site History)	**Potential Chemicals Used / Stored**	**Sampling Scope and Rationale**[1] [See Figure A1.2-1 for sampling locations]	**Sampling Results** Chemical concentrations detected greater than background and/or risk screening levels?[2]	**Potential concentration gradients sufficiently evaluated for risk assessment?**[3,4]	**Is delineation sufficient to estimate soil volume in CMS?**[5] [see Figure A1.5-1 for CMS areas]
1	**New Con Yard (continued)**	**Metals**: Metals potentially associated with equipment or salvaged construction materials stored at the New Con Yard.	Collect and analyze two surficial (0-0.5 feet bgs) and deep (5 to 6 feet bgs) soil samples in southern, downslope portion of yard (NCBS02, NCBS03) Collect surface sediment sample downslope in drainage adjacent to yard (NCBS01). Based on initial results, collect three lateral stepout samples within yard (NCBS04 through NCBS06).	Metals results are shown on Figure A1.3-4. Concentrations of eight metals exceeded background concentrations in two shallow samples on the southern downslope portion of NCY (NCBS02 and NCBS03): cadmium (up to 20 mg/kg, background = 1 mg/kg), chromium (up to 72 mg/kg, background = 36.8 mg/kg), copper (up to 200 mg/kg, background = 29 mg/kg), lead (up to 100 mg/kg, background = 34 mg/kg), mercury (up to 1.0 mg/kg, background = 0.09 mg/kg), nickel (up to 130 mg/kg, background = 29 mg/kg), silver (up to 5 mg/kg, background = 0.79 mg/kg), and zinc (up to 1,100 mg/kg, background = 110 mg/kg). • Highest concentrations occur in the shallow samples in southern New Con Yard. • Metals were not detected greater than background in lateral stepout samples. • Metals concentrations in all deep samples were within background ranges. Detection limits for several metals in shallow samples were greater than background levels (Table A1.3-3G). Lead detected above background in the drainage in two samples: one down-drainage sample (NCSS06) at 41mg/kg (background = 34 mg/kg) and one sample upgradient of the NCY RFI Site in sample OCSS04 at 41 mg/kg. [See OCY RFI Site Report (Group 6 Appendix A2)]. No other NCY RFI Site samples collected along this drainage contained metals greater than background. Sampling results in this drainage are discussed further under Chemical Use Area 2 (below).	YES Area is recommended for further evaluation during the CMS based on cadmium concentrations and risk assessment results.	YES Extent of impacted soil is defined by lateral stepouts and deeper samples.

Table A1.3-2A (Page 3 of 5)

Description of Chemical Use Areas at the NCY RFI Site and Soil Sampling Results Summary

Map Key	Chemical UseArea Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale[1] [See Figure A1.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment?[3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A1.5-1 for CMS areas]
2	**Building 040 Ash Pile** Ash pile adjacent to Building 040, possibly from incinerator. Ash deposit is approx. 30 feet by 50 feet wide and a maximum of 1 foot thick. Ash material has potentially migrated down the gentle slope and into the asphalt lined drainage to the east. The asphalt lined drainage originates at OCY, flows south through NCY RFI site, and discharges into an unlined drainage south of the NCY RFI site. The drainage intersects two drainages before reaching Silvernale Reservoir. Erosion control measures installed in the Ash Pile, downslope, and in the drainage to control potential contaminant migration (MWH, 2006).	**SVOCs** Not used at site but can be present in burned materials and ash Dioxins were detected in the drainage potentially impacted by OCY RFI site upgradient of NCY RFI site. [See OCY RFI Site Report (Group 6 Appendix A2)]	**Ash Pile**: Collect and analyze sample at surface (NCSS01S02) to represent potentially highest SVOC concentrations. Based on results, collect and analyze sample at ~0.5 feet bgs (NCBS07S02) and ~5 feet bgs (NCBS07S01) to assess vertical profile. **Downslope**: Based on ash pile results, collect and analyze one surface soil sample (0.5 feet bgs at NCBS11) to assess downslope SVOC concentrations. **Drainage**: Also based results from the Ash Pile and downslope, collect and analyze surface samples (NCSS06 through NCSS08) in the drainage. **North and West of Ash Pile (Air Dispersion)** Analyze for silver north and west of ash pile.	SVOC results are shown on Figure A1.3-2 **Ash Pile:** Six Polynuclear Aromatic Hydrocarbons (PAHs) detected in NCSS01. Benzo(a)pyrene detected greater than Res RBSL (6 µg/kg) at 43 µg/kg. All other PAHs less than RBSLs. All SVOCs nondetect in the 0.5 foot and 5 foot sample taken at NCBS07. **Downslope**: Eleven PAHs detected in NCBS11, with Benzo(a)pyrene at 13 µg/kg. **Drainage**: Chrysene, fluoranthene, pyrene were detected in one sample (NCSS07), less than 30 µg/kg and Eco and ResRBSLs. SVOCs were not detected in NCSS06 or NCSS08 SVOCs were also detected in samples taken in the upstream portion of the lined drainage (downstream of the OCY RFI site) and within the Topographic Low Spot that drains into the lined drainage. [See OCY RFI Site Appendix A2]. The highest concentrations are located in soils beneath Ash Pile, and decrease downslope and with depth. Based on association with burned materials, and decrease with depth and downslope consistent with dioxins and metals, PAHs are expected to correlate with these compounds. Based on delineation of dioxins and metals (below), no further delineation of PAHs required. Rock outcrops along the southern and western portion of the drainage limit lateral extent. Bedrock at approximately 2.5 feet bgs as observed during sampling activities. The south (and west) side bank depth decreases linearly due to the rock outcrop.	YES **Ash Pile and Downslope area:** Area recommended for further evaluation in CMS based on PAHs dioxins, and metals. **Drainage:** Unlined drainage area recommended for further evaluation in CMS based on PAH and dioxin concentrations and risk assessment results.	YES **Ash Pile and Downslope area:** Extent of impacted area is defined by sample results for PAHs, dioxins, and metals. **Drainage:** The extent of impacted soil in the unlined drainage is based on the length of the drainage from the end of the asphalt-lined portion to the confluence with the Alfa/Bravo/SPA drainage, bedrock depth, rock outcrops, and sampling results.
		PCBs No documented uses of PCBs. PCBs were detected in the drainage potentially impacted by OCY RFI site upgradient of NCY RFI site. [See OCY RFI Site Report (Group 6 Appendix A2)]	**Drainage**: Recollect surface sample in drainage at NCSS07 to assess PCB in sediment (sample previously analyzed for metals), based on upstream PCB concentrations at OCY. Sample located in unlined drainage after end of asphalt swale. Based on NCSS07 results, collect and analyze stepout samples at 5 feet from channel (NCBS18, NCBS19) and analyze downstream sample NCSS06.	**Drainage**: • Aroclor 1254 detected in NCSS07S01 at 71 µg/kg, less than ResRBSL (350 µg/kg) and EcoRBSL (79 µg/kg). No other PCBs detected; • PCBs not detected in stepout samples NCBS18 and NCBS19; • PCBs not detected in downstream sample NCSS06; • PCBs were also detected in samples taken in the upstream portion of the lined drainage (downstream of the OCY RFI site) and within the Topographic Low Spot that drains into the lined drainage. [See OCY RFI Site Appendix A2].	**Drainage**: YES Area recommended for CMS based on PAH and dioxins concentrations and risk assessment results.	**Drainage**: YES PCB results and associated risks do not drive CMS recommendation.

Table A1.3-2A (Page 4 of 5)

Description of Chemical Use Areas at the NCY RFI Site and Soil Sampling Results Summary

Map Key	**Chemical UseArea Name** Status, How Used and Physical Characteristics (see text for Site History)	**Potential Chemicals Used / Stored**	**Sampling Scope and Rationale**[1] [See Figure A1.2-1 for sampling locations]	**Sampling Results** Chemical concentrations detected greater than background and/or risk screening levels?[2]	**Potential concentration gradients sufficiently evaluated for risk assessment?**[3,4]	**Is delineation sufficient to estimate soil volume in CMS?**[5] [see Figure A1.5-1 for CMS areas]
2	**Building 040 Ash Pile (continued)**	**Dioxins** Not used at site but can be present in burned materials and ash	**General**: Dioxins were analyzed in Ash Pile soil, down slope soil and drainage sediment. Barium, lead, silver and zinc concentrations in soil and ash used as a dioxin surrogate to delineate downslope impacts. This relationship is based on elevated metals in ash pile and adjacent samples (see "metals sampling rationale" below). To assess potential for air dispersion of ash, soil samples west of the ash pile were analyzed for silver as surrogate for dioxins. **Ash Pile**: Collect soil samples at surface (NCSS01) to assess surficial impacts. Based on results, collect sample at 5 ft bgs (NCBS07) to assess vertical concentration profile. **Downslope**: Collect soil samples downslope of ash pile at surface (NCSS03, NCSS04) and at 0.5 feet bgs (NCBS10 through NCBS12). Further definition of soil dioxin extent based on using metals as surrogates in stepout samples. **Drainage**: Collect two surface soil samples in drainage at NCSS06 and NCSS07. Based on initial results, collect drainage stepout bank samples at each location for further delineation: • NCSS06: 5 foot stepouts from channel on both sides (south side limited by rock outcrop). All samples at 0.5 feet bgs. • NCBS07: 5 foot stepouts from channel on both sides. All samples at 0.5 feet bgs except NCBS19 at 2.5 feet bgs. Collect soil sample at NCSS08 to assess downstream extent. **North and West of Ash Pile (Air Dispersion)**: Analyze for silver north and west of ash pile.	Dioxin sampling results are shown on Figure A1.3-3. **Ash Pile**: Dioxin TEQs detected greater than background (1 ng/kg), ResRBSL (6.9 ng/kg), and EcoRBSL (3.4 ng/kg) in Ash Pile surface sample (NCSS01) at 66 ng/kg; but not in 5-foot sample (NCBS07 at 0.4 ng/kg). Dioxin congener concentrations were greater than background in the surface sample and consistent with background in 5-foot sample. Vertical extent of dioxins are limited by sample results and low mobility characteristics. **Downslope**: Dioxin TEQs decrease relative to ash pile samples, from 66 ng/kg to 2.4 ng/kg downslope near the drainage. TEQ concentrations in all downslope samples exceeded background, Res RBSL and/or Eco RBSL, similar to dioxin congener concentrations. Metals results confirm this trend and define (as surrogate) lateral extent (to the north and south). **Drainage**: Dioxin TEQs exceed background, ResRBSL and/or EcoRBSL in all sediment samples collected throughout the drainage (Figure 4-x). Overall: • TEQs are significantly higher (up to an order of magnitude) in the drainage relative to the ash pile and the OCY or SRE sites [see individual reports, Appendix A2 and A3]. • Dioxins were detected in the Topographic Low Spot in the OCY RFI site which drains into a lined drainage that flows through the NCY RFI site. • TEQs generally decrease downstream from NCSS06 to NCSS07 to NCSS08 where the TEQ is 13.9 ng/kg. • Bank sediment samples contained the highest concentrations (TEQs up to 664 ng/kg). TEQs are much lower at depth, as indicated by the sample at NCBS19 taken at ~2.5 feet where the TEQ was 15 ng/kg. Rock outcrops along the southern and western portion of the drainage limit lateral extent. Bedrock at approximately 2.5 feet bgs as observed during sampling activities. The south (and west) side bank depth decreases linearly due to the rock outcrop. **North and West of Ash Pile (Air Dispersion)**: Based on silver results (see below), air dispersion has not resulted in transport of ash material west of the ash pile. No further evaluation required.	**Ash Pile and Downslope**: YES Dioxin concentrations decrease laterally and downslope away from the Ash Pile and toward the drainage. Area recommended for further evaluation in CMS based on PAH, dioxin, and metals concentrations and risk assessment results. **Drainage**: YES Unlined drainage area recommended for further evaluation in CMS based on PAH and dioxin concentrations and risk assessment results.	**Ash Pile and Downslope**: YES Extent of impacted soil is based on defined dioxin/metals extent from sampling results and low mobility characteristics. **Drainage**: YES The extent of impacted soil in the unlined portion of the drainage is based on the length of the drainage from the end of the asphalt-lined portion to the confluence with the Alfa/Bravo/SPA drainage, bedrock depth, rock outcrops, and sampling results.

Table A1.3-2A (Page 5 of 5)

Description of Chemical Use Areas at the NCY RFI Site and Soil Sampling Results Summary

Map Key	Chemical UseArea Name Status, How Used and Physical Characteristics (see text for Site History)	Potential Chemicals Used / Stored	Sampling Scope and Rationale[1] [See Figure A1.2-1 for sampling locations]	Sampling Results Chemical concentrations detected greater than background and/or risk screening levels?[2]	Potential concentration gradients sufficiently evaluated for risk assessment?[3,4]	Is delineation sufficient to estimate soil volume in CMS?[5] [see Figure A1.5-1 for CMS areas]
2	**Building 040 Ash Pile (continued)**	**Metals** Not used at site but can be present in burned materials and ash	Barium, lead, silver and zinc were consistently elevated in samples within, beneath and surrounding the ash pile where they were co-located with elevated dioxin concentrations. Therefore, these metals were used as surrogates to delineate dioxins downslope from the Ash Pile, and in air dispersion samples. The potential for air dispersion of ash was assessed using silver as a surrogate for both metals and dioxins in samples west of the ash pile. **Ash Pile**: Collect samples at surface (NCSS01, NCSS02) and at ~5 feet bgs (NCBS07). **Downslope**: Collect and analyze soil samples to characterize downslope migration from Ash Pile (NCBS08 through NCBS12, NCBS14 though NCBS17, NCSS05, NCBS26 [silver only]). **Drainage**: Collect surface sediment samples in the drainage (NCBS01, NCSS06 through NCSS08) Based on initial results, collect two stepout surface soil bank samples (NCBS22, NCBS23) and analyze for lead. **North and West of Ash Pile (Air Dispersion)**: Collect four surface soil samples (NCBS27 through NCBS29) and analyze for silver to characterize possible ash migration via air dispersion.	Metals results are shown on Figure A1.3-4. **Ash Pile**: Metals concentrations exceeded background in two shallow samples (NCSS01, NCSS02) for barium (up to 1,000 mg/kg), lead (up to 77 mg/kg), silver (up to 150 mg/kg), and zinc (up to 3,400 mg/kg). None of these metals were detected greater than background in the 5 foot bgs sample (NCBS07). **Downslope**: The four "surrogate" metals exceeded background in four surficial samples (NCBS08, NCBS10, NCBS11, NCBS17). Of these, the highest concentrations were located at NCBS08, closest to the ash pile. Overall: • Concentrations of these four metals decrease to background levels at 4 feet bgs (NCBS08) • Metals concentrations generally decrease to background levels laterally (NCBS09, NCBS14, NCBS15) and downslope approaching the drainage (NCBS12, NCBS16, NCBS17). • None of these detected surrogate metals exceeded the ResRBSL, but did exceed the EcoRBSL near the ash pile (NCBS08); Vertical extent of metals in the Ash Pile and downslope are defined by results and low mobility characteristics. **Drainage**: One sample collected at NCSS06 contained 41 mg/kg lead, above background of 34 mg/kg; stepout bank sample lead concentrations were less than background. Lead was also detected in upstream sample OCSS04 at 41 mg/kg [see OCY RFI Site Appendix A2] **North and West of Ash Pile (Air Dispersion)**: Silver was not detected greater than background, indicating air dispersion has not caused migration of ash material.	**Ash Pile and Downslope**: YES. The highest metals concentrations occur in the ash pile and decrease laterally and downslope toward drainage and with soil depth. Area recommended for further evaluation in CMS based on PAH, dioxin, and metals concentrations and risk assessment results. **Drainage**: YES Single lead detection in the unlined drainage is within area recommended for further evaluation in CMS based on PAH and dioxin concentrations and risk assessment results.	**Ash Pile and Downslope**: YES Extent of impacted soil is based on defined dioxin/metals extent from sampling results and low mobility characteristics. **Drainage**: YES Lead and associated risks do not drive CMS recommendation.

Sources: ICF 1993, SAIC 1994; Ogden 1996; Lenox 2000a; MWH, 2006 and facility records

ACRONYMS

bgs = below ground surface
CMS = Corrective Measures Study
EcoRBSL = Ecological Risk Based Screening Level
mg/kg = milligrams per kilogram
NCY RFI site = New Conservation Yard RFI site (entire site)
New Con Yard = New Conservation Yard (Chemical Use Area 1)
ng/kg = nanograms per kilogram
OCY = Old Conservation Yard
PAH = Polynuclear Aromatic Hydrocarbon
PCB = Polychlorinated Biphenyls
ResRBSL = Residential Risk Based Screening Level
RFI = Resource Conservation and Recovery Act (RCRA) Facility Investigation
SVOC = Semivolatile Organic Compounds
TEQ = Total Equivalency Quotient (normalized to 2,3,7,8 TCDD)
TPH = Total Petroleum Hydrocarbons
µg/kg = micrograms per kilogram
VOC = Volatile Organic Compound

Notes:

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

[1] Where historical records and physical characteristics do not suggest the presence of a chemical group, that chemical group was not analyzed in samples from the respective chemical use area and is not reflected in this table. For example, site records and physical evidence did not suggest burning activities in the New Conservation Yard. Therefore, dioxins were not analyzed in samples from this chemical use area and are not listed.

[2] The use of the SRAM-based screening levels for comparison purpose does not serve as a risk assessment. These screening levels are not used to determine the significance of detected chemical concentrations or if a chemical use area will be recommended for further consideration in the CMS, but only to provide the reader another tool to evaluate the characterization data. The SRAM-based screening levels represent conservative concentrations that pose a low level of risk. 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 recommendation for evaluation during CMS. Such data may be deemed unnecessary if other constituent concentrations are sufficient to require a CMS recommendation, provided the CMS areas for both constituents are roughly similar.

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

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

Table A1.3-2B (Page 1 of 3)
Summary and Evaluation of Groundwater Sampling Results
NCY RFI Site

Analytical Group	**Site Soil Impacts? (Summary of Relevant Impacts)** [See Table A1.3-2A for a complete summary of soil impacts]	**Monitored in GW? Number of samples/Date Range** [See Figure A1.2-1 for groundwater monitoring locations]	**Constituents Detected in GW? Above GWCC or Regulatory Criteria?*** [See Appendix B for a summary of groundwater results]	**Site Related?** (Describe Transport & Fate)	**Groundwater Characterized Sufficiently for Risk Assessment?**
VOCs	One VOC, toluene, was detected in a single sample in the New Con Yard. 1,4-dioxane was not analyzed in surficial soil.	YES A total of 20 samples were collected and analyzed for VOCs between 1989 and 2005 in: PZ-056 (2 samples), RD-15 (16 samples) and RD-92 (2 samples). Two samples were also analyzed for 1,4 Dioxane in 2001 in RD-92.	YES VOCs in monitoring wells RD-15, RD-92, and PZ-056 detected, but are below respective regulatory criteria (MCLs). Detected VOCs include: • Trichloroethene has been detected (TCE) at a maximum of 1 µg/L since 1989 in RD-15; TCE was not detected in PZ-056 and RD-92. • Toluene detected once (1.8 µg/L) in RD-92 in 2004. • Methylene chloride detected, but identified as blank contaminant. • Acetone was detected once in RD-15, RD-92 and PZ-56 (up to 15 µg/L). Acetone was also identified as a blank contaminant in the one PZ-056 sample. • Carbon disulfide was also detected once (0.6 µg/L), but in 2001. Not detected in recent samples. • Acetone and carbon disulfide were sporadic and not present in most results. • 1,4 Dioxane was not detected.	NO VOC impacts in NCY RFI site soils are minimal.	YES • VOCs not related to NCY RFI site conditions.No further characterization required. • CMS recommendation for Group 6 groundwater will be made in Final Sitewide Groundwater Report, if needed. Groundwater risk results suggest CMS recommendation likely for all Group 6 as a whole.
SVOCs	PAHs, including Benzo(a)pyrene [B(a)P] were detected in shallow soil samples at the Ash Pile and down slope area. PAHs were not detected in deeper samples indicating limited vertical migration. N-nitrosodimethylamine (NDMA) was analyzed, but not detected in the New Con Yard, Ash Pile, the downslope area, and the drainage.	YES One sample was collected in 1989 from monitoring well RD-15 for SVOCs including N-nitrosodimethylamine (NDMA).	NO SVOCs, including NDMA, were not detected in Group 6 groundwater.	--	YES
TPH	TPH was not detected in site soil samples.	NO	NO	--	YES
PCBs	Aroclor 1254 was detected in one sample; no other PCBs were detected.	YES Groundwater samples collected from Group 6 wells at location near higher soil PCB concentrations (RD-14 and PZ-056).	NO No PCBs detected in Group 6 groundwater.	--	YES

Table A1.3-2B (Page 2 of 3)
Summary and Evaluation of Groundwater Sampling Results
NCY RFI Site

Analytical Group	**Site Soil Impacts?** **(Summary of Relevant Impacts)** [See Table A1.3-2A for a complete summary of soil impacts]	**Monitored in GW?** **Number of samples/Date Range** [See Figure A1.2-1 for groundwater monitoring locations]	**Constituents Detected in GW?** **Above GWCC or Regulatory Criteria?*** [See Appendix B for a summary of groundwater results]	**Site Related?** (Describe Transport & Fate)	**Groundwater Characterized Sufficiently for Risk Assessment?**
Dioxins	High dioxin concentrations were detected within: • Ash Pile, 2,3,7,8 TCDD Toxic Equivalency Quotients (TEQs) up to 66 ng/kg • Downslope area, TEQs up to 24 ng/kg • Drainage. TEQs over 600 ng/kg One deeper dioxin sample was taken at 5 feet bgs in the Ash Pile with a TEQ of 0.4 ng/kg (below background), indicating limited vertical migration.	YES One sample was collected and analyzed in 2006 for dioxins in PZ-056.	YES Dioxin TEQ concentration was 0.167 pg/L below the MCL of 30 pg/L.	NO • Historically the presence of dioxins has been attributed to high suspended sediment load in groundwater samples (GWRC, 2000; Haley & Aldrich, 2006). • Unfiltered sample from shallow screened PZ-056 characterized by high measured turbidity (130 NTU compared to RD-14 NTU of 17 where no dioxins were detected). • Detected concentration reflects dioxins associated with particulate matter not representative of dissolved dioxins or prevailing Chatsworth formation conditions. • Dioxins are naturally occurring in soil and have been detected in samples at concentrations higher than ambient surface soil background in shale samples from SSFL Corehole C-5 at depth of 92 feet bgs (H&A 2006). • Presence of octa-chlorinated congeners is consistent with the pattern of naturally occurring congeners. • Low mobility characteristics of dioxins in soil and deeper sample do not indicate vertical migration.	YES • Dioxins not related to NCY RFI site conditions • Unfiltered turbid sample does not reflect Chatsworth Formation conditions. • No further characterization required.
Metals	Eight metals (cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc) detected above background in shallow soil samples within the southern New Con Yard. All detected metals were below background concentrations in deeper samples indicating limited vertical migration characteristic of metals. Four metals (barium, lead, silver, and zinc) were detected above background in shallow soil samples beneath the Ash Pile. All metals were below background concentrations in deeper samples. Molybdenum, thallium, and selenium detection limits (DLs) were elevated above soil background throughout Group 6, including the NCY RFI site. Elevated DLs occurred in deeper samples in which other metals were below background; therefore, these DLs are not indicative of elevated concentrations for these metals.	YES A total of 13 samples were collected and analyzed for metals between 1989 and 2006 in PZ-056 (2 samples), RD-15 (8 samples), and RD-92 (3 samples).	YES Four metals were detected among the three wells above Groundwater Comparison Concentrations (GWCCs): • RD-92 – Manganese detected above GWCC in one sample from March 2006, at 190 µg/L, just above GWCC of 150 µg/L. • PZ-056 Molybdenum detected above GWCC in one sample from March 2006. at 3.9 µg/L, above the GWCC of 2.2 mg/L; • RD-15 – Selenium and thallium have been detected above GWCCs: ➢ Selenium reported above GWCC at 5 µg/L in one sample in 2001. Five samples since have been near or below GWCC. ➢ Thallium not detected 2001 through 2004, with detection limits less than GWCC; detected in 2005 at 0.32 µg/L (estimated). All other metals results were below GWCCs. [See Group 6 RFI Report Appendix B Table __ for detailed groundwater metals results]	NO Metals concentrations in groundwater are not related to metals concentrations in NCY RFI site soils. • None of the four metals were detected above background in soil samples. • Depth profiles for metals above soil background do not indicate vertical migration • Metals detected above background in site soils are not above GWCC in groundwater samples indicating transport through vadose zone not occurring. • Manganese and molybdenum are similar to GWCC and represent background for these metals. • Selenium results since 2001 considered representative of groundwater conditions in RD-15. • Thallium result in 2005 RD-15 sample is considered anomalous relative to consistent prior data.	YES • Metals not related to site metals concentrations • No further characterization required.

Table A1.3-2B (Page 3 of 3)
Summary and Evaluation of Groundwater Sampling Results
NCY RFI Site

Analytical Group	Site Soil Impacts? (Summary of Relevant Impacts) [See Table A1.3-2A for a complete summary of soil impacts]	Monitored in GW? Number of samples/Date Range [See Figure A1.2-1 for groundwater monitoring locations]	Constituents Detected in GW? Above GWCC or Regulatory Criteria?* [See Appendix B for a summary of groundwater results]	Site Related? (Describe Transport & Fate)	Groundwater Characterized Sufficiently for Risk Assessment?
Perchlorate	Perchlorate has no known related chemical use, storage, or discharge at site and were not analyzed in surficial media samples at NCY RFI site.	YES A total of 8 samples were collected for perchlorate between 1999 and 2004 in: RD-15 (6 samples) and RD-92 (2 samples).	NO Perchlorate was not detected in any samples.	--	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 A total of 6 samples were collected and analyzed for inorganics between 1989 and 2006 in: PZ-056: (2 samples), RD-15: (1 sample) and RD-92: (3 samples)	YES GWCCs were established for fluoride, potassium, sodium, and sulfate. All detected concentrations of these analytes were below GWCCs, except for potassium, which was slightly above the GWCC of 9,600 µg/L at 10,796 µg/L (PZ-056 in May 2001). Bicarbonate, chloride, nitrate, and silica were detected. Total dissolved solids were 615 mg/L in RD-15 and ranged from 300-310 mg/L in RD-92.	NO Surficial media samples were not analyzed for Inorganic Constituents at NCY RFI site. Inorganic parameters provide information about groundwater characteristics and are not identified as COPCs at the site.	YES

ACRONYMS
bgs - below ground surface
CMS - Corrective Measures Study
DL - Detection Limit
EcoRBSL - Ecological risk based screening level
mg/kg - milligrams per kilogram
SVOC - Semi volatile organic compounds
TCE - Trichloroethene
MCL – Maximum Contaminant Limit
NCY - New Conservation Yard
NTU - Nephelometer Turbidity Units
ng/kg - nanograms per kilogram
OCY - Old Conservation Yard
TEQ - Toxic Equivalency Quotient
VOC - Volatile organic compounds
PAH - Polynuclear aromatic hydrocarbon
PCB - Polychlorinated biphenyls
RFI - Resource Conservation and Recovery Act (RCRA) Facility Investigation
SSFL - Santa Susana Field Laboratory

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

Table A1.3-3B
NCY RFI Report
Analytical Data Quality Summary for Soil Matrix VOCs
Page 1 of 1

Constituent	units	Screening Levels [1]		SWMU 7.8 - New Conservation Yard RFI Site Data									Data Issue	Issue Resolution[2]
				Site Data Summary (all)					Site Non Detect Data Summary					
		Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > ResRBSL	NDs > EcoRBSL		
1,1,1-Trichloroethane	µg/kg	490	2800000	6	0	NA	NA	6	50	50	0	0	--	--
1,1,2-Trichloroethane	µg/kg	1.2	9000	6	0	NA	NA	6	50	50	6	0	--	--
1,1-Dichloroethane	µg/kg	1.6	230000	6	0	NA	NA	6	50	50	6	0	Elevated DLs	a,d, and/or e; (d - Limited VOC/SVOC/TPHs in New Con Yard samples indicates low VOC concentrations)
1,1-Dichloroethene	µg/kg	23	12000	6	0	NA	NA	6	50	50	6	0	Elevated DLs	a,d, and/or e; (d - Limited VOC/SVOC/TPHs in New Con Yard samples indicates low VOC concentrations)
1,2-Dichloroethane	µg/kg	0.5	76000	6	0	NA	NA	6	50	50	6	0	Elevated DLs	a,d, and/or e; (d - Limited VOC/SVOC/TPHs in New Con Yard samples indicates low VOC concentrations)
2-Butanone	µg/kg	62000	8200000	6	0	NA	NA	6	500	500	0	0	--	--
Acetone	µg/kg	51000	46000	6	0	NA	NA	6	500	500	0	0	--	--
Benzene	µg/kg	0.13	4600	6	0	NA	NA	6	50	50	6	0	Elevated DLs	a,d, and/or e; (d - Limited VOC/SVOC/TPHs in New Con Yard samples indicates low VOC concentrations)
Carbon disulfide	µg/kg	NA	NA	6	0	NA	NA	6	50	50	NA	NA	--	--
Carbon tetrachloride	µg/kg	0.042	1600	6	0	NA	NA	6	50	50	6	0	Elevated DLs	a,d, and/or e; (d - Limited VOC/SVOC/TPHs in New Con Yard samples indicates low VOC concentrations)
Chlorobenzene	µg/kg	97	63000	6	0	NA	NA	6	50	50	0	0	--	--
Chloroform	µg/kg	0.77	920	6	0	NA	NA	6	50	50	6	0	Elevated DLs	a,d, and/or e; (d - Limited VOC/SVOC/TPHs in New Con Yard samples indicates low VOC concentrations)
Ethylbenzene	µg/kg	1200	220000	6	0	NA	NA	6	50	50	0	0	--	--
Methylene chloride	µg/kg	4	27000	6	0	NA	NA	6	300	300	6	0	Elevated DLs	a,d, and/or e; (d - Limited VOC/SVOC/TPHs in New Con Yard samples indicates low VOC concentrations)
Tetrachloroethene	µg/kg	0.43	2300	6	0	NA	NA	6	50	50	6	0	--	--
Toluene	µg/kg	300	2700	6	1	110	110	5	50	50	0	0	--	--
trans-1,2-Dichloroethene	µg/kg	16	1000000	6	0	NA	NA	6	50	50	6	0	Elevated DLs	a,d, and/or e; (d - Limited VOC/SVOC/TPHs in New Con Yard samples indicates low VOC concentrations)
Trichloroethene	µg/kg	2.2	3200	6	0	NA	NA	6	50	50	6	0	Elevated DLs	a,d, and/or e; (d - Limited VOC/SVOC/TPHs in New Con Yard samples indicates low VOC concentrations)
Vinyl chloride	µg/kg	0.0096	780	6	0	NA	NA	6	50	50	6	0	Elevated DLs	a,d, and/or e; (d - Limited VOC/SVOC/TPHs in New Con Yard samples indicates low VOC concentrations)
Xylenes (total)	µg/kg	150	690000	6	0	NA	NA	6	50	50	0	0	--	--

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

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

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

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

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

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

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

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

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

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

Table A1.3-3C
NCY RFI Report
Analytical Data Quality Summary for SVOCs
Page 1 of 1

Constituent	units	Screening Levels [1]		SWMU 7.8 - New Conservation Yard RFI Site Data									Data Issue	Issue Resolution[2]
				Site Data Summary (all)					Site Non Detect Data Summary					
		Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > ResRBSL	NDs > EcoRBSL		
1-Methylnaphthalene	µg/kg	NA	230000	5	0	NA	NA	5	22	24	NA	0	--	--
2-Chloronaphthalene	µg/kg	NA	NA	6	0	NA	NA	6	170	170	NA	NA	--	--
2-Methylnaphthalene	µg/kg	230000	230000	12	0	NA	NA	12	4	170	0	0	--	--
Acenaphthene	µg/kg	3400000	2500	13	0	NA	NA	13	4	170	0	0	--	--
Acenaphthylene	µg/kg	1700000	810000	13	0	NA	NA	13	4	170	0	0	--	--
Anthracene	µg/kg	17000000	2400	13	0	NA	NA	13	4	170	0	0	--	--
Benzo(a)anthracene	µg/kg	600	1700	13	1	12	12	12	22	170	0	0	--	--
Benzo(a)pyrene	µg/kg	6	4700	13	2	13	43	11	22	170	11	0	Elevated DLs	a,d, and/or e; (d - Limited VOC/SVOC/TPHs in New Con Yard samples indicates low SVOC concentrations)
Benzo(b)fluoranthene	µg/kg	600	5500	13	2	24	65	11	22	170	0	0	--	--
Benzo(g,h,i)perylene	µg/kg	NA	6400	13	2	18	31	11	22	170	NA	0	--	--
Benzo(k)fluoranthene	µg/kg	600	3700	13	1	12	12	12	22	170	0	0	--	--
bis(2-Ethylhexyl)phthalate	µg/kg	250000	4900	7	0	NA	NA	7	101	170	0	0	--	--
Butylbenzylphthalate	µg/kg	11000000	370000	6	0	NA	NA	6	170	170	0	0	--	--
Chrysene	µg/kg	6000	2400	13	2	24	27	11	22	170	0	0	--	--
Dibenzo(a,h)anthracene	µg/kg	170	1700	13	1	8	8	12	22	170	0	0	--	--
Diethylphthalate	µg/kg	46000000	7000000	7	0	NA	NA	7	101	170	0	0	--	--
Di-n-butyl phthalate	µg/kg	5700000	500	7	0	NA	NA	7	101	170	0	0	--	--
Fluoranthene	µg/kg	2300000	130000	13	3	28	36	10	22	170	0	0	--	--
Fluorene	µg/kg	2300000	1600	13	0	NA	NA	13	4	170	0	0	--	--
Indeno(1,2,3-cd)pyrene	µg/kg	600	3900	13	2	15	53	11	22	170	0	0	--	--
Naphthalene	µg/kg	6000	240000	13	0	NA	NA	13	4	170	0	0	--	--
Phenanthrene	µg/kg	1700000	1300	13	1	14	14	12	22	170	0	0	--	--
Phenol	µg/kg	18000000	280000	6	0	NA	NA	6	170	170	0	0	--	--
Pyrene	µg/kg	1700000	79000	13	3	23	43	10	22	170	0	0	--	--

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

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

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

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

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

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

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

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

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

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

Table A1.3-3D and A1.3-3E
NCY RFI Report
Analytical Data Quality Summary for TPH and PCBs
Page 1 of 1

Table A1.3-3D Analytical Data Quality Summary for TPH

Constituent	units	Screening Levels [1]		SWMU 7.8 - New Conservation Yard RFI Site Data									Data Issue	Issue Resolution[2]
				Site Data Summary (all)					Site Non Detect Data Summary					
		Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > ResRBSL	NDs > EcoRBSL		
Hydrocarbons	mg/kg	1400	NA	6	0	NA	NA	6	5	5	0	NA	--	--

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

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

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

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

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

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

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

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

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

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

Table A1.3-3E Analytical Data Quality Summary for PCBs

Constituent	units	Screening Levels [1]		SWMU 7.8 - New Conservation Yard RFI Site Data									Data Issue	Issue Resolution[2]
				Site Data Summary (all)					Site Non Detect Data Summary					
		Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > ResRBSL	NDs > EcoRBSL		
Aroclor 1016	µg/kg	3900	1600	4	0	NA	NA	4	190	230	0	0	--	--
Aroclor 1221	µg/kg	350	1600	4	0	NA	NA	4	190	230	0	0	--	--
Aroclor 1232	µg/kg	350	79	4	0	NA	NA	4	190	230	0	4	Elevated DLs	a and e
Aroclor 1242	µg/kg	350	80	4	0	NA	NA	4	190	230	0	4	Elevated DLs	a and e
Aroclor 1248	µg/kg	350	12	4	0	NA	NA	4	190	230	0	4	Elevated DLs	a and e
Aroclor 1254	µg/kg	350	79	5	1	71	71	4	190	230	0	4	Elevated DLs	a and e
Aroclor 1260	µg/kg	350	79	4	0	NA	NA	4	190	230	0	4	Elevated DLs	a and e

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

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

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

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

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

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

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

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

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

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

Table A1.3-3F
NCY RFI Report
Analytical Data Quality Summary for Dioxin/Furans
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Constituent	units	Background/ Screening Levels[1]			SWMU 7.8 - New Conservation Yard RFI Site Data										Data Issue	Issue Resolution[3]
					Site Data Summary (all)					Site Non Detect Data Summary						
		Background[2]	Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > Background	NDs > ResRBSL	NDs > EcoRBSL		
1,2,3,4,6,7,8-HpCDD	ng/kg	13	690	1000	18	18	12.7	26500	0	NA	NA	NA	NA	NA	--	--
1,2,3,4,6,7,8-HpCDF	ng/kg	2.5	690	340	18	14	1.87	5680	4	6.6	560	4	0	1	Elevated DLs	a and e
1,2,3,4,7,8,9-HpCDF	ng/kg	0.19	690	340	18	16	1.2	486	2	0.189	0.92	1	0	0	Elevated DLs	a and e
1,2,3,4,7,8-HxCDD	ng/kg	0.34	69	34	18	15	0.841	242	3	0.34	1.7	3	0	0	Elevated DLs	a and e
1,2,3,4,7,8-HxCDF	ng/kg	0.73	69	34	18	17	0.404	150	1	0.4	0.4	0	0	0	--	--
1,2,3,6,7,8-HxCDD	ng/kg	0.95	69	34	18	17	0.333	1210	1	1.4	1.4	1	0	0	Elevated DLs	a and e
1,2,3,6,7,8-HxCDF	ng/kg	0.3	69	34	18	15	0.178	106	3	0.79	19	3	0	0	Elevated DLs	a and e
1,2,3,7,8,9-HxCDD	ng/kg	1.1	69	35	18	16	1.89	472	2	0.197	1.2	1	0	0	Elevated DLs	a, e, and f
1,2,3,7,8,9-HxCDF	ng/kg	0.43	69	34	18	15	0.225	33.9	3	0.269	0.6	1	0	0	Elevated DLs	a, e, and f
1,2,3,7,8-PeCDD	ng/kg	0.18	140	3.4	18	13	0.477	94.9	5	0.128	4.8	4	0	1	Elevated DLs	a and e
1,2,3,7,8-PeCDF	ng/kg	0.59	140	69	18	15	0.103	11.3	3	0.181	1.7	2	0	0	Elevated DLs	a and e
2,3,4,6,7,8-HxCDF	ng/kg	0.45	69	34	18	17	0.235	275	1	0.64	0.64	1	0	0	Elevated DLs	a, e, and f
2,3,4,7,8-PeCDF	ng/kg	0.64	14	6.9	18	17	0.187	30.8	1	0.44	0.44	0	0	0	--	--
2,3,7,8-TCDD	ng/kg	0.5	6.9	3.4	18	10	0.269	42.3	8	0.111	1.4	4	0	0	Elevated DLs	a and e
2,3,7,8-TCDF	ng/kg	1.8	69	4.4	18	15	0.186	13	3	0.0403	0.46	0	0	0	--	--
OCDD	ng/kg	140	69000	140000	18	18	151	295000	0	NA	NA	NA	NA	NA	--	--
OCDF	ng/kg	8.1	69000	99000	18	18	3.09	14700	0	NA	NA	NA	NA	NA	--	--
TCDD TEQ (ND = 0)	ng/kg	0.98	6.9	3.4	18	18	0.1949	664.472	0	NA	NA	NA	NA	NA	--	--
Total HpCDD	ng/kg	NA	NA	NA	18	18	41	55300	0	NA	NA	NA	NA	NA	--	--
Total HpCDF	ng/kg	NA	NA	NA	18	18	6.83	27200	0	NA	NA	NA	NA	NA	--	--
Total HxCDD	ng/kg	NA	NA	NA	18	17	3.68	5960	1	1.5	1.5	NA	NA	NA	--	--
Total HxCDF	ng/kg	NA	NA	NA	18	17	3.96	10500	1	0.61	0.61	NA	NA	NA	--	--
Total PeCDD	ng/kg	NA	NA	NA	18	17	0.494	471	1	0.58	0.58	NA	NA	NA	--	--
Total PeCDF	ng/kg	NA	NA	NA	18	17	1.32	1350	1	0.65	0.65	NA	NA	NA	--	--
Total TCDD	ng/kg	NA	NA	NA	18	16	0.498	110	2	0.111	0.79	NA	NA	NA	--	--
Total TCDF	ng/kg	NA	NA	NA	18	17	0.928	186	1	0.46	0.46	NA	NA	NA	--	--

Notes:

-- 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 1×10^{-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 A1.3-3G
NCY RFI Report
Analytical Data Quality Summary for Metals
Page 1 of 1

Constituent	units	Background/ Screening Levels[1]			SWMU 7.8 - New Conservation Yard RFI Site Data										Data Issue	Issue Resolution[3]
					Site Data Summary (all)					Site Non Detect Data Summary						
		Background[2]	Residential (ResRBSL)	Ecological (EcoRBSL)	Samples Analyzed	Samples Detected	Minimum Detected Concentration	Maximum Detected Concentration	Samples ND	Minimum ND	Maximum ND	NDs > Background	NDs > ResRBSL	NDs > EcoRBSL		
Aluminum	mg/kg	20000	75000	14	7	7	6900	14000	0	NA	NA	NA	NA	NA	--	--
Antimony	mg/kg	8.7	30	0.096	14	0	NA	NA	14	10	12	14	0	14	Elevated DLs	a, c, d, e, and/or f; (d - Elevated metals trend to below background in the New Con Yard samples that are not within the CMS area at surface and at depth, indicating that antimony is not above background)
Arsenic	mg/kg	15	0.095	0.34	21	8	1.6	9	13	5	6	0	13	13	--	--
Barium	mg/kg	140	15000	15	24	24	34	1000	0	NA	NA	NA	NA	NA	--	--
Beryllium	mg/kg	1.1	150	5.7	21	13	0.23	0.8	8	0.5	0.6	0	0	0	--	--
Boron	mg/kg	9.7	15000	6.3	7	0	NA	NA	7	5.6	7.6	0	0	3	--	--
Cadmium	mg/kg	1	2.6	0.0031	21	10	0.14	20	11	1	1	0	0	11	--	--
Chromium	mg/kg	36.8	3400	940	21	21	9	72	0	NA	NA	NA	NA	NA	--	--
Cobalt	mg/kg	21	1500	10	21	21	3	14	0	NA	NA	NA	NA	NA	--	--
Copper	mg/kg	29	3000	1.1	21	21	3	200	0	NA	NA	NA	NA	NA	--	--
Lead	mg/kg	34	150	0.063	28	28	4.9	100	0	NA	NA	NA	NA	NA	--	--
Mercury	mg/kg	0.09	23	0.89	22	5	0.033	1	17	0.0087	0.2	13	0	0	Elevated DLs	a, d, and/or e; (d - Elevated metals trend to below background in the New Con Yard samples that are not within the CMS area at surface and at depth, indicating that mercury is not above background)
Molybdenum	mg/kg	5.3	380	0.11	21	0	NA	NA	21	0.33	12	14	0	21	Elevated DLs	a, c, d, and/or e; (d - Elevated metals trend to below background in the New Con Yard samples that are not within the CMS area at surface and at depth, indicating that molybdenum is not above background)
Nickel	mg/kg	29	1500	0.1	21	20	8.9	130	1	5	5	0	0	1	--	
Selenium	mg/kg	0.655	380	0.18	21	0	NA	NA	21	0.21	6	14	0	21	Elevated DLs	a, c, d, and/or e; (d - Elevated metals trend to below background in the New Con Yard samples that are not within the CMS area at surface and at depth, indicating that selenium is not above background)
Silver	mg/kg	0.79	380	0.55	28	15	0.026	150	13	0.052	1	11	0	11	Elevated DLs	a, d, e, and/or f; (d - Elevated metals trend to below background in the New Con Yard samples that are not within the CMS area at surface and at depth, indicating that silver is not above background)
Thallium	mg/kg	0.46	6.1	3.2	21	7	0.13	0.34	14	5	6	14	0	14	Elevated DLs	a, c, d, and/or e; (d - Elevated metals trend to below background in the New Con Yard samples that are not within the CMS area at surface and at depth, indicating that thallium is not above background)
Vanadium	mg/kg	62	76	1.6	21	21	17	39	0	NA	NA	NA	NA	NA	--	--
Zinc	mg/kg	110	23000	22	25	25	38	3400	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.
- Results for antimony were rejected in 7 samples distribruted throughout the NCY RFI Site.

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

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

[2] Reference Soil Background Report (MWH 2005)

[3] The following statements indicate standard DL issue resolutions and important notes throughout the group. Additional detail is provided when the elevated DL does not fall within a CMS 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 A1.4-1 (Page 1 of 3)

Chemicals of Potential Concern for Human Health
New Conservation Yard RFI Site

Chemical	Soil (0 to 2 feet bgs)	Soil (0 to 10 feet bgs)	RFI Site Chatsworth Formation Groundwater (indirect pathway) [a]	Group 6 Reporting Area Chatsworth Formation Groundwater (direct pathway) [a]
Inorganic Compounds				
Barium	X	X		
Cadmium	X	X		
Chromium	X	X		
Copper	X	X		X
Fluoride				X
Lead	X	X		
Mercury	X	X		
Molybdenum	X	X		
Nickel	X	X		
Nitrate				X
Selenium	X	X		
Silver	X	X		
Thallium				X
Zinc	X	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	X	X
Trichloroethene			X	X
SVOCs				
Benzo(a)anthracene	X	X		
Benzo(a)pyrene	X	X		
Benzo(b)fluoranthene	X	X		
Benzo(g,h,i)perylene	X	X		
Benzo(k)fluoranthene	X	X		
Chrysene	X	X		
Dibenz(a,h)anthracene	X	X		
Fluoranthene	X	X		
Indeno(1,2,3-cd)pyrene	X	X		
Phenanthrene	X	X		
Pyrene	X	X		

Table A1.4-1 (Page 2 of 3)

Chemicals of Potential Concern for Human Health
New Conservation Yard RFI Site

Chemical	Soil (0 to 2 feet bgs)	Soil (0 to 10 feet bgs)	RFI Site Chatsworth Formation Groundwater (indirect pathway) [(a)]	Group 6 Reporting Area Chatsworth Formation Groundwater (direct pathway) [(a)]
Total Petroleum Hydrocarbons				
C14-C20(Diesel Range)				X
DIOXINS				
2,3,7,8-TCDD	X	X		
1,2,3,7,8-PeCDD	X	X		
1,2,3,4,7,8-HxCDD	X	X		
1,2,3,6,7,8-HxCDD	X	X		
1,2,3,7,8,9-HxCDD	X	X		
1,2,3,4,6,7,8-HpCDD	X	X		
OCDD	X	X		
2,3,7,8-TCDF	X	X		
1,2,3,7,8-PeCDF	X	X		
2,3,4,7,8-PeCDF	X	X		
1,2,3,4,7,8-HxCDF	X	X		
1,2,3,6,7,8-HxCDF	X	X		
2,3,4,6,7,8-HxCDF	X	X		
1,2,3,7,8,9-HxCDF	X	X		
1,2,3,4,6,7,8-HpCDF	X	X		
1,2,3,4,7,8,9-HpCDF	X	X		
OCDF	X	X		
Total Tetra	X	X		
Total Penta	X	X		
Total Hexa	X	X		
Total Hepta	X	X		
Total Octa	X	X		
PCDD/PCDF	X	X		
PCBs				
Aroclor-1254	X	X		
PCB-105	X	X		
PCB-114	X	X		
PCB-118	X	X		
PCB-123	X	X		
PCB-126	X	X		
PCB-156	X	X		
PCB-157	X	X		
PCB-167	X	X		
PCB-169	X	X		
PCB-189	X	X		
PCB-77	X	X		

Table A1.4-1 (Page 3 of 3)

Chemicals of Potential Concern for Human Health
New Conservation Yard RFI Site

Chemical	Soil (0 to 2 feet bgs)	Soil (0 to 10 feet bgs)	RFI Site Chatsworth Formation Groundwater (indirect pathway) [(a)]	Group 6 Reporting Area Chatsworth Formation Groundwater (direct pathway)[(a)]
PCB-81	X	X		

Notes:
VOC - volatile organic compound
SVOC - semi-volatile organic compound
PCBs - polychlorinated biphenyls
COPC - chemical of potential concern
bgs - below ground surface
(a) Only Chatsworth Formation groundwater is considered in the risk assessment because near-surface groundwater is localized (does not occur at the NCY RFI site or does not meet State Water Resources Control Board yield requirements.

Table A1.4-2 (Page 1 of 1)

Human Health Risk Estimates[1]
New Conservation Yard 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	0.007 - 0.12		1E-06 - 4E-05	a, c	<0.001 - <0.001		5E-11 - 4E-10		0.007 - 0.12		1E-06 - 4E-05	a, c
Future Adult Recreator	<0.001 - 0.02		1E-07 - 1E-05	a	<0.001 - <0.001		5E-13 - 3E-12		<0.001 - 0.02		1E-07 - 1E-05	a
Future Child Recreator	0.013 - 0.03		2E-06 - 2E-05	a	<0.001 - <0.001		3E-12 - 1E-11		0.013 - 0.03		2E-06 - 2E-05	a
Future Adult Resident	0.01 - 0.09		2E-06 - 3E-05	a, c	1.4 - 2.2	b	8E-07 - 3E-06	b	1.4 - 2.3	b	3E-06 - 3E-05	a, b, c
without domestic use of groundwater[5]	NA NA		NA NA		<0.001 - <0.001		2E-10 - 1E-09		0.012 - 0.09		2E-06 - 3E-05	a, c
Future Child Resident	0.11 - 0.81		1E-05 - 7E-05	a, c	4.9 - 8.2	b	2E-06 - 3E-06	b	5.0 - 9.0	b	1E-05 - 7E-05	a, b, c
without domestic use of groundwater[5]	NA NA		NA NA		<0.001 - <0.001		6E-10 - 9E-10		0.11 - 0.81		1E-05 - 7E-05	a, c

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 = Dioxins
b = Trichloroethene
c = Cadmium

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

Table A1.4-3 (1 of 1)

Human Health Risk Assessment Uncertainty Analysis
New Conservation Yard RFI Site

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
Exposure Pathways	Domestic use of near surface groundwater was determined to be an incomplete exposure pathway because the estimated production rate is below the minimum criteria of 200 gpd specified in the SRAM.	Low	Realistic, reasonable determination
COPC Selection	The results of the Wilcoxon Rank Sum test inidcate that barium, copper, lead, mercury and nickel site soil concnetrations are similar to background. However, these metals were selected as COPCs because of the spatial extent of the highest detections which exceeded the range of background concentrations.	Low	Conservative
EPC Calculations	Groundwater exposure point concentrations are based on maximum detected concentrations	Low	Conservative
	While measured and non-detect PAH concentrations are available for samples in and around the ash pile, PAHs were not analyzed for in Ash Pile samples that contain the highest concentrations of dioxins. It is therefore likely that the highest PAH concentrations are not accounted for. However, given the presence of elevated dioxins in the Ash Pile, more information regarding the levels of PAHs would not likely alter decision-making.	Moderate	Non-Conservative
Cancer Slope Factor	Extrapolation of dose-response data from laboratory animals to humans.	High	Conservative
	Assumes that all carcinogens do not have a threshold below which carcinogenic response occurs, and therefore, any dose, no matter how small, results in some potential risk.	Moderate	Conservative
	Cancer slope factors derived from animal studies are the upper-bound maximum likelihood estimates based on a linear dose-response curve, and therefore, overstate carcinogenic potency.	Moderate	Conservative
Reference Dose	High degree of uncertainty in extrapolation of dose-response data from laboratory animals to humans.	High	Conservative

Notes:
PAH - polycyclic aromatic hydrocarbon
COPC - Chemical of potential concern
EPC - exposure point concentration
UCL - upper confidence limit

Table A1.4-4 (1 of 2)

Summary of Chemicals of Potential Ecological Concern
New Conservation Yard RFI Site

Chemical	Soil/Sediment 0 to 2 feet bgs	Soil/Sediment 0 to 4 feet bgs	Soil/Sediment 0 to 6 feet bgs
Inorganic Compounds			
Antimony	X	X	X
Barium	X	X	X
Cadmium	X	X	X
Chromium	X	X	X
Copper	X	X	X
Lead	X	X	X
Mercury	X	X	X
Molybdenum	X	X	X
Nickel	X	X	X
Selenium	X	X	X
Silver	X	X	X
Zinc	X	X	X
VOCs			
Toluene	X	X	X
SVOCs			
Benzo(a)anthracene	X	X	X
Benzo(a)pyrene	X	X	X
Benzo(b)fluoranthene	X	X	X
Benzo(g,h,i)perylene	X	X	X
Benzo(k)fluoranthene	X	X	X
Chrysene	X	X	X
Dibenz(a,h)anthracene	X	X	X
Fluoranthene	X	X	X
Indeno(1,2,3-cd)pyrene	X	X	X
Phenanthrene	X	X	X
Pyrene	X	X	X
DIOXINS			
2,3,7,8-TCDD	X	X	X
1,2,3,7,8-PeCDD	X	X	X
1,2,3,4,7,8-HxCDD	X	X	X
1,2,3,6,7,8-HxCDD	X	X	X
1,2,3,7,8,9-HxCDD	X	X	X
1,2,3,4,6,7,8-HpCDD	X	X	X
OCDD	X	X	X
2,3,7,8-TCDF	X	X	X

Table A1.4-4 (2 of 2)

Summary of Chemicals of Potential Ecological Concern
New Conservation Yard RFI Site

Chemical	Soil/Sediment 0 to 2 feet bgs	Soil/Sediment 0 to 4 feet bgs	Soil/Sediment 0 to 6 feet bgs
1,2,3,7,8-PeCDF	X	X	X
2,3,4,7,8-PeCDF	X	X	X
1,2,3,4,7,8-HxCDF	X	X	X
1,2,3,6,7,8-HxCDF	X	X	X
2,3,4,6,7,8-HxCDF	X	X	X
1,2,3,7,8,9-HxCDF	X	X	X
1,2,3,4,6,7,8-HpCDF	X	X	X
1,2,3,4,7,8,9-HpCDF	X	X	X
OCDF	X	X	X
PCBs			
Aroclor-1254	X	X	X
PCB-105	X	X	X
PCB-114	X	X	X
PCB-118	X	X	X
PCB-123	X	X	X
PCB-126	X	X	X
PCB-156	X	X	X
PCB-157	X	X	X
PCB-167	X	X	X
PCB-169	X	X	X
PCB-189	X	X	X
PCB-77	X	X	X
PCB-81	X	X	X

Notes:
VOC - volatile organic compound
SVOC - semi-volatile organic compound
PCB - polychlorinated biphenyl
CPEC - chemical of potential ecological concern
bgs - below ground surface

Table A1.4-5 (Page 1 of 1)

Risk Estimates for Ecological Receptors
New Conservation Yard RFI Site

Receptor	Total for Site Media (Soil Only)	
	HI Range[1]	CD[2]
Deer Mouse	62 - 220	Barium, Cadmium, Copper, Lead, Molybdenum, Nickel, Selenium, Silver, Zinc, Dioxins
without inhalation pathway	62 - 220	Barium, Cadmium, Copper, Lead, Molybdenum, Nickel, Selenium, Silver, Zinc, Dioxins
Thrush	560 - >1,000	Barium, Cadmium, Copper, Lead, Molybdenum, Nickel, Selenium, Zinc, Dioxins
Hawk	160 - 270	Barium, Cadmium,Lead, Selenium, Zinc
Using Large Home Range Factor[3]	1.6 - 2.7	None
Bobcat	7.2 - 24	Barium, Cadmium, Nickel, Selenium, Zinc, Dioxins
Using Large Home Range Factor[3]	0.012 - 0.041	None
Mule Deer	57 - 280	Barium, Cadmium, Molybdenum, Nickel, Zinc, Dioxins
Using Large Home Range Factor[3]	0.59 - 2.9	None

Notes:

1. HI Range is the sum of the hazard quotients for all exposure pathways; the range reported is for the mean and 95% upper confidence limit estimates, respectively.
2. Chemical risk drivers are those CPECs detected onsite with an HQ > 1, or major risk contributors if cumulative HIs >> 1. "None" indicates that no chemical's HQs > 1.
3. The HIs for hawk, mule deer, and bobcat assume that their home ranges are equal to the RFI site acreage. This is an extremely conservative assumption; RFI site acreage is typically only a small fraction of a large animal's home range. The estimated HIs decrease to the values indicated above if an adjustment is made to reflect a more realistic home range for these receptors.

CD = Chemical risk driver
CPEC = Chemical of potential ecological concern
HI = Hazard index
HQ = Hazard Quotient

Table A1.4-6 (1 of 1)

Ecological Risk Assessment Uncertainty Analysis
New Conservation Yard RFI Site

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
CPEC Selection	The results of the Wilcoxon Rank Sum test inidcate that barium, copper, lead, mercury and nickel site soil concnetrations are similar to background. However, these metals were selected as COPECs because of the spatial extent of the highest detections which exceeded the range of background concentrations.	Low	Conservative
	Due to elevated detection limits above ESLs for antimony, molybdenum, and selenium, these metals were considered as COPECs even though they were not detected in any soil samples. In these cases, it was assumed that chemicals may be present at half the detection limit. This is believed to be a conservative overestimation as the RME EPC.	Moderate	Conservative
EPC Calculations	While measured and non-detect PAH concentrations are available for samples in and around the ash pile, PAHs were not analyzed for in Ash Pile samples that contain the highest concentrations of dioxins. It is therefore likely that the highest PAH concentrations are not accounted for. However, given the presence of elevated dioxins in the Ash Pile, more information regarding the levels of PAHs would not likely alter decision-making.	Moderate	Non-Conservative
Toxicity Reference Value	High degree of uncertainty in extrapolation of dose-response data from laboratory animals to representative receptors.	High	Not Known
	Avian toxicity values are only available for a limited number of CPECs at the NCY RFI site.	Moderate	Not conservative
	Use of short-term (acute) toxicity data to estimate chronic toxicity values are uncertain. Most TRVs are based on chronic or subchronic studies. Uncertainty factors are used to obtain a chronic NOAEL-equivalent TRV.	Low	Conservative
Risk Characterization	The estimated risks to the hawk, the bobcat, and the mule deer assume that these species' spend all of their time at the NCY RFI site. There is a high degree of uncertainty in this assumption and it substantially overstates the risks to these species' due to chemicals present in soils at the site. The minimum reported foraging ranges for the red-tailed hawk, the bobcat, the mule deer are 195, 1,152, and 192 acres, respectively, as compared to 2.0 acres for the NCY RFI site. When the foraging ranges of the these species' is accounted for in the ERA, it indicates that RME HIs for the hawk, the bobcat, and the mule deer could be as low as 0.7, 0.3, and 47, respectively. Estimates to large home range receptors (hawk, bobcat, and mule deer) will be addressed for the entire SSFL facility after all RFI site risk assessments have been completed and potential site risks evaluated.	High	Conservative

Notes:
CPEC - chemical of potential ecological concern

Table A1.5-1 (Page 1 of 1)
Surficial Media Site Action Recommendations
NCY RFI Site

Area	Associated Chemical Use Area(s)	CMS Area[1] (Figure A1.5-1)	Recommended for Further Consideration in CMS Based On:			
			Residential Receptor[2]	Industrial Receptor[2]	Recreational Receptor[2]	Ecological Receptor[2]
New Conservation Yard (New Con Yard)	1	NCY 1-1	Cadmium	Cadmium	--	Metals (Barium, Cadmium, Copper, Lead, Molybdenum, Nickel, Selenium, Silver, Zinc)
Building 040 Ash Pile	2	NCY 2-1 (stabilization)	Dioxins, PAHs,	Dioxins, PAHs,	Dioxins, PAHs	Dioxins, PAHs, Metals (Barium, Lead, Silver, Zinc)
Downslope Area	2	NCY 2-2 (stabilization)	Dioxins, PAHs	Dioxins, PAHs	Dioxins, PAHs	Dioxins, PAHs, Metals (Barium, Lead, Silver, Zinc)
Drainage [3]	2	NCY 2-3 (stabilization)	Dioxins, PAHs	Dioxins, PAHs	Dioxins, PAHs	Dioxins, Metals (Barium, Lead, Silver, Zinc)
Groundwater	--	--	• Indirect groundwater risks insignificant, do not affect surficial media CMS decisions • Direct groundwater risks > 1 x 10^{-6} may affect surficial media CMS decisions	• Indirect groundwater risks insignificant, do not affect surficial media CMS decisions • No direct groundwater use	• Indirect groundwater risks insignificant, do not affect CMS surficial media decisions • No direct groundwater use	• Indirect groundwater risks insignificant, do not affect surficial media CMS decisions • No direct groundwater use

General Notes:

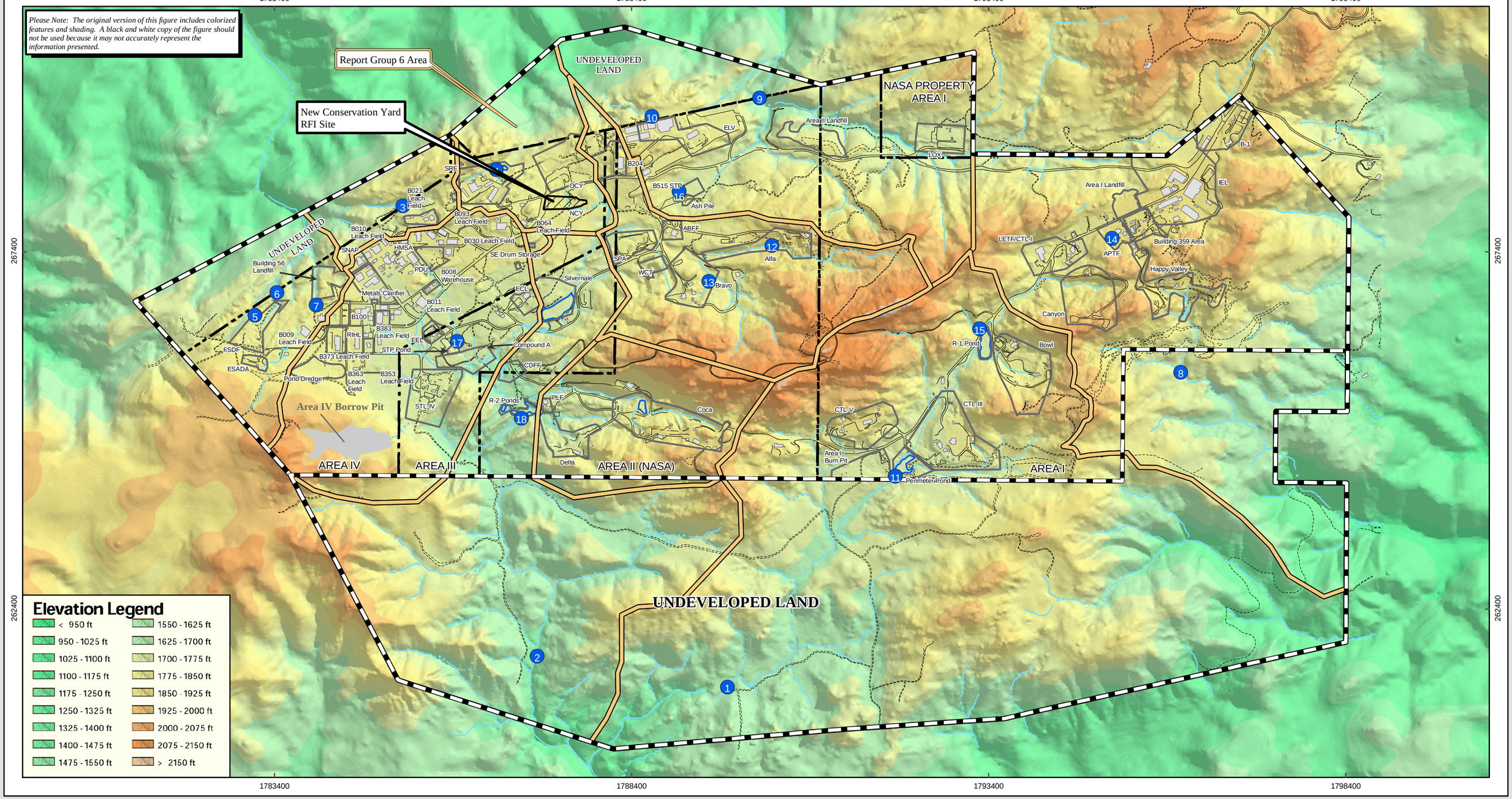
(a) -- Indicates area is recommended for No Further Action (NFA) for respective receptor, or parameter not applicable.

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. The NCY drainage is potentially associated with either NCY Chemical Use Area 1 or 2; however, it is included as an area recommended for further consideration in the CMS with Chemical Use Area 2 based on the association of dioxins. A portion of this drainage is asphalt-lined, and sediments above the liner are recommended for removal as part of facility maintenance activities.

ACRONYMS
CMS = Corrective Measures Study
NCY = New Conservation Yard
New Con Yard = New Conservation Yard (refers to Chemical Use Area 1, not the entire RFI site)
NFA = No further action
SWMU = Solid Waste Management Unit

FIGURES



N

0 1,300
FEET

MAP COORDINATES IN STATEPLANE, NAD 27, ZONE V

RFI SITES

AREA I
SWMU 4.1 - B-1 Area
SWMU 4.2 - Area I Landfill
SWMUs 4.3, 4.4 and AOC - Instrument and Equipment Laboratories (IEL)
SWMU 4.5, 4.6 - LOX Plant Former Sump/Clarifier and Drum Disposal Area
SWMU 4.7 - Component Test Laboratory III (CTL-III) Area
SWMU 4.8 - Area I Burn Pit
SWMU 4.9, AOC - Advanced Propulstion Test Facility (APTF) Area
SWMU 4.12 - Laser Engineering Test Facility (LETF)/Component Test Lab I (CTL-I) Area
SWMU 4.14 - Canyon Area
SWMU 4.15 and AOC - Bowl Area and Building 901 Leachfield
SWMU 4.16 - Area I Reservoir (R-1 Pond)
SWMU 4.17 - Perimeter Pond
AOC - Building 359 Sump
AOC - Happy Valley Area

AREA II
SWMU 5.1 - Area II Landfill
SWMU 5.2 - ELV Final Assembly, Building 206
SWMU 5.5 and AOC - Building 204 Area
SWMU 5.6 - Former Incinerator Ash Pile
SWMU 5.7 - Hazardous Waste Storage Area Waste Coolant Tank (WCT)
SWMU 5.9, 5.10, 5.11 - Alfa Area
SWMU 5.12, 5.13, 5.14, 5.15 - Alfa/Bravo Skim Pond and Bravo Area
SWMU 5.18, 5.19 - Coca Area
SWMU 5.20, 5.21, 5.22 - Propellant Load Facility (PLF)
SWMU 5.23 - Delta Area
SWMU 5.26 - R-2A and R-2B Ponds
AOC - Building 515 Sewage Treatment Plant
AOC - Storable Propellant Area (SPA)
AOC - Alfa/Bravo Fuel Farm
AOC - Coca/Delta Fuel Farm

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

AREA IV
SWMU 7.1 - Building 56 Landfill
SWMU 7.3 - Former Sodium Disposal Facility (FSDF)
SWMU 7.4 - Old Conservation Yard (OCY)
SWMU 7.5 - Building 100 Trench
SWMU 7.6 - Radioactive Materials Handling Facility (RMHF)

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

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

New Conservation Yard RFI Site Location Map

SANTA SUSANA FIELD LABORATORY

Date: Sep 28, 2006
Document: RFI-Report-Group6_NC_RFI_Location.mxd

MWH MONTGOMERY WATSON HARZA

FIGURE A1.1-1

Potential Chemical Use Areas and Sample Locations
New Conservation Yard (SWMU 7.8)

Santa Susana Field Laboratory

MWH MONTGOMERY WATSON HARZA

FIGURE
A1.2-1

Soil Sample Location

- Soil Matrix
- Soil Vapor
- Surface Water

Sample Number
Historical Sample Number
Contained Sample Number

Chemical Use Areas

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

NCY Chemical Use Areas

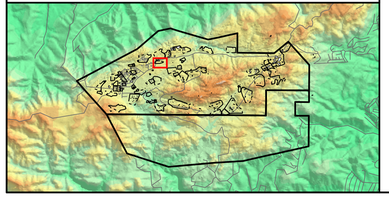
1 New Conservation Yard (NCY)
2 Ash Pile Near Building 040

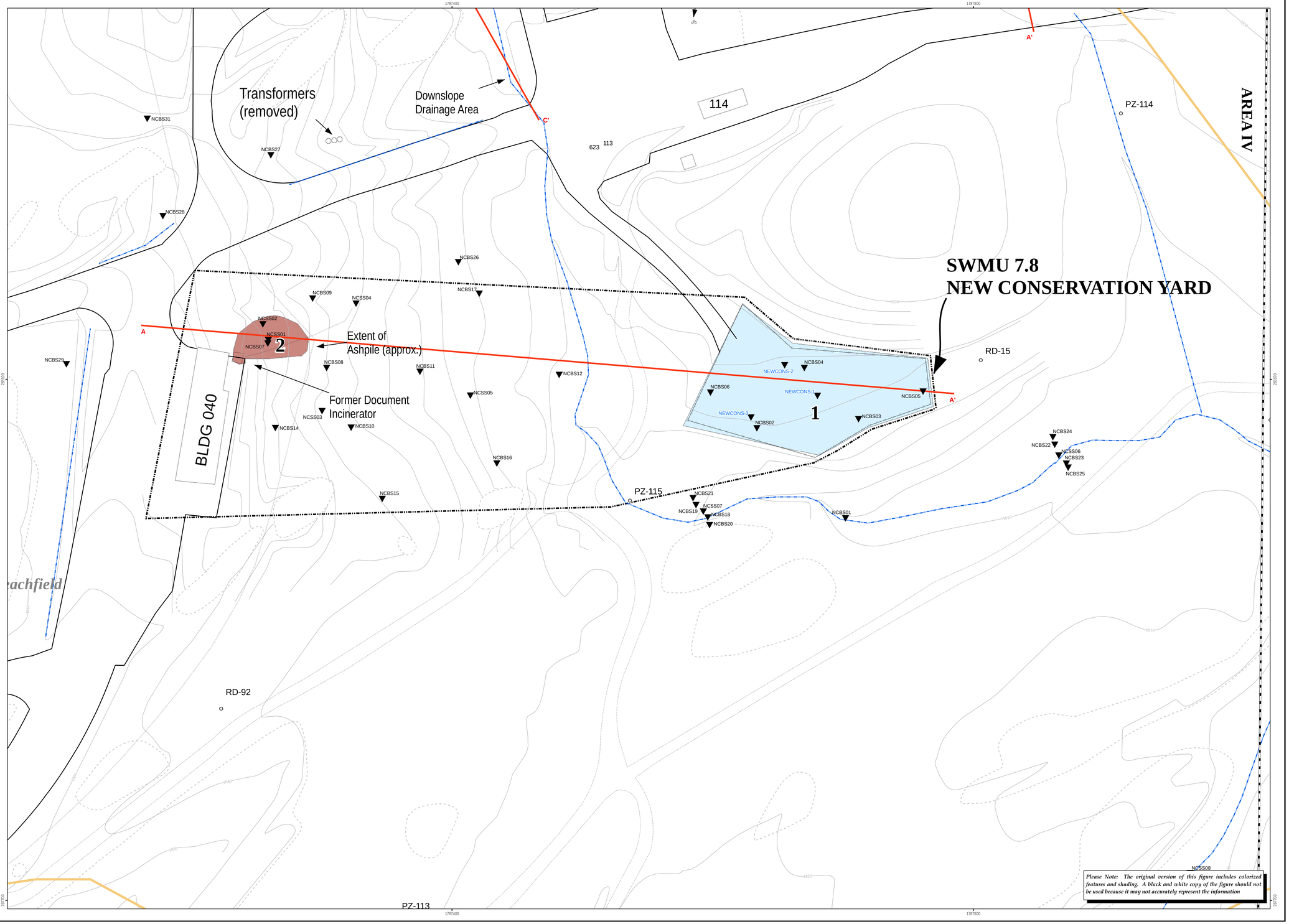
Base Map Legend

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

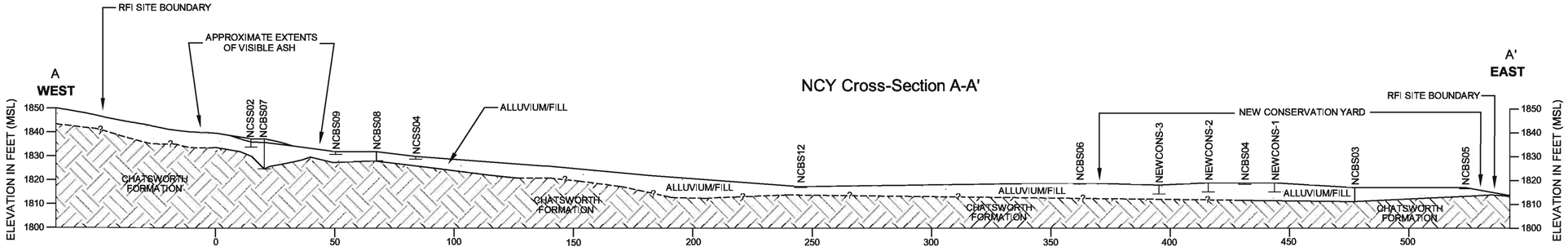
Date: Sep 29, 2006 Document: RFI-Report-Group6_NC_Chemical_Use.mxd

1 inch equals 30 feet 0 30 60 Feet





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



0 20 40
HORIZONTAL SCALE IN FEET

LEGEND

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

REVISION	DATE

MWH

Surficial Cross-Section A - A'
NCY RFI Site

FIGURE
A1.2-2

Soil VOC Results
New Conservation Yard (SWMU 7.8)

Santa Susana Field Laboratory

MWH MONTGOMERY WATSON HARZA

FIGURE A1.3-1

Soil Sample Location Symbol Legend

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

Comparison Levels

VOCs	Res RBSL (ug/kg)	Eco RBSL (ug/kg)
Toluene	300	2700
1,1,1-Trichloroethane	490	2800000
1,1,2,2-Tetrachloroethane	1.4	6400
1,1,2-Trichloroethane	1.2	9000
1,1-Dichloroethane	1.6	230000
1,1-Dichloroethene	23	12000
1,2-Dichloroethane	0.5	76000
1,2-Dichloropropane	- -	- -
2-Butanone	62000	8200000
2-Chloroethyl vinyl ether	- -	- -
2-Hexanone	- -	2600000
4-Methyl-2-pentanone	- -	- -
Acetone	51000	46000
Benzene	0.13	4600
Bromodichloromethane	- -	- -
Bromoform	- -	- -
Bromomethane	- -	- -
Carbon disulfide	- -	- -
Carbon tetrachloride	0.042	1600
Chlorobenzene	97	63000
Chloroethane	- -	- -
Chloroform	0.77	920
Chloromethane	- -	- -
cis-1,3-Dichloropropene	- -	- -
Dibromochloromethane	- -	- -
Dichlorobenzenes	- -	- -
Ethylbenzene	1200	220000
Methylene chloride	4	27000
Styrene	- -	- -
Tetrachloroethene	0.43	2300
trans-1,2-Dichloroethene	16	1000000
trans-1,3-Dichloropropene	- -	- -
Trichloroethene	2.2	3200
Vinyl acetate	- -	- -
Vinyl chloride	0.0096	780
Xylenes (total)	150	690000

Note: (ug/kg) = micrograms per kilogram

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

Data Date: 070306

Data Box Information

Sample Location ID: NCBS02 | 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 brackets.

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

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

Chemical Use Areas

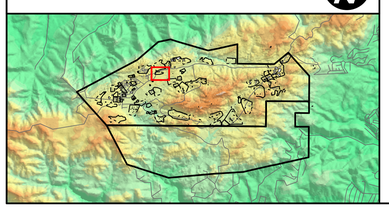
- Solvent
- Petroleum
- Oil
- Transformer
- Metal
- Debris
- Hydrazine
- Perchlorate
- Screening
- Multiple Use

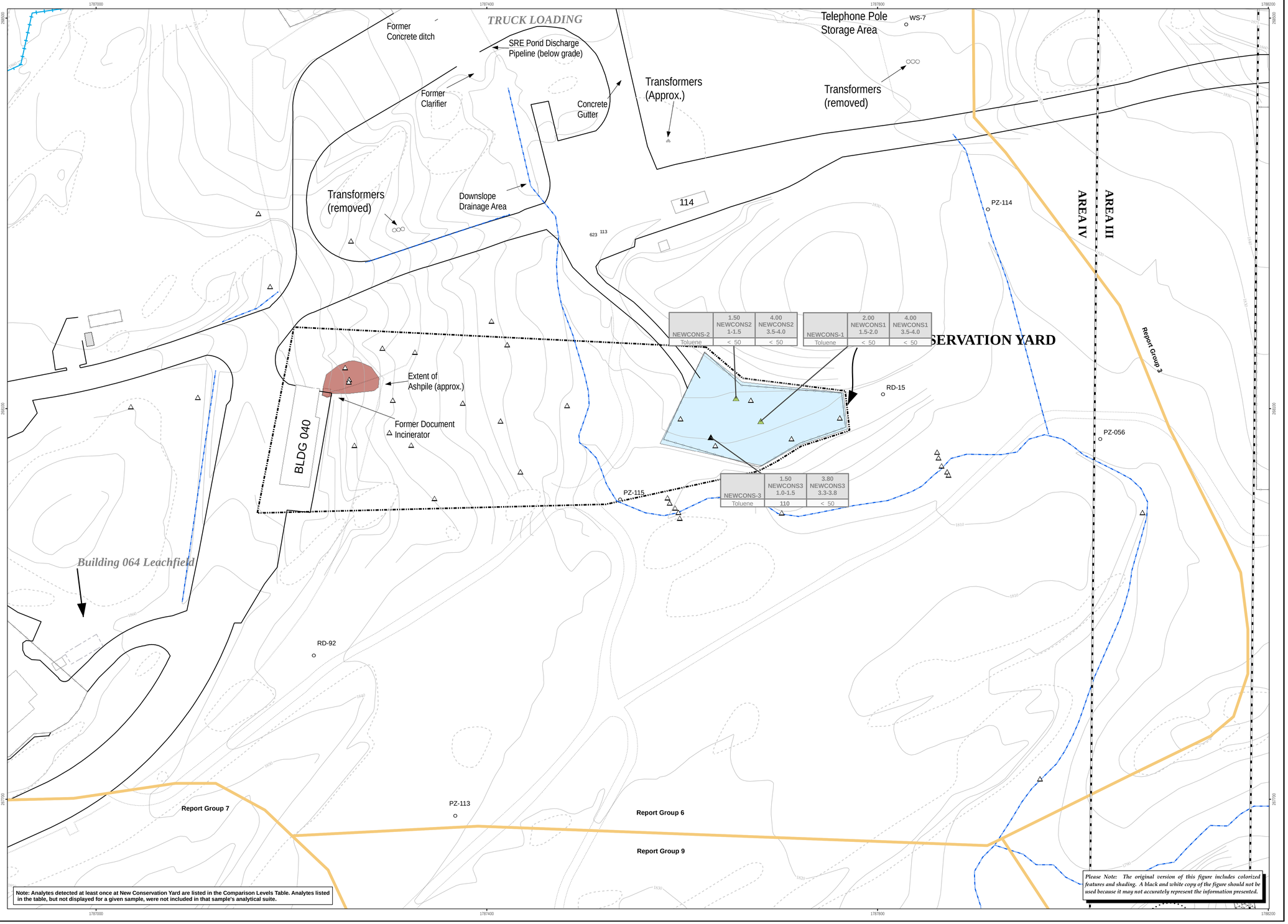
Base Map Legend

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

Date: Sep 25, 2006 Document: RFI-Report-Group6_NC_VOC.mxd

1 inch equals 40 feet 0 40 80 Feet





Note: Analytes detected at least once at New Conservation Yard are listed in the Comparison Levels Table. Analytes listed in the table, but not displayed for a given sample, were not included in that sample's analytical suite.

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

Soil SVOC/TPH/PCB Results
New Conservation Yard (SWMU 7.8)

Santa Susana Field Laboratory

MWH MONTGOMERY WATSON HARZA

FIGURE A1.3-2

Soil Sample Location Symbol Legend

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

Comparison Levels

SVOCs	Res RBSL (ug/kg)	Eco RBSL (ug/kg)
Benzo(a)anthracene	600	1700
Benzo(a)pyrene	6	4700
Benzo(b)fluoranthene	600	5500
Benzo(g,h,i)perylene	- -	6400
Benzo(k)fluoranthene	600	3700
Chrysene	6000	2400
Dibenzo(a,h)anthracene	170	1700
Fluoranthene	2300000	130000
Indeno(1,2,3-cd)pyrene	600	3900
Phenanthrene	1700000	1300
Pyrene	1700000	79000
TPHs	**Res RBSL (mg/kg)**	**Eco RBSL (mg/kg)**
Hydrocarbons	1400	- -
PCBs	**Res RBSL (ug/kg)**	**Eco RBSL (ug/kg)**
Aroclor 1254	350	79
Aroclor 1016	3900	1600
Aroclor 1221	350	1600
Aroclor 1232	350	79
Aroclor 1242	350	80
Aroclor 1248	350	12
Aroclor 1260	350	79

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

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

Data Date: 070306

Data Box Information

Sample Location ID: NCBS02 | 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 brackets.

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

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

Chemical Use Areas

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

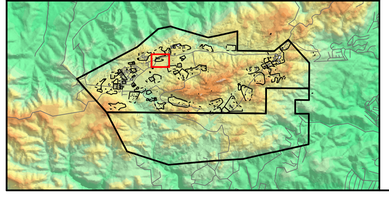
Base Map Legend

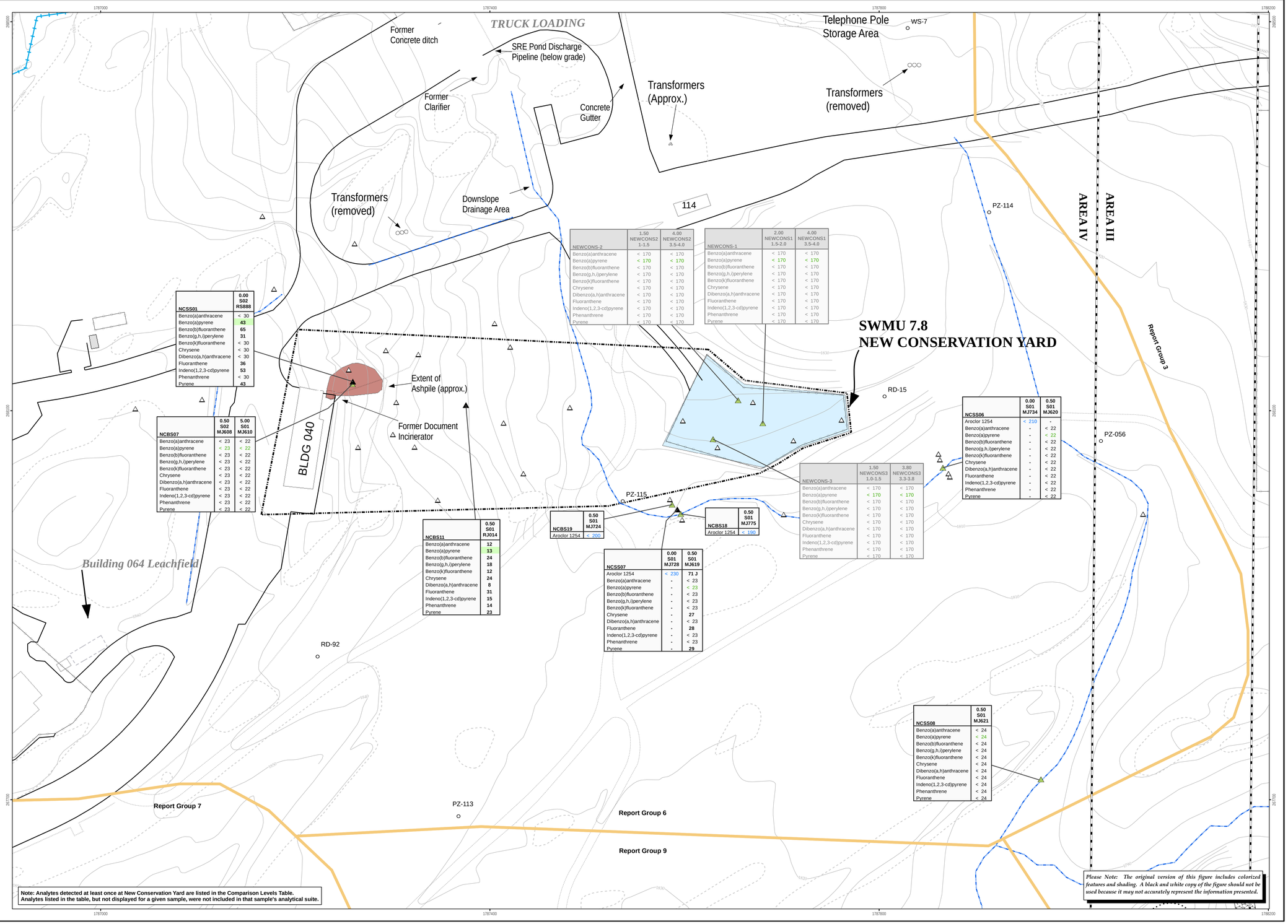
- Administrative Area Boundary
- RFI Boundary
- Report Group Boundary
- Existing Building or Structure
- Removed Building or Structure
- Other Tanks
- Solvent Tank
- Petroleum Fuel/Oil Tank
- Hydrazine Tank
- Awning
- Dirt Road
- A/C Curbing
- Trench
- Fence
- Pipe
- Leachfield
- NPDES Outfall
- Well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

Date: Sep 25, 2006 Document: RFI-Report-Group6_NC_SVOC.mxd

1 inch equals 40 feet

0 40 80 Feet





NEWCONS-2	1.50 NEWCONS2 1-1.5	4.00 NEWCONS2 3.5-4.0
Benzo(a)anthracene	< 170	< 170
Benzo(a)pyrene	< 170	< 170
Benzo(b)fluoranthene	< 170	< 170
Benzo(g,h,i)perylene	< 170	< 170
Benzo(k)fluoranthene	< 170	< 170
Chrysene	< 170	< 170
Dibenzo(a,h)anthracene	< 170	< 170
Fluoranthene	< 170	< 170
Indeno(1,2,3-cd)pyrene	< 170	< 170
Phenanthrene	< 170	< 170
Pyrene	< 170	< 170

NEWCONS-1	2.00 NEWCONS1 1.5-2.0	4.00 NEWCONS1 3.5-4.0
Benzo(a)anthracene	< 170	< 170
Benzo(a)pyrene	< 170	< 170
Benzo(b)fluoranthene	< 170	< 170
Benzo(g,h,i)perylene	< 170	< 170
Benzo(k)fluoranthene	< 170	< 170
Chrysene	< 170	< 170
Dibenzo(a,h)anthracene	< 170	< 170
Fluoranthene	< 170	< 170
Indeno(1,2,3-cd)pyrene	< 170	< 170
Phenanthrene	< 170	< 170
Pyrene	< 170	< 170

NCSS01	0.00 S02 RS888
Benzo(a)anthracene	< 30
Benzo(a)pyrene	43
Benzo(b)fluoranthene	65
Benzo(g,h,i)perylene	31
Benzo(k)fluoranthene	< 30
Chrysene	< 30
Dibenzo(a,h)anthracene	< 30
Fluoranthene	36
Indeno(1,2,3-cd)pyrene	53
Phenanthrene	< 30
Pyrene	43

NCSS07	0.50 S02 MJ608	5.00 S01 MJ610
Benzo(a)anthracene	< 23	< 22
Benzo(a)pyrene	< 23	< 22
Benzo(b)fluoranthene	< 23	< 22
Benzo(g,h,i)perylene	< 23	< 22
Benzo(k)fluoranthene	< 23	< 22
Chrysene	< 23	< 22
Dibenzo(a,h)anthracene	< 23	< 22
Fluoranthene	< 23	< 22
Indeno(1,2,3-cd)pyrene	< 23	< 22
Phenanthrene	< 23	< 22
Pyrene	< 23	< 22

NCBS11	0.50 S01 RJ014
Benzo(a)anthracene	12
Benzo(a)pyrene	13
Benzo(b)fluoranthene	24
Benzo(g,h,i)perylene	18
Benzo(k)fluoranthene	12
Chrysene	24
Dibenzo(a,h)anthracene	8
Fluoranthene	31
Indeno(1,2,3-cd)pyrene	15
Phenanthrene	14
Pyrene	23

NCBS19	0.50 S01 MJ724
Aroclor 1254	< 200

NCBS18	0.50 S01 MJ775
Aroclor 1254	< 190

NCSS07	0.00 S01 MJ728	0.50 S01 MJ619
Aroclor 1254	< 230	71 J
Benzo(a)anthracene	-	< 23
Benzo(a)pyrene	-	< 23
Benzo(b)fluoranthene	-	< 23
Benzo(g,h,i)perylene	-	< 23
Benzo(k)fluoranthene	-	< 23
Chrysene	-	27
Dibenzo(a,h)anthracene	-	< 23
Fluoranthene	-	28
Indeno(1,2,3-cd)pyrene	-	< 23
Phenanthrene	-	< 23
Pyrene	-	29

NEWCONS-3	1.50 NEWCONS3 1.0-1.5	3.80 NEWCONS3 3.3-3.8
Benzo(a)anthracene	< 170	< 170
Benzo(a)pyrene	< 170	< 170
Benzo(b)fluoranthene	< 170	< 170
Benzo(g,h,i)perylene	< 170	< 170
Benzo(k)fluoranthene	< 170	< 170
Chrysene	< 170	< 170
Dibenzo(a,h)anthracene	< 170	< 170
Fluoranthene	< 170	< 170
Indeno(1,2,3-cd)pyrene	< 170	< 170
Phenanthrene	< 170	< 170
Pyrene	< 170	< 170

NCSS06	0.00 S01 MJ734	0.50 S01 MJ620
Aroclor 1254	< 210	-
Benzo(a)anthracene	-	< 22
Benzo(a)pyrene	-	< 22
Benzo(b)fluoranthene	-	< 22
Benzo(g,h,i)perylene	-	< 22
Benzo(k)fluoranthene	-	< 22
Chrysene	-	< 22
Dibenzo(a,h)anthracene	-	< 22
Fluoranthene	-	< 22
Indeno(1,2,3-cd)pyrene	-	< 22
Phenanthrene	-	< 22
Pyrene	-	< 22

NCSS08	0.50 S01 MJ621
Benzo(a)anthracene	< 24
Benzo(a)pyrene	< 24
Benzo(b)fluoranthene	< 24
Benzo(g,h,i)perylene	< 24
Benzo(k)fluoranthene	< 24
Chrysene	< 24
Dibenzo(a,h)anthracene	< 24
Fluoranthene	< 24
Indeno(1,2,3-cd)pyrene	< 24
Phenanthrene	< 24
Pyrene	< 24

Note: Analytes detected at least once at New Conservation Yard are listed in the Comparison Levels Table. Analytes listed in the table, but not displayed for a given sample, were not included in that sample's analytical suite.

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

Soil Dioxins Results
New Conservation Yard (SWMU 7.8)

Santa Susana Field Laboratory

MWH MONTGOMERY WATSON HARZA

FIGURE A1.3-3

Soil Sample Location Symbol Legend

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

Comparison Levels

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

Note: (ng/kg) = nanograms per kilogram

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

Data Date: 062306

Data Box Information

Sample Location ID: NCBS02 | 1.00 | S01 | MH007 (EPA ID)
1.00 = Depth in Feet; S01 = Sample Number; MH007 = Lab Reporting Code

(Historical Sample)

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

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

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

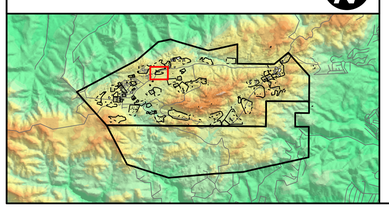
- Solvent
- Petroleum
- Oil
- Transformer
- Metal
- Debris
- Hydrazine
- Perchlorate
- Screening
- Multiple Use

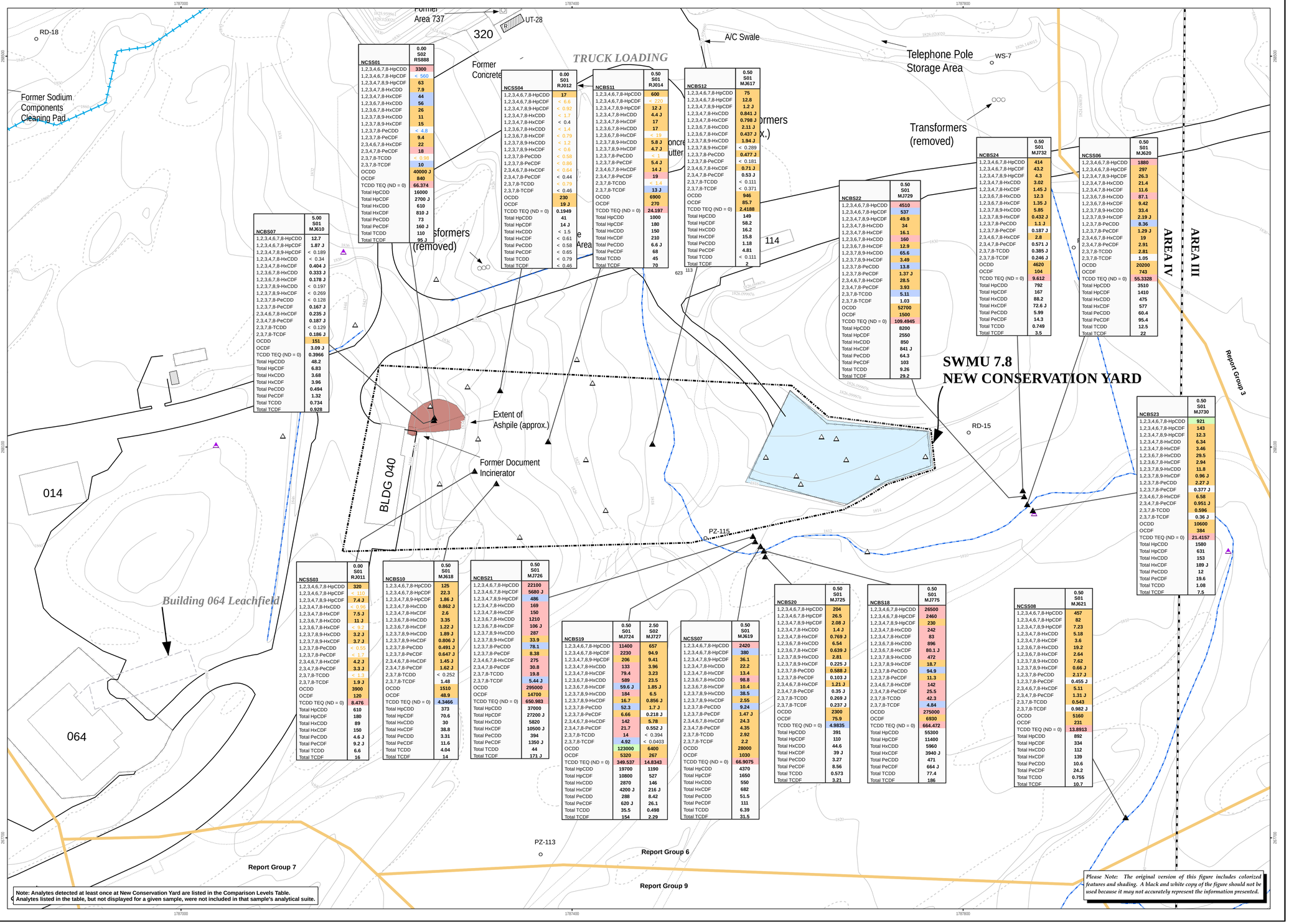
Base Map Legend

- 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 25, 2006 Document: RFI-Report-Group6_NC_Dioxin.mxd

1 inch equals 40 feet 0 40 80 Feet





NCSS01	0.00 S02 RS888
1,2,3,4,6,7,8-HpCDD	3300
1,2,3,4,6,7,8-HpCDF	< 560
1,2,3,4,7,8,9-HpCDF	63
1,2,3,4,7,8-HxCDD	7.9
1,2,3,4,7,8-HxCDF	44
1,2,3,6,7,8-HxCDD	56
1,2,3,6,7,8-HxCDF	26
1,2,3,7,8,9-HxCDD	11
1,2,3,7,8,9-HxCDF	15
1,2,3,7,8-PeCDD	< 4.8
1,2,3,7,8-PeCDF	9.4
2,3,4,6,7,8-HxCDF	22
2,3,4,7,8-PeCDF	18
2,3,7,8-TCDD	< 1.08
2,3,7,8-TCDF	10
OCDD	40000 J
OCDF	840
TCDD TEQ (ND = 0)	66.374
Total HpCDD	16000
Total HpCDF	2700 J
Total HxCDD	610
Total HxCDF	810 J
Total PeCDD	73
Total PeCDF	160 J
Total TCDD	110
Total TCDF	95 J

NCSS04	0.00 S01 RJ012
1,2,3,4,6,7,8-HpCDD	17
1,2,3,4,6,7,8-HpCDF	< 6.6
1,2,3,4,7,8,9-HpCDF	< 0.92
1,2,3,4,7,8-HxCDD	< 1.7
1,2,3,4,7,8-HxCDF	< 0.4
1,2,3,6,7,8-HxCDD	< 1.4
1,2,3,6,7,8-HxCDF	< 0.79
1,2,3,7,8,9-HxCDD	< 1.2
1,2,3,7,8,9-HxCDF	< 0.6
1,2,3,7,8-PeCDD	< 0.58
1,2,3,7,8-PeCDF	< 0.86
2,3,4,6,7,8-HxCDF	< 0.64
2,3,4,7,8-PeCDF	< 0.44
2,3,7,8-TCDD	< 0.79
2,3,7,8-TCDF	< 0.46
OCDD	230
OCDF	19 J
TCDD TEQ (ND = 0)	0.1949
Total HpCDD	41
Total HpCDF	14 J
Total HxCDD	< 1.5
Total HxCDF	< 0.61
Total PeCDD	< 0.58
Total PeCDF	< 0.65
Total TCDD	< 0.79
Total TCDF	< 0.46

NCSS07	5.00 S01 MJ610
1,2,3,4,6,7,8-HpCDD	12.7
1,2,3,4,6,7,8-HpCDF	1.87 J
1,2,3,4,7,8,9-HpCDF	< 0.189
1,2,3,4,7,8-HxCDD	< 0.34
1,2,3,4,7,8-HxCDF	0.404 J
1,2,3,6,7,8-HxCDD	0.333 J
1,2,3,6,7,8-HxCDF	0.178 J
1,2,3,7,8,9-HxCDD	< 0.197
1,2,3,7,8,9-HxCDF	< 0.269
1,2,3,7,8-PeCDD	< 0.128
1,2,3,7,8-PeCDF	0.167 J
2,3,4,6,7,8-HxCDF	0.235 J
2,3,4,7,8-PeCDF	0.187 J
2,3,7,8-TCDD	< 0.129
2,3,7,8-TCDF	0.186 J
OCDD	151
OCDF	3.09 J
TCDD TEQ (ND = 0)	0.3966
Total HpCDD	48.2
Total HpCDF	6.83
Total HxCDD	3.68
Total HxCDF	3.96
Total PeCDD	0.494
Total PeCDF	1.32
Total TCDD	0.734
Total TCDF	0.928

NCSS03	0.00 S01 RJ011
1,2,3,4,6,7,8-HpCDD	320
1,2,3,4,6,7,8-HpCDF	< 110
1,2,3,4,7,8,9-HpCDF	7.4 J
1,2,3,4,7,8-HxCDD	< 0.36
1,2,3,4,7,8-HxCDF	7.5 J
1,2,3,6,7,8-HxCDD	11 J
1,2,3,6,7,8-HxCDF	< 9.2
1,2,3,7,8,9-HxCDD	3.2 J
1,2,3,7,8,9-HxCDF	3.7 J
1,2,3,7,8-PeCDD	< 0.55
1,2,3,7,8-PeCDF	< 1.7
2,3,4,6,7,8-HxCDF	4.2 J
2,3,4,7,8-PeCDF	3.3 J
2,3,7,8-TCDD	< 1.3
2,3,7,8-TCDF	1.9 J
OCDD	3900
OCDF	120
TCDD TEQ (ND = 0)	8.476
Total HpCDD	610
Total HpCDF	180
Total HxCDD	89
Total HxCDF	150
Total PeCDD	4.6 J
Total PeCDF	9.2 J
Total TCDD	6.6
Total TCDF	16

NCBS10	0.50 S01 MJ618
1,2,3,4,6,7,8-HpCDD	125
1,2,3,4,6,7,8-HpCDF	22.3
1,2,3,4,7,8,9-HpCDF	1.86 J
1,2,3,4,7,8-HxCDD	0.862 J
1,2,3,4,7,8-HxCDF	2.6
1,2,3,6,7,8-HxCDD	3.35
1,2,3,6,7,8-HxCDF	1.22 J
1,2,3,7,8,9-HxCDD	1.89 J
1,2,3,7,8,9-HxCDF	0.806 J
1,2,3,7,8-PeCDD	0.491 J
1,2,3,7,8-PeCDF	0.647 J
2,3,4,6,7,8-HxCDF	1.45 J
2,3,4,7,8-PeCDF	1.62 J
2,3,7,8-TCDD	< 0.252
2,3,7,8-TCDF	1.48
OCDD	1510
OCDF	48.9
TCDD TEQ (ND = 0)	4.3466
Total HpCDD	373
Total HpCDF	70.6
Total HxCDD	30
Total HxCDF	38.8
Total PeCDD	3.31
Total PeCDF	11.6
Total TCDD	4.04
Total TCDF	14

NCBS21	0.50 S01 MJ726
1,2,3,4,6,7,8-HpCDD	22100
1,2,3,4,6,7,8-HpCDF	5680 J
1,2,3,4,7,8,9-HpCDF	486
1,2,3,4,7,8-HxCDD	169
1,2,3,4,7,8-HxCDF	150
1,2,3,6,7,8-HxCDD	1210
1,2,3,6,7,8-HxCDF	106 J
1,2,3,7,8,9-HxCDD	287
1,2,3,7,8,9-HxCDF	33.9
1,2,3,7,8-PeCDD	78.1
1,2,3,7,8-PeCDF	8.38
2,3,4,6,7,8-HxCDF	275
2,3,4,7,8-PeCDF	30.8
2,3,7,8-TCDD	19.8
2,3,7,8-TCDF	5.44 J
OCDD	295000
OCDF	14700
TCDD TEQ (ND = 0)	650.983
Total HpCDD	37000
Total HpCDF	27200 J
Total HxCDD	5820
Total HxCDF	10500 J
Total PeCDD	394
Total PeCDF	1350 J
Total TCDD	44
Total TCDF	171 J

NCBS11	0.50 S01 RJ014
1,2,3,4,6,7,8-HpCDD	600
1,2,3,4,6,7,8-HpCDF	< 220
1,2,3,4,7,8,9-HpCDF	12 J
1,2,3,4,7,8-HxCDD	4.4 J
1,2,3,4,7,8-HxCDF	17
1,2,3,6,7,8-HxCDD	17
1,2,3,6,7,8-HxCDF	< 19
1,2,3,7,8,9-HxCDD	5.8 J
1,2,3,7,8,9-HxCDF	4.7 J
1,2,3,7,8-PeCDD	< 1
1,2,3,7,8-PeCDF	5.4 J
2,3,4,6,7,8-HxCDF	14 J
2,3,4,7,8-PeCDF	19
2,3,7,8-TCDD	< 1.4
2,3,7,8-TCDF	13 J
OCDD	6900
OCDF	270
TCDD TEQ (ND = 0)	24.197
Total HpCDD	1000
Total HpCDF	180
Total HxCDD	150
Total HxCDF	210
Total PeCDD	6.6 J
Total PeCDF	68
Total TCDD	45
Total TCDF	70

NCBS12	0.50 S01 MJ617
1,2,3,4,6,7,8-HpCDD	75
1,2,3,4,6,7,8-HpCDF	12.8
1,2,3,4,7,8,9-HpCDF	1.2 J
1,2,3,4,7,8-HxCDD	0.841 J
1,2,3,4,7,8-HxCDF	0.798 J
1,2,3,6,7,8-HxCDD	2.11 J
1,2,3,6,7,8-HxCDF	0.437 J
1,2,3,7,8,9-HxCDD	1.94 J
1,2,3,7,8,9-HxCDF	< 0.289
1,2,3,7,8-PeCDD	0.477 J
1,2,3,7,8-PeCDF	< 0.181
2,3,4,6,7,8-HxCDF	0.71 J
2,3,4,7,8-PeCDF	0.53 J
2,3,7,8-TCDD	< 0.111
2,3,7,8-TCDF	< 0.371
OCDD	946
OCDF	85.7
TCDD TEQ (ND = 0)	2.4188
Total HpCDD	149
Total HpCDF	58.2
Total HxCDD	16.2
Total HxCDF	15.8
Total PeCDD	1.18
Total PeCDF	4.81
Total TCDD	< 0.111
Total TCDF	2

NCBS22	0.50 S01 MJ729
1,2,3,4,6,7,8-HpCDD	4510
1,2,3,4,6,7,8-HpCDF	537
1,2,3,4,7,8,9-HpCDF	49.9
1,2,3,4,7,8-HxCDD	34
1,2,3,4,7,8-HxCDF	16.1
1,2,3,6,7,8-HxCDD	160
1,2,3,6,7,8-HxCDF	12.9
1,2,3,7,8,9-HxCDD	65.6
1,2,3,7,8,9-HxCDF	3.49
1,2,3,7,8-PeCDD	13.8
1,2,3,7,8-PeCDF	1.37 J
2,3,4,6,7,8-HxCDF	28.5
2,3,4,7,8-PeCDF	3.93
2,3,7,8-TCDD	5.11
2,3,7,8-TCDF	1.03
OCDD	52700
OCDF	1500
TCDD TEQ (ND = 0)	109.4945
Total HpCDD	8200
Total HpCDF	2550
Total HxCDD	850
Total HxCDF	841 J
Total PeCDD	64.3
Total PeCDF	103
Total TCDD	9.26
Total TCDF	29.2

NCBS24	0.50 S01 MJ732
1,2,3,4,6,7,8-HpCDD	414
1,2,3,4,6,7,8-HpCDF	43.2
1,2,3,4,7,8,9-HpCDF	4.3
1,2,3,4,7,8-HxCDD	3.02
1,2,3,4,7,8-HxCDF	1.45 J
1,2,3,6,7,8-HxCDD	12.3
1,2,3,6,7,8-HxCDF	1.35 J
1,2,3,7,8,9-HxCDD	5.85
1,2,3,7,8,9-HxCDF	0.432 J
1,2,3,7,8-PeCDD	1.1 J
1,2,3,7,8-PeCDF	0.187 J
2,3,4,6,7,8-HxCDF	2.8
2,3,4,7,8-PeCDF	0.571 J
2,3,7,8-TCDD	0.385 J
2,3,7,8-TCDF	0.246 J
OCDD	4620
OCDF	104
TCDD TEQ (ND = 0)	9.612
Total HpCDD	792
Total HpCDF	167
Total HxCDD	88.2
Total HxCDF	72.6 J
Total PeCDD	5.99
Total PeCDF	14.3
Total TCDD	0.749
Total TCDF	3.5

NCSS06	0.50 S01 MJ620
1,2,3,4,6,7,8-HpCDD	1880
1,2,3,4,6,7,8-HpCDF	297
1,2,3,4,7,8,9-HpCDF	26.3
1,2,3,4,7,8-HxCDD	21.4
1,2,3,4,7,8-HxCDF	11.6
1,2,3,6,7,8-HxCDD	87.1
1,2,3,6,7,8-HxCDF	9.42
1,2,3,7,8,9-HxCDD	33.4
1,2,3,7,8,9-HxCDF	2.19 J
1,2,3,7,8-PeCDD	8.36
1,2,3,7,8-PeCDF	1.29 J
2,3,4,6,7,8-HxCDF	19
2,3,4,7,8-PeCDF	2.91
2,3,7,8-TCDD	2.81
2,3,7,8-TCDF	1.05
OCDD	20200
OCDF	743
TCDD TEQ (ND = 0)	55.3328
Total HpCDD	3510
Total HpCDF	1410
Total HxCDD	475
Total HxCDF	577
Total PeCDD	60.4
Total PeCDF	95.4
Total TCDD	12.5
Total TCDF	22

NCBS23	0.50 S01 MJ730
1,2,3,4,6,7,8-HpCDD	921
1,2,3,4,6,7,8-HpCDF	143
1,2,3,4,7,8,9-HpCDF	12.3
1,2,3,4,7,8-HxCDD	6.34
1,2,3,4,7,8-HxCDF	3.46
1,2,3,6,7,8-HxCDD	29.5
1,2,3,6,7,8-HxCDF	2.94
1,2,3,7,8,9-HxCDD	11.8
1,2,3,7,8,9-HxCDF	0.96 J
1,2,3,7,8-PeCDD	2.27 J
1,2,3,7,8-PeCDF	0.377 J
2,3,4,6,7,8-HxCDF	6.58
2,3,4,7,8-PeCDF	0.951 J
2,3,7,8-TCDD	0.596
2,3,7,8-TCDF	0.36 J
OCDD	10600
OCDF	384
TCDD TEQ (ND = 0)	21.4157
Total HpCDD	1580
Total HpCDF	631
Total HxCDD	153
Total HxCDF	189 J
Total PeCDD	12
Total PeCDF	19.6
Total TCDD	1.08
Total TCDF	7.5

NCBS19	0.50 S01 MJ724	2.50 S02 MJ727
1,2,3,4,6,7,8-HpCDD	11400	657
1,2,3,4,6,7,8-HpCDF	2230	94.9
1,2,3,4,7,8,9-HpCDF	206	9.41
1,2,3,4,7,8-HxCDD	133	3.96
1,2,3,4,7,8-HxCDF	79.4	3.23
1,2,3,6,7,8-HxCDD	589	23.5
1,2,3,6,7,8-HxCDF	59.6 J	1.85 J
1,2,3,7,8,9-HxCDD	184	6.5
1,2,3,7,8,9-HxCDF	16.7	0.856 J
1,2,3,7,8-PeCDD	52.3	1.7 J
1,2,3,7,8-PeCDF	6.66	0.218 J
2,3,4,6,7,8-HxCDF	142	5.78
2,3,4,7,8-PeCDF	21.7	0.552 J
2,3,7,8-TCDD	14	< 0.394
2,3,7,8-TCDF	4.92	< 0.0403
OCDD	123000	6400
OCDF	5320	267
TCDD TEQ (ND = 0)	349.537	14.8343
Total HpCDD	19700	1190
Total HpCDF	10800	527
Total HxCDD	2870	146
Total HxCDF	4200 J	216 J
Total PeCDD	288	8.42
Total PeCDF	620 J	26.1
Total TCDD	35.5	0.498
Total TCDF	154	2.29

NCSS07	0.50 S01 MJ619
1,2,3,4,6,7,8-HpCDD	2420
1,2,3,4,6,7,8-HpCDF	380
1,2,3,4,7,8,9-HpCDF	36.1
1,2,3,4,7,8-HxCDD	22.2
1,2,3,4,7,8-HxCDF	13.4
1,2,3,6,7,8-HxCDD	98.8
1,2,3,6,7,8-HxCDF	10.4
1,2,3,7,8,9-HxCDD	38.5
1,2,3,7,8,9-HxCDF	2.55
1,2,3,7,8-PeCDD	9.24
1,2,3,7,8-PeCDF	1.47 J
2,3,4,6,7,8-HxCDF	24.3
2,3,4,7,8-PeCDF	4.35
2,3,7,8-TCDD	2.92
2,3,7,8-TCDF	2.2
OCDD	28000
OCDF	1030
TCDD TEQ (ND = 0)	66.9075
Total HpCDD	4370
Total HpCDF	1650
Total HxCDD	550
Total HxCDF	682
Total PeCDD	51.5
Total PeCDF	111
Total TCDD	6.39
Total TCDF	31.5

NCBS20	0.50 S01 MJ725
1,2,3,4,6,7,8-HpCDD	204
1,2,3,4,6,7,8-HpCDF	26.5
1,2,3,4,7,8,9-HpCDF	2.08 J
1,2,3,4,7,8-HxCDD	1.4 J
1,2,3,4,7,8-HxCDF	0.769 J
1,2,3,6,7,8-HxCDD	6.54
1,2,3,6,7,8-HxCDF	0.639 J
1,2,3,7,8,9-HxCDD	2.81
1,2,3,7,8,9-HxCDF	0.225 J
1,2,3,7,8-PeCDD	0.588 J
1,2,3,7,8-PeCDF	0.103 J
2,3,4,6,7,8-HxCDF	1.21 J
2,3,4,7,8-PeCDF	0.35 J
2,3,7,8-TCDD	0.269 J
2,3,7,8-TCDF	0.237 J
OCDD	2300
OCDF	75.9
TCDD TEQ (ND = 0)	4.9835
Total HpCDD	391
Total HpCDF	110
Total HxCDD	44.6
Total HxCDF	39 J
Total PeCDD	3.27
Total PeCDF	8.56
Total TCDD	0.573
Total TCDF	3.21

NCBS18	0.50 S01 MJ775
1,2,3,4,6,7,8-HpCDD	26500
1,2,3,4,6,7,8-HpCDF	2460
1,2,3,4,7,8,9-HpCDF	230
1,2,3,4,7,8-HxCDD	242
1,2,3,4,7,8-HxCDF	83
1,2,3,6,7,8-HxCDD	896
1,2,3,6,7,8-HxCDF	80.1 J
1,2,3,7,8,9-HxCDD	472
1,2,3,7,8,9-HxCDF	18.7
1,2,3,7,8-PeCDD	94.9
1,2,3,7,8-PeCDF	11.3
2,3,4,6,7,8-HxCDF	142
2,3,4,7,8-PeCDF	25.5
2,3,7,8-TCDD	42.3
2,3,7,8-TCDF	4.84
OCDD	275000
OCDF	6930
TCDD TEQ (ND = 0)	664.472
Total HpCDD	55300
Total HpCDF	11400
Total HxCDD	5960
Total HxCDF	3940 J
Total PeCDD	471
Total PeCDF	664 J
Total TCDD	77.4
Total TCDF	186

NCSS08	0.50 S01 MJ621
1,2,3,4,6,7,8-HpCDD	457
1,2,3,4,6,7,8-HpCDF	82
1,2,3,4,7,8,9-HpCDF	7.23
1,2,3,4,7,8-HxCDD	5.18
1,2,3,4,7,8-HxCDF	3.6
1,2,3,6,7,8-HxCDD	19.2
1,2,3,6,7,8-HxCDF	2.64
1,2,3,7,8,9-HxCDD	7.62
1,2,3,7,8,9-HxCDF	0.66 J
1,2,3,7,8-PeCDD	2.17 J
1,2,3,7,8-PeCDF	0.455 J
2,3,4,6,7,8-HxCDF	5.11
2,3,4,7,8-PeCDF	1.31 J
2,3,7,8-TCDD	0.543
2,3,7,8-TCDF	0.982 J
OCDD	5160
OCDF	231
TCDD TEQ (ND = 0)	13.8913
Total HpCDD	892
Total HpCDF	334
Total HxCDD	112
Total HxCDF	139
Total PeCDD	10.6
Total PeCDF	24.2
Total TCDD	0.755
Total TCDF	10.7

Note: Analytes detected at least once at New Conservation Yard are listed in the Comparison Levels Table. Analytes listed in the table, but not displayed for a given sample, were not included in that sample's analytical suite.

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

Soil Metals/pH Results
New Conservation Yard (SWMU 7.8)

Santa Susana Field Laboratory

MWH MONTGOMERY WATSON HARZA

FIGURE A1.3-4

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
Hexavalent Chromium	- -	110	15
Lead	34	150	0.063
Mercury	0.09	23	0.89
Molybdenum	5.3	380	0.11
Nickel	29	1500	0.1
Selenium	0.655	380	0.18
Silver	0.79	380	0.55
Thallium	0.46	6.1	3.2
Vanadium	62	76	1.6
Zinc	110	23000	22

Note: (mg/kg) = milligrams per kilogram

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

Data Date: 062306

Data Box Information

Sample Location ID: NCBSO2 | 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

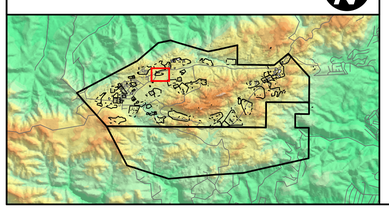
- Solvent
- Petroleum
- Oil
- Transformer
- Metal
- Debris
- Hydrazine
- Perchlorate
- Screening
- Multiple Use

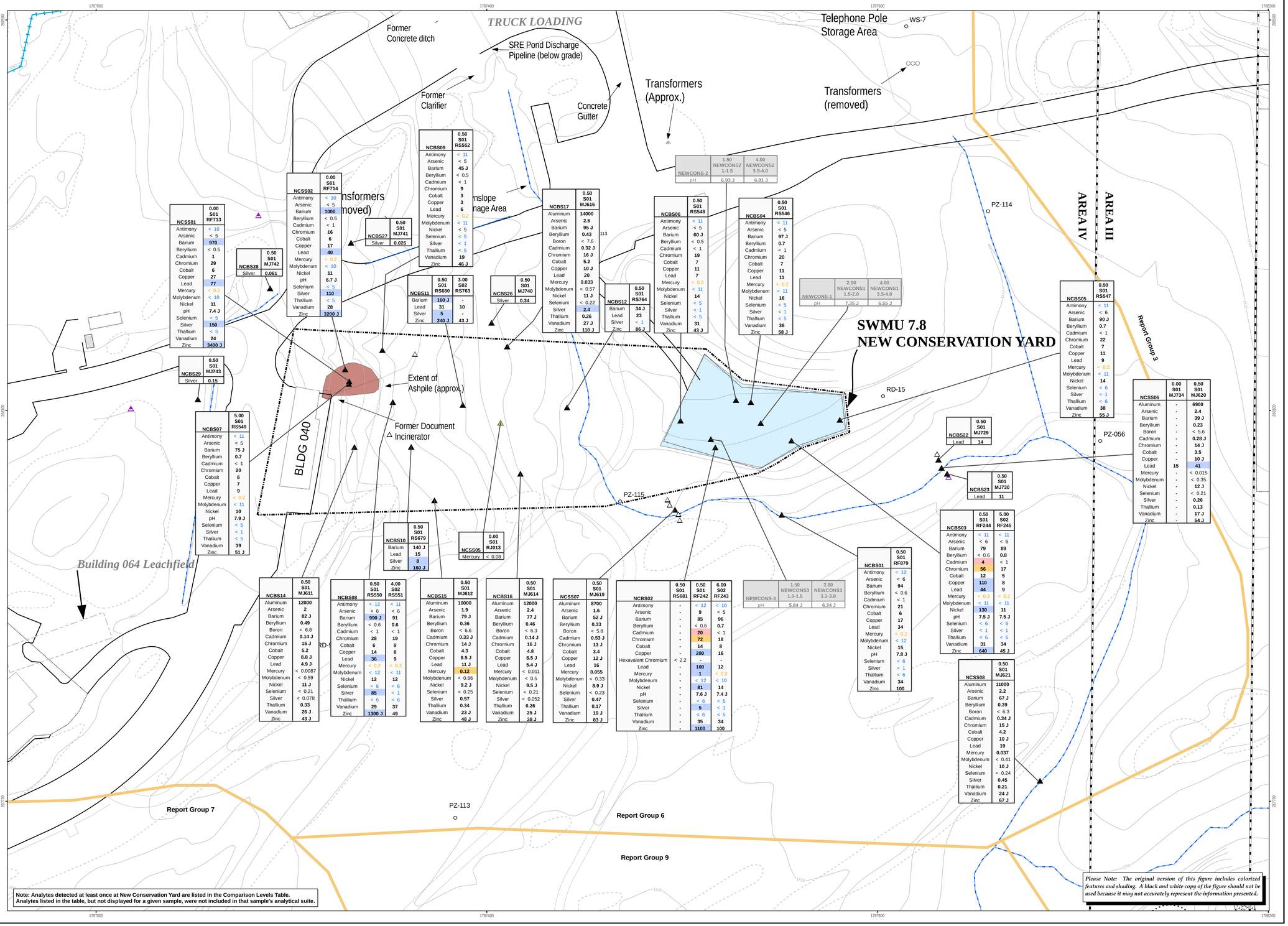
Base Map Legend

- 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 25, 2006 Document: RFI-Report-Group6_NC_Metals.mxd

1 inch equals 40 feet 0 40 80 Feet





NCSS01	0.00 S01 RF713
Antimony	< 10
Arsenic	< 5
Barium	970
Beryllium	< 0.5
Cadmium	1
Chromium	29
Cobalt	6
Copper	27
Lead	77
Mercury	< 0.2
Molybdenum	< 10
Nickel	11
pH	7.4 J
Selenium	< 5
Silver	150
Thallium	< 5
Vanadium	24
Zinc	3400 J

NCSS02	0.00 S01 RF714
Antimony	< 10
Arsenic	< 5
Barium	1000
Beryllium	< 0.5
Cadmium	< 1
Chromium	16
Cobalt	6
Copper	17
Lead	40
Mercury	< 0.2
Molybdenum	< 10
Nickel	11
pH	6.7 J
Selenium	< 5
Silver	110
Thallium	< 5
Vanadium	28
Zinc	3200 J

NCBS09	0.50 S01 RS552
Antimony	< 11
Arsenic	< 5
Barium	45 J
Beryllium	< 0.5
Cadmium	< 1
Chromium	9
Cobalt	3
Copper	3
Lead	6
Mercury	< 0.2
Molybdenum	< 11
Nickel	< 5
Selenium	< 5
Silver	< 1
Thallium	< 5
Vanadium	19
Zinc	46 J

NCBS17	0.50 S01 MJ616
Aluminum	14000
Arsenic	2.5
Barium	95 J
Beryllium	0.43
Boron	< 7.6
Cadmium	0.32 J
Chromium	16 J
Cobalt	5.2
Copper	10 J
Lead	20
Mercury	0.033
Molybdenum	< 0.57
Nickel	11 J
Selenium	< 0.22
Silver	2.4
Thallium	0.26
Vanadium	27 J
Zinc	110 J

NCBS06	0.50 S01 RS548
Antimony	< 11
Arsenic	< 5
Barium	60 J
Beryllium	< 0.5
Cadmium	< 1
Chromium	19
Cobalt	7
Copper	11
Lead	7
Mercury	< 0.2
Molybdenum	< 11
Nickel	14
Selenium	< 5
Silver	< 1
Thallium	< 5
Vanadium	31
Zinc	43 J

NCBS04	0.50 S01 RS546
Antimony	< 11
Arsenic	< 5
Barium	97 J
Beryllium	0.7
Cadmium	< 1
Chromium	20
Cobalt	7
Copper	11
Lead	11
Mercury	< 0.2
Molybdenum	< 11
Nickel	16
Selenium	< 5
Silver	< 1
Thallium	< 5
Vanadium	36
Zinc	58 J

NCBS05	0.50 S01 RS547
Antimony	< 11
Arsenic	< 6
Barium	90 J
Beryllium	0.7
Cadmium	< 1
Chromium	22
Cobalt	7
Copper	11
Lead	9
Mercury	< 0.2
Molybdenum	< 11
Nickel	14
Selenium	< 6
Silver	< 1
Thallium	< 6
Vanadium	38
Zinc	55 J

NCBS03	0.50 S01 RF244	5.00 S02 RF245
Antimony	< 11	< 11
Arsenic	< 6	< 6
Barium	79	89
Beryllium	< 0.6	0.8
Cadmium	4	< 1
Chromium	56	17
Cobalt	12	5
Copper	110	8
Lead	44	9
Mercury	< 0.2	< 0.2
Molybdenum	< 11	< 11
Nickel	130	11
pH	7.5 J	7.5 J
Selenium	< 6	< 6
Silver	< 1	< 1
Thallium	< 6	< 6
Vanadium	31	34
Zinc	640	45 J

NCSS08	0.50 S01 MJ621
Aluminum	11000
Arsenic	2.2
Barium	67 J
Beryllium	0.39
Boron	< 6.3
Cadmium	0.34 J
Chromium	15 J
Cobalt	4.2
Copper	10 J
Lead	19
Mercury	0.037
Molybdenum	< 0.41
Nickel	10 J
Selenium	< 0.24
Silver	0.45
Thallium	0.21
Vanadium	24 J
Zinc	67 J

NCSS06	0.00 S01 MJ734	0.50 S01 MJ620
Aluminum	-	6900
Arsenic	-	2.4
Barium	-	39 J
Beryllium	-	0.23
Boron	-	< 5.6
Cadmium	-	0.28 J
Chromium	-	14 J
Cobalt	-	3.5
Copper	-	10 J
Lead	15	41
Mercury	-	< 0.015
Molybdenum	-	< 0.35
Nickel	-	12 J
Selenium	-	< 0.21
Silver	-	0.26
Thallium	-	0.13
Vanadium	-	17 J
Zinc	-	54 J

NCBS01	0.50 S01 RF879
Antimony	< 12
Arsenic	< 6
Barium	94
Beryllium	< 0.6
Cadmium	< 1
Chromium	21
Cobalt	6
Copper	17
Lead	34
Mercury	< 0.2
Molybdenum	< 12
Nickel	15
pH	7.8 J
Selenium	< 6
Silver	< 1
Thallium	< 6
Vanadium	34
Zinc	100

NCBS02	0.50 S01 RS681	0.50 S01 RF242	6.00 S02 RF243
Antimony	-	< 12	< 10
Arsenic	-	9	< 5
Barium	-	85	96
Beryllium	-	< 0.6	0.7
Cadmium	-	20	< 1
Chromium	-	72	18
Cobalt	-	14	8
Copper	-	200	16
Hexavalent Chromium	< 2.2	-	-
Lead	-	100	12
Mercury	-	1	< 0.2
Molybdenum	-	< 12	< 10
Nickel	-	81	14
pH	-	7.6 J	7.4 J
Selenium	-	< 6	< 5
Silver	-	5	< 1
Thallium	-	< 6	< 5
Vanadium	-	35	34
Zinc	-	1100	100

NCBS14	0.50 S01 MJ611
Aluminum	12000
Arsenic	2
Barium	82 J
Beryllium	0.49
Boron	< 6.8
Cadmium	0.14 J
Chromium	15 J
Cobalt	5.2
Copper	8.8 J
Lead	4.9 J
Mercury	< 0.0087
Molybdenum	< 0.59
Nickel	11 J
Selenium	< 0.21
Silver	< 0.078
Thallium	0.33
Vanadium	26 J
Zinc	43 J

NCBS08	0.50 S01 RS550	4.00 S02 RS551
Antimony	< 12	< 11
Arsenic	< 6	< 6
Barium	990 J	91
Beryllium	< 0.6	0.6
Cadmium	< 1	< 1
Chromium	28	19
Cobalt	6	9
Copper	14	8
Lead	36	9
Mercury	< 0.2	< 0.2
Molybdenum	< 12	< 11
Nickel	12	12
Selenium	< 6	< 6
Silver	85	< 1
Thallium	< 6	< 6
Vanadium	29	37
Zinc	1300 J	49

NCBS15	0.50 S01 MJ612
Aluminum	10000
Arsenic	1.9
Barium	79 J
Beryllium	0.36
Boron	< 6.6
Cadmium	0.33 J
Chromium	14 J
Cobalt	4.3
Copper	8.5 J
Lead	11 J
Mercury	0.12
Molybdenum	< 0.66
Nickel	9.2 J
Selenium	< 0.25
Silver	0.57
Thallium	0.34
Vanadium	23 J
Zinc	48 J

NCBS16	0.50 S01 MJ614
Aluminum	12000
Arsenic	2.4
Barium	77 J
Beryllium	0.46
Boron	< 6.3
Cadmium	0.14 J
Chromium	16 J
Cobalt	4.8
Copper	8.5 J
Lead	5.4 J
Mercury	< 0.011
Molybdenum	< 0.5
Nickel	9.5 J
Selenium	< 0.21
Silver	< 0.052
Thallium	0.26
Vanadium	25 J
Zinc	38 J

NCSS07	0.50 S01 MJ619
Aluminum	8700
Arsenic	1.6
Barium	52 J
Beryllium	0.33
Boron	< 5.8
Cadmium	0.53 J
Chromium	13 J
Cobalt	3.4
Copper	12 J
Lead	16
Mercury	0.055
Molybdenum	< 0.33
Nickel	8.9 J
Selenium	< 0.23
Silver	0.47
Thallium	0.17
Vanadium	19 J
Zinc	83 J

NCBS07	5.00 S01 RS549
Antimony	< 11
Arsenic	< 5
Barium	75 J
Beryllium	0.7
Cadmium	< 1
Chromium	20
Cobalt	6
Copper	7
Lead	9
Mercury	< 0.2
Molybdenum	< 11
Nickel	10
pH	7.9 J
Selenium	< 5
Silver	< 1
Thallium	< 5
Vanadium	39
Zinc	51 J

NCBS10	0.50 S01 RS679
Barium	140 J
Lead	15
Silver	8
Zinc	160 J

NCSS05	0.00 S01 RJ013
Mercury	< 0.08

NCBS11	0.50 S01 RS680	3.00 S02 RS763
Barium	160 J	-
Lead	31	10
Silver	5	-
Zinc	240 J	43 J

NCBS26	0.50 S01 MJ740
Silver	0.34

NCBS12	0.50 S01 RS764
Barium	34 J
Lead	23
Silver	< 1
Zinc	86 J

NCBS27	0.50 S01 MJ741
Silver	0.026

NCBS28	0.50 S01 MJ742
Silver	0.061

NCBS29	0.50 S01 MJ743
Silver	0.15

NCBS22	0.50 S01 MJ729
Lead	14

NCBS23	0.50 S01 MJ730
Lead	11

NEWCONS-2	1.50 NEWCONS2 1-1.5	4.00 NEWCONS2 3.5-4.0
pH	6.93 J	6.81 J

NEWCONS-1	2.00 NEWCONS1 1.5-2.0	4.00 NEWCONS1 3.5-4.0
pH	7.35 J	6.55 J

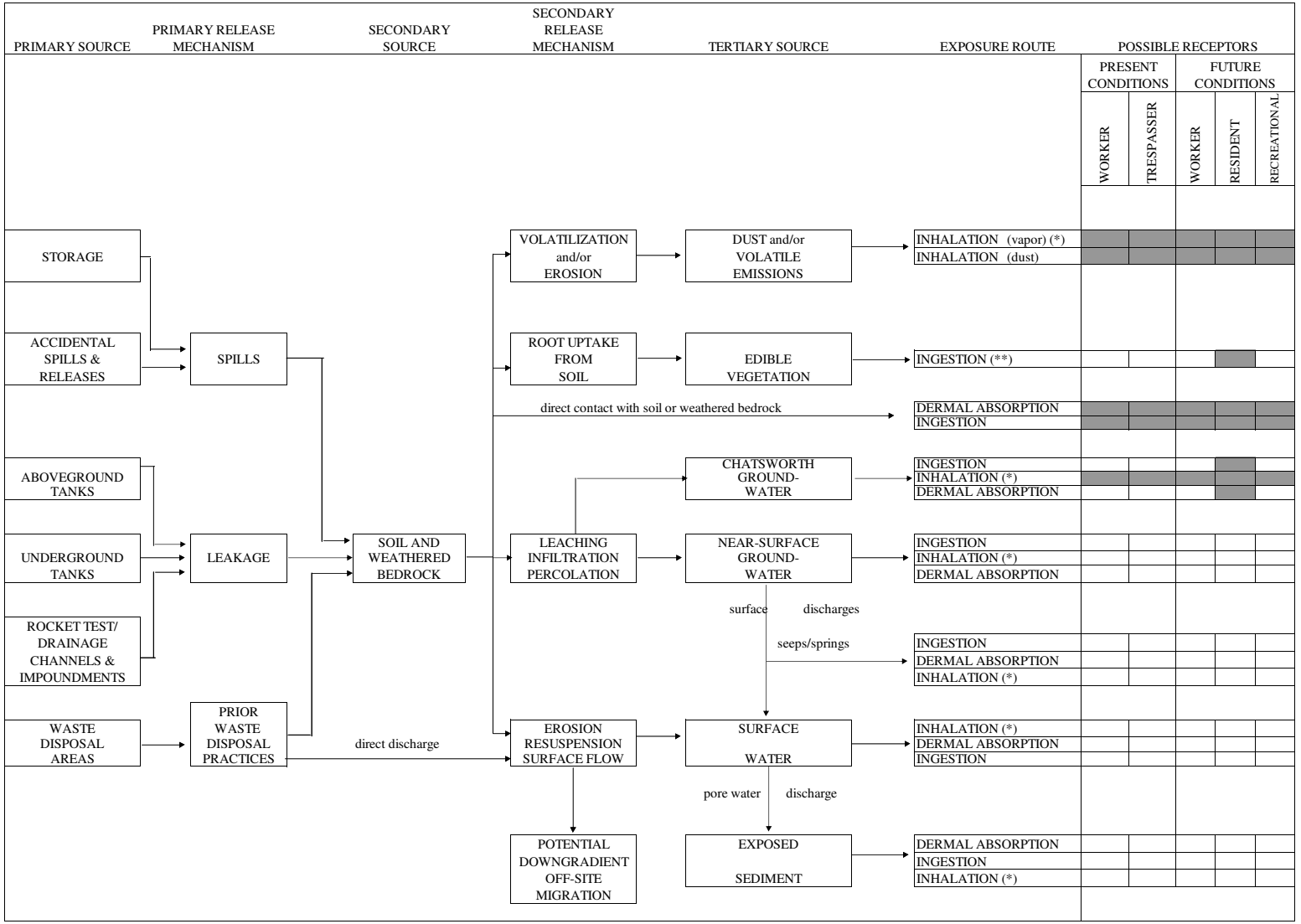
NEWCONS-3	1.50 NEWCONS3 1.0-1.5	3.80 NEWCONS3 3.3-3.8
pH	5.84 J	6.34 J

Note: Analytes detected at least once at New Conservation Yard are listed in the Comparison Levels Table. Analytes listed in the table, but not displayed for a given sample, were not included in that sample's analytical suite.

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

Figure A1.4-1

Human Health Risk Assessment Conceptual Site Model
New Conservation Yard 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. Exposure to fugitive dust is limited to non-VOC compounds.

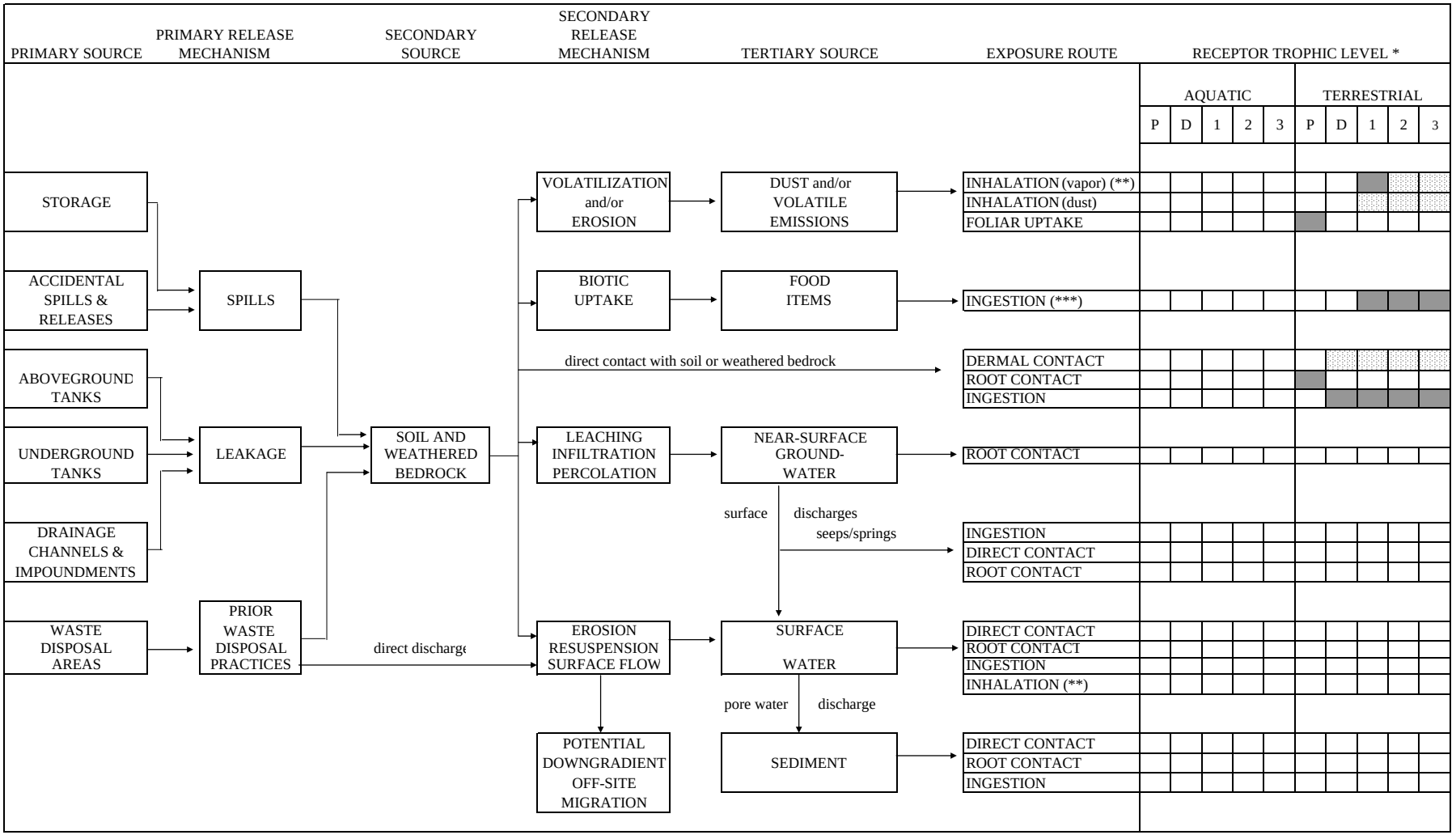
(**) Exposure limited to bioaccumulatable compounds as described in the text.

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

- incomplete exposure pathways not evaluated in this risk assessment

Table A1.4-2 (1 of 1)

Ecological Risk Assessment Conceptual Site Model
New Conservation Yard RFI Site



NOTES:

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

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

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

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

- incomplete exposure pathways not evaluated in this risk assessment

- minor exposure pathway not evaluated in this risk assessment

RFI SITE	CMS AREAS	DRIVERS (Eco and HH)
NCY	1-1	Metals
NCY	2-1	PAHs, Dioxins, Metals
NCY	2-2	PAHs, Dioxins, Metals
NCY	2-3	PAHs, Dioxins, Metals

1787175 1787400 1787625 1787850

268425 268200 267975

Former Storage Area

SRE Pond Discharge Pipeline (below grade)

Concrete Gutter

Transformers (Approx.)

Transformers (removed)

Transformers (removed)

Downslope Drainage Area

114

623 113

AREA IV

SWMU 7.8
NEW CONSERVATION YARD

NCY 2-1

Extent of Ashpile (approx.)

NCY 2-2

Former Document Incinerator

BLDG 040

NCY 1-1

NCY 2-3

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

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

CMS Areas

NCY 2-1 — NCY CMS Areas

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

CMS area designations identified in Table A1.5-1

Surficial Media Site Action Recommendations New Conservation Yard

Date: Sep 29, 2006

Document: RFI-Report-Group6_NC_CMS_ Areas.mxd

1 inch equals 75 feet

0 75 150 Feet

SANTA SUSANA FIELD LABORATORY

MWH MONTGOMERY WATSON HARZA

FIGURE A1.5-1

APPENDIX A1-1

REGULATORY AGENCY CORRESPONDENCE

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 A1-2

SUBSURFACE INFORMAITON
(SOIL BORING AND TRENCH LOGS)

OGDEN

FIELD LOG OF BORING

BORING NUMBER NCBSØ1

SHEET ___ OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne	313150002	clear, cool	New Con ULS 3

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	K.J.	11/17/97 1600	11/17 1625

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
	Push	Ø.5	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
	2"					

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ___ HOURS
			—	

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
			T. Burton 11/17/97	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	Ø.5	X			Surface: grass, wet	ML	—	25	75	@1620
					Sandy silt (ML), dk. yellow brown (10YR 3/2), moist, loose, fine sand, rootlets, ss (bedrock) frags (½")					NCBSØ1SØ1DØ.5 No H.S. taken
					T.D. Ø.5'					

OGDEN

FIELD LOG OF BORING

BORING NUMBER ~~DCBS&2~~ NC

SHEET 1 OF 1

PROJECT NAME Rocketdyne	PROJECT NUMBER 31315000Z	ELEVATION AND DATUM	LOCATION NEWCONS
DRILLING COMPANY Interphase	DRILLER Charlie Paul	DATE AND TIME STARTED 11/11/97; 1400	DATE AND TIME COMPLETED 11/11/97; 1445
DRILLING EQUIPMENT Geoprobe 5400	DRILLING METHOD D.P. Push	COMPLETION DEPTH 8'	TOTAL NO. OF SAMPLES 2
SIZE AND TYPE OF BIT	HOLE DIAMETER 3"	NO. OF SAMPLES: BULK / SS	DRIVE 2 / PITCHER
DRILLING FLUID None	DRILLING ANGLE 90°	WATER LEVEL: FIRST	AFTER _____ HOURS
SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE D. BARRIE	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0	X			Surface: exposed soil, Adj. to fence	SM	tr	80	20	@ 1435 DCBS&2S&1DQ.5
	1				@ 0'; Silty Sand [SM]; wet Brn (10YR 4/3); moist; loose; med. gr., contains roots, grass					
	2									
	3									
	4					SM	-	85	15	
			4.5 / 7.5		@ 4'; Silty Sand [SM]; Dk. Yel. Brn (10YR 4/6); moist; loose; f. gr.					@ 1444
	5	X			[w. bedrock].	SM	-	85	15	DCBS&2S&2DE.&
	6				@ 6'; as above					
	7				T.D. 8'					
	8				Ref. @ 8' Backfilled w/ Bentonite					
					[Resampled @ 0.5' 1/27/98]					

OGDEN

FIELD LOG OF BORING

BORING NUMBER: NC DLBSØ3

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
DB Rocketdyne	31815000Z		Newtons

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
Interphase	Paul / Charlie	11/11/97; 145Ø	11/11/97; 15

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
GeoProbe 5400	Dir. Push	6'	2

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
	3"				2	

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ___ HOURS
NONE	90°		—	

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

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	GR	SA	FI	COMMENTS
										@ 1500
		X			Surface: exposed	SM	TR.	80	20	DLBSØ3SØ1DØ.5
	1				Soil, Adj. to fence					
					@ 0'; Silty Sand (SM);					
	2				Dk. Brn (10YR 3/3);					
					Moist; Loose; F.-					
	3				Med. Gr.					
	4				@ 4'; Clayey Sand /	SC-SM	–	70	30	
					Silty Sand (SC/SM);					@ 151Ø
	5	X			Brn (7.5YR 4/4);					DLBSØ3SØ2D5.Ø
					Moist; Med. Dense;	Sm	–	80	20	
	6				F. Gr.; Low plasticity					
	7				@ 5.5'; Silty Sand (SM);					
					Yel. Brn (10YR 5/6);					
	8				Moist; Med. Dense;					
					F-M. Gr.; Non-plastic					
					(W. Bedrock)					
					T.D. 6'					
					Ref. @ 6'					
					Backfilled w/ Bentonite					

OGDEN

NCBSØ4SØ1

FIELD LOG OF BORING

BORING NUMBER NCBSØ4SØ1 ULS 6 RS 546

SHEET 1 OF 1

PROJECT NAME: ROCKETDYNE	PROJECT NUMBER: 313150CCD2	ELEVATION AND DATUM: windy	LOCATION: NEW CON YARD
DRILLING COMPANY: OGDEN	DRILLER: KJ	DATE AND TIME STARTED: 12/11/97 1140	DATE AND TIME COMPLETED: 12/11/97 1145
DRILLING EQUIPMENT: HAND HAMMER	DRILLING METHOD: Slide ~~HAND~~ HAMMER	COMPLETION DEPTH: 0.5	TOTAL NO. OF SAMPLES: 1
SIZE AND TYPE OF BIT:	HOLE DIAMETER:	NO. OF SAMPLES: 1 BULK: SS:	DRIVE: PITCHER:
DRILLING FLUID:	DRILLING ANGLE:	WATER LEVEL: - FIRST: -	AFTER ____ HOURS: -
SAMPLE HAMMER TYPE: DRIVING WT.: DROP:		HYDROGEOLOGIST / DATE: T. Burton 12/11/97	CHECKED BY / DATE:

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
		X			Sfc: flat, bare		10	80	10	@ 1145
	1				@ Ø.5' well graded sand w/silt (SW-SM) dk. brn (10YR 3/3), dry,					NCBSØ4SØ1 ØØ5 Full Sleeve
					very loose, ~~SS~~ weathered ss					
	2				gravels (1/2"), angular					
	3				T.D. Ø.5'					

OGDEN

NCBS05

FIELD LOG OF BORING

BORING NUMBER NCBS05S01 ULS 6a RS 547

SHEET 1 OF 1

PROJECT NAME: ROCKETDYNE	PROJECT NUMBER: 313150002	ELEVATION AND DATUM:	LOCATION: NEW CON YARD
DRILLING COMPANY: OGDEN	DRILLER: KJ	DATE AND TIME STARTED: 12/11/97 1145	DATE AND TIME COMPLETED: 12/11/97 1150
DRILLING EQUIPMENT: HAND HAMMER	DRILLING METHOD: HAND HAMMER	COMPLETION DEPTH: 0.5'	TOTAL NO. OF SAMPLES: 1 : RS 547
SIZE AND TYPE OF BIT:	HOLE DIAMETER: 2"	NO. OF SAMPLES: 1 BULK: SS:	DRIVE: PITCHER:
DRILLING FLUID:	DRILLING ANGLE:	WATER LEVEL: – FIRST: –	AFTER _____ HOURS: –
SAMPLE HAMMER TYPE: DRIVING WT.: DROP:		HYDROGEOLOGIST / DATE: T. Burton 12/11/97	CHECKED BY / DATE:

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
		X			Surface: flat, bare	SW SM	10	80	10	@ 1150
	1				@ 0.5: well graded sand w/ silt (SW-SM), dk. yellowish brn (10YR3/4), dry, very loose, roots (1"), angular SS gravels (1/2")					NCBS05S01 D0.5 Full Sleeve
	2				T.D 0.5'					
	3									

OGDEN

FIELD LOG OF BORING

BORING NUMBER NCBSØ65Ø1 WLS7 RS548

SHEET ____ OF ____

PROJECT NAME: ROCKETDYNE	PROJECT NUMBER: 313150002	ELEVATION AND DATUM:	LOCATION: NEW CON YARD
DRILLING COMPANY: OGDEN	DRILLER: KJ	DATE AND TIME STARTED: 12/11/97 1155	DATE AND TIME COMPLETED: 12/11/97 1200
DRILLING EQUIPMENT: ~~HAND~~ SLIDE HAMMER	DRILLING METHOD: SLIDE ~~HAND~~ HAMMER	COMPLETION DEPTH: Ø.5'	TOTAL NO. OF SAMPLES: 1 RS548
SIZE AND TYPE OF BIT:	HOLE DIAMETER: 2"	NO. OF SAMPLES: 1 / BULK / SS / DRIVE / PITCHER	
DRILLING FLUID:	DRILLING ANGLE:	WATER LEVEL: - / FIRST: -	AFTER ____ HOURS: -
SAMPLE HAMMER TYPE: DRIVING WT.: DROP:		HYDROGEOLOGIST / DATE: T. Burton 12/11/97	CHECKED BY / DATE:

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
		X			@Ø.5 Sandy silt (ML), dk. brn (10YR 3/3), moist, loose, fine-med. sand, micas, debris (metal)	ML	—	45	55	SMALL SILVER SCREW FOUND IN SAMPLE @ 1200 NCBSØ65Ø1DØ.5 FULL SLEEVE
	1									
	2				T.D. Ø.5'					

OGDEN

FIELD LOG OF BORING

BORING NUMBER NCBS01

SHEET 1 OF 1

PROJECT NAME: Rocketdyne	PROJECT NUMBER: 313/50002	ELEVATION AND DATUM:	LOCATION: New Con ULS 5
DRILLING COMPANY:	DRILLER: K. Jamieson	DATE AND TIME STARTED: 12/11/97 1400	DATE AND TIME COMPLETED: 12/11 1430
DRILLING EQUIPMENT:	DRILLING METHOD: hand push (auger)	COMPLETION DEPTH: 5'	TOTAL NO. OF SAMPLES:
SIZE AND TYPE OF BIT:	HOLE DIAMETER: 2"	NO. OF SAMPLES: BULK: SS:	DRIVE: PITCHER:
DRILLING FLUID:	DRILLING ANGLE:	WATER LEVEL: FIRST: —	AFTER _____ HOURS
SAMPLE HAMMER TYPE: DRIVING WT.: DROP:		HYDROGEOLOGIST / DATE: T. Burton 12/11/97	CHECKED BY / DATE:

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
					Sfc: low slope, grassy, ashy	ML	—	15	85	deepening of NC55Ø1
	1				@ Ø.5 Silt w/sand (ML), silver-grey (N5), moist, m.stiff, dk					
	2				ve sw brown stains (10YR4/4),	ML	—	25	75	
	3				low-med plasticity					
	4				@ 2' Silt w/sand (ML), dk. yellow brown (10YR3/6), moist, m.stiff,					
	5	X			vf sand, micaceous	ML	—	10	90	@ 1430 NCBS0-50.D5.0 Full sleeve
	6				@ 5' Silt (ML), yellow-brown (10YR5/8), dry, loose, low plasticity, weathered siltstone					
					T.D. 5.0' Possible Bedrock refusal (hand auger)					

MWH

Ash Pile

X BS07

Brick Wall

Former Building

X BS14

N↑

Site Sketch Map

Boring #: NCBS07 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #: 189111	Site: SSFL - NCY
Logged By: J Dolmat	Reviewed By:
Drilling Contractor: NA	
Drill Rig Type/Method: Hand Auger	
Drillers Name: Ben Stewart	
Borehole Diam./Drill Bit Type: 3" Auger	Total Depth: 12' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 1345 10/13/06 Drill Finish Time/Date: 1420
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: NA
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: NA

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description (Ash Pile Recovered BS07)	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
SO2	X			X			0.5'		sandy silt (ML) 10YR 4/1 dark gray soft, dry (lost recovery)	—	—	10	25	65
							1		sandy silt (ML) 10YR 3/4 dark yellowish brown, med stiff, moist, low-med plasticity	—	—	—	40	60
							2		surface sparse vegitation					
							3		flat					
SO3	X			X			3'							
							4							
							5							
SO1	X			X			5'		silty sand (SM) 10YR5/8, yellowish brown loose, moist	—	—	10	50	40
							6							
							7							
							8							
							9							
							10							
SO4	X			X			10'		lithology same as 5'					
							11		Bedrock @ 12'					
							12							

QA/QC

OGDEN

NCBS08

FIELD LOG OF BORING

BORING NUMBER NCBS08 ULS ID

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
ROCKETDYNE	313150002		NEW CON YARD

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
OGDEN	KJ	12/11/97 1430	12/11/97 1510

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
HAND AUGER	HAND AUGER	4'	2 RS 550, 551

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
	2"	2 1				

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ____ HOURS
			N/A	N/A

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
			T. Burton 12/11/97	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
		X			Sfc: grassy, sloped moist	ML	–	5	95	@ 1440
	1				@ 0.5' Silt (ML), v.dk brn (10YR2/2), moist, loose, micaceous, low plasticity					NCBS08SC1 D0.5 Full Sleeve
	2									
	3				@ 3' Silt w/sand (ML), dk. yellow brown (10YR 4/4), moist, m.stiff, med. plasticity, micas	ML	–	20	80	
	4	X								@ 1510 NCBS08SC2 D4.0 Full Sleeve
Bdrk.	5				@ 4' as above					
					T.D. 4.0' Bedrock refusal					

OGDEN

NCBS09

FIELD LOG OF BORING

BORING NUMBER NCBS09 ULS 9 RS 552

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
ROCKETDYNE	313150002		NEW CON YARD

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
OGDEN	KJ	12/11/97 1520	12/11/97 1520

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
~~HAND~~ Slide HAMMER	~~HAND~~ Slide HAMMER	0.5'	1

SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
	2"	1				

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ____ HOURS
			N/A	N/A

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
			T. Burton 12/11/97	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
	0	X			Sfc: grassy	SP	–	95	5	@ 1520
	1				@ 0.5 Poorly graded sand (SP), lt. yellow brn (10YR 3/4), dry, V. loose, med. gr, weathered bedrk.						NCBS09S01 D0.5 Full
	2				T.D. 0.5'					

OGDEN

FIELD LOG OF BORING

BORING NUMBER NCBS1Ø

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
Rocketdyne	313150002		New Con ULS 12

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
	T.B.	1/27/98 1600	1615

DRILLING EQUIPMENT	DRILLING METHOD	COMPLETION DEPTH	TOTAL NO. OF SAMPLES
	slide hammer	Ø.5	1

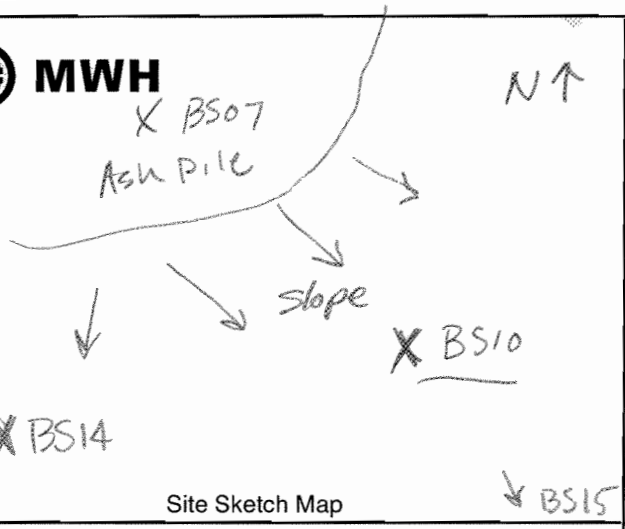
SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
	2"					

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER ____ HOURS
			—	

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
			T. Burton 1/27/98	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
SM		X			Sfc: grassy	SM	–	55	45	@1615
										NCBS1ØSØ1DØ.5
	1				@Ø.5' Silty sand (SM), v.dk.					Full
					yellowbrn 10YR3/4, moist, loose,					
	2				fine gr., rootlets					
					T.D. Ø.5' (Term-Before Refusal)					

MWH



Site Sketch Map

Boring #: NC BS 10 MW#: Sheet 1 of 1

Project: Group 6 Data Gaps

Job #: Site: SSFL - NCY

Logged By: J Dalmat Reviewed By:

Drilling Contractor: —

Drill Rig Type/Method: hand trowel

Drillers Name: B Burton

Borehole Diam./Drill Bit Type: 2" Total Depth 0.5'

Ref. Elev.

Sampler Type: hand trowel

Depth to 1st Water (▽): Time/Date:

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

Depth to other Water Bearing Zones:

Drill Start Time/Date: 0910 2/14/06 Drill Finish Time/Date: Same

Well Completion Time/Date: —

Soil Boring Backfill Time/Date: —

Downslope from Ash Pile

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
SO1	X			X			0.5'	ML	sand + Silt (mix) Brown (10YR 4/3) soft, slightly moist, trace roots	—	—	—	40	60
							1		surface ash, 0.5 inch very dark grey (10 YR 3/1)					
							2		surface ash layer not sampled, boring not deepened to bedrock, boring re-occupied surface low vegitation Sloping 10-20° SE of Ash pile					
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

OGDEN

FIELD LOG OF BORING

BORING NUMBER NCBS11 SHEET 1 OF 1

PROJECT NAME: Rocketdyne	PROJECT NUMBER: 313150002	ELEVATION AND DATUM:	LOCATION: New Con NCS 11
DRILLING COMPANY:	DRILLER: T.B.	DATE AND TIME STARTED: 1/27/98 1615	DATE AND TIME COMPLETED: 1630 4/9/98
DRILLING EQUIPMENT	DRILLING METHOD: slide hammer	COMPLETION DEPTH: 0.5', 3'	TOTAL NO. OF SAMPLES: 1
SIZE AND TYPE OF BIT	HOLE DIAMETER: 2"	NO. OF SAMPLES: BULK / SS	DRIVE / PITCHER
DRILLING FLUID	DRILLING ANGLE	WATER LEVEL: FIRST —	AFTER _____ HOURS
SAMPLE HAMMER TYPE: DRIVING WT.: DROP:		HYDROGEOLOGIST / DATE: T. Burton 1/27/98	CHECKED BY / DATE

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
		X			Sfc: leaves 3"	ML	–	15	85	@1630
										NCBS11SØ1DØ.5
	1				@Ø.5 Silt w/sand (ML), v.dk.					Full
					brn 10YR 2/2, moist, loose,					
	2				fine sand, low plasticity, rootlets					
		X				ML	–	40	60	@1745
	3				T.D. Ø.5' (Term. Before Refusal)					NCBS11SØ2D3.Ø'
	4				[Reoccupied 4/9/98]					
					@3' Sandy silt (ML), dk brn 10YR3/3, moist, loose - m.stiff, fine gr., micaceous, no plast.					
					[Reoccupied 6/29/00 @ 0.5']					

OGDEN

FIELD LOG OF BORING

BORING NUMBER NCBS12

SHEET 1 OF 1

PROJECT NAME	PROJECT NUMBER	ELEVATION AND DATUM	LOCATION
ROCKETDYNE	313150002		NEW CON ULS 13

DRILLING COMPANY	DRILLER	DATE AND TIME STARTED	DATE AND TIME COMPLETED
OGDEN	KJ	4/9/98 1810	4/9/98 1815

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

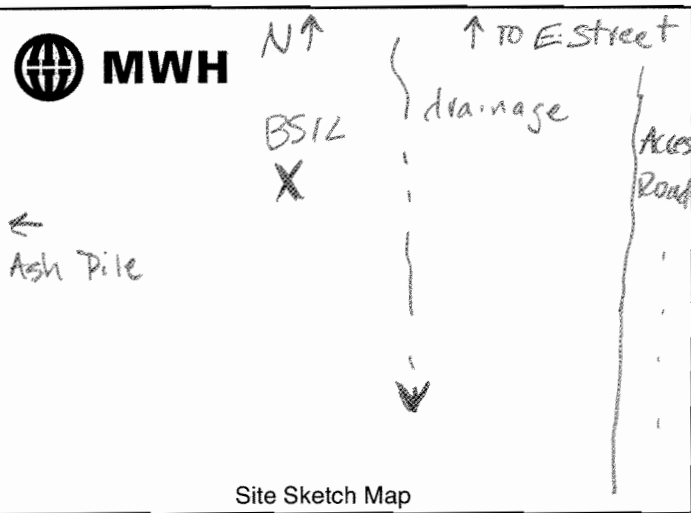
SIZE AND TYPE OF BIT	HOLE DIAMETER	NO. OF SAMPLES	BULK	SS	DRIVE	PITCHER
			1			

DRILLING FLUID	DRILLING ANGLE	WATER LEVEL	FIRST	AFTER 0.2 HOURS
NONE	90°		1" ABOVE SURFACE	1" ABOVE SURFACE

SAMPLE HAMMER TYPE	DRIVING WT.	DROP	HYDROGEOLOGIST / DATE	CHECKED BY / DATE
			T. Burton 4/11/98	

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
		X			SFC: bare soil, wet sand, standing water	SP	–	100	–	@1815
	1				@ 0.5 Poorly graded sand (SP),					NCBS12 S@1 D@.5
	2				dk. greyish brn 10YR 3/2, moist-wet, v. loose, fine-med. gr					
					T.D. @.5'					

MWH



Site Sketch Map

Boring #: RE BS12 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: SSFL - NCY

Logged By: J Dolmat Reviewed By:

Drilling Contractor: —

Drill Rig Type/Method: hand trowel

Drillers Name: B Burton

Borehole Diam./Drill Bit Type: 2" Total Depth 0.5'

Ref. Elev.

Sampler Type: hand trowel

Depth to 1st Water (▽): Time/Date:

Drill Start Time/Date: 0851 2/14/06 Drill Finish Time/Date: same

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

Well Completion Time/Date: —

Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date: —

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
SO1	X			X			0.5'	ML	Sandy Silt (ML) Brown (10YR 4/3) soft, moist tr plant roots	—	—	—	35	65
							1		surface ash 0.5 inch very dark gray (10YR 3/1) surface ash layer not sampled boring not deepened to bedrock					
							2							
							3							
							4							
							5		boring reoccupied BS12 surface low regititation sloping 10-20° E/SE					
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

OGDEN

FIELD LOG OF BORING

BORING NUMBER NCBS13

SHEET 1 OF 1

PROJECT NAME: ROCKETDYNE	PROJECT NUMBER: 3131500052	ELEVATION AND DATUM:	LOCATION: NEW CON ULS8
DRILLING COMPANY: OGDEN	DRILLER: KJ	DATE AND TIME STARTED: 4/9/98 1825	DATE AND TIME COMPLETED: 4/9/98 1830
DRILLING EQUIPMENT: SLIDE HAMMER	DRILLING METHOD: SLIDE HAMMER	COMPLETION DEPTH: 0.5'	TOTAL NO. OF SAMPLES: 1
SIZE AND TYPE OF BIT:	HOLE DIAMETER: 3"	NO. OF SAMPLES: BULK 1 SS	DRIVE: PITCHER
DRILLING FLUID: NONE	DRILLING ANGLE: 90°	WATER LEVEL: FIRST 1/2" ABOVE SURFACE	AFTER 0.3 HOURS 1/2" ABOVE SURFACE
SAMPLE HAMMER TYPE: DRIVING WT.: DROP:		HYDROGEOLOGIST / DATE: T. Burton 4/11/98	CHECKED BY / DATE:

LITHOLOGY	DEPTH (FEET)	SAMPLES	RECOVERY	BLOW COUNT	DESCRIPTION	USCS SYMBOL	ESTIMATED PERCENT OF GR	SA	FI	COMMENTS
		X			PEBBLES @ surface	SP	10	90	—	@ 1830
										NCBS13 SP1 D 0.5
	1				@ 0.5' Poorly graded sand (SP), v. dk. greyish brown 10YR 3/2, wet,					
	2				v. loose, med gr., 1/2" sandstone gravels					
					T.D. 0.5'					

MWH

Boring #: NCBS14 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: SSFL - NCY

Logged By: J Dolmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: hand trowel

Drillers Name: Sampler B Burton

Borehole Diam./Drill Bit Type: 3" Total Depth 0.5'

Ref. Elev.

Sampler Type:

Drill Start Time/Date: 13:13 02/13/06 Drill Finish Time/Date: 15:13

Well Completion Time/Date: NA

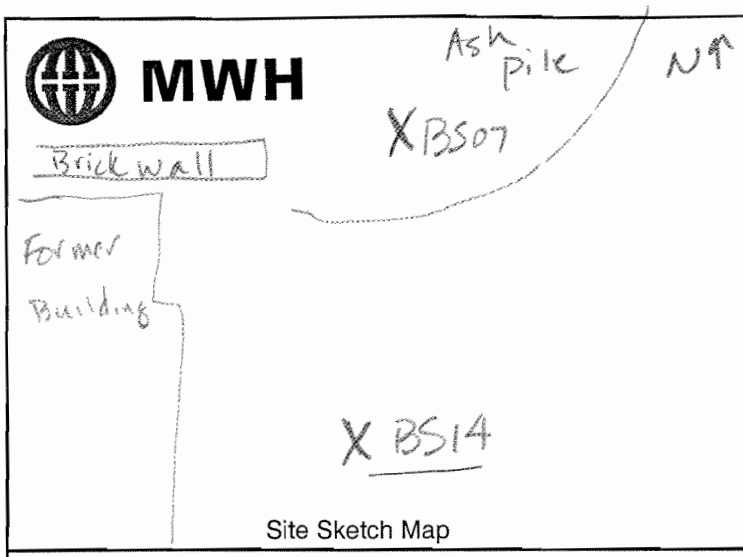
Soil Boring Backfill Time/Date: NA

Depth to 1st Water (▽): Time/Date:

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

Depth to other Water Bearing Zones:

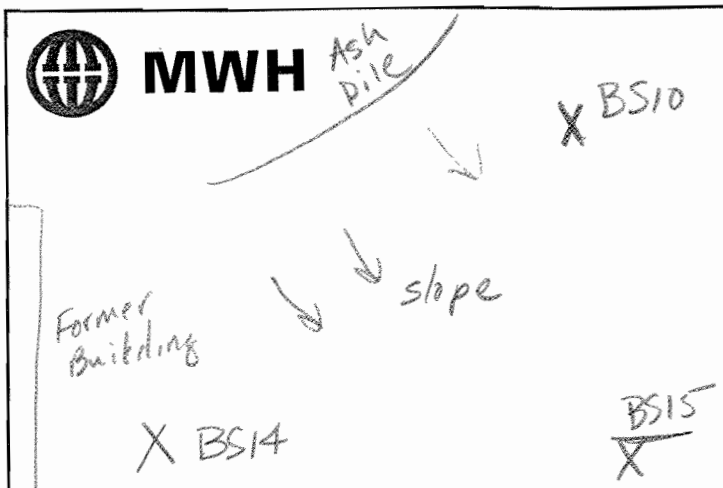
Site Sketch Map



PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
SO1	X			X			0.5'		Silty sand (sm) 10YR 4/3 Brown very loose, dry, weakly cemented	–	–	10	50	40
							1							
									surface ash 0.25 inch very dark grey (10YR 3/1) surface ash layer not sampled, boring not deepened to bedrock					
							2							
							3							
							4		surface flat, low vegetation					
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



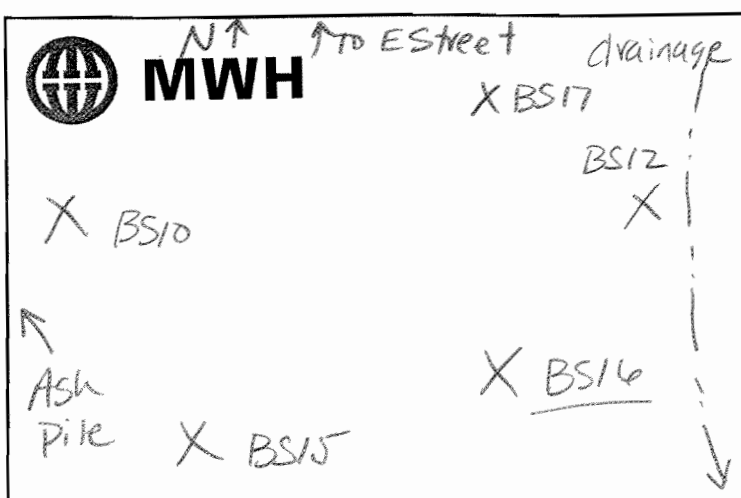
Site Sketch Map

Boring #: NCBS15 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL - NCY
Logged By: JDolmat	Reviewed By:
Drilling Contractor:	
Drill Rig Type/Method: hand Trowel	
Drillers Name: sampler B Burton	
Borehole Diam./Drill Bit Type: 3"	Total Depth 0.5' / Ref. Elev.
Sampler Type: NA	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 1526 / 02/13/06 Drill Finish Time/Date: 1526
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
SO1	X			X			0.5'	ML	sandy silt (ML) 10YR 4/3 Brown soft, slightly moist, weakly cemented, low plasticity trace organic roots	—	—	—	40	60
							1		Suface low vegetation sloping 10-20° E surface ash 0.05 inch, very dark grey (10YR 3/1) surface ash not sampled Boring NOT deepened to Bedrock					
							2							
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



Site Sketch Map

Boring #: NCBS16 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: SSFL – NCY
Logged By: JDolmat	Reviewed By:
Drilling Contractor:	
Drill Rig Type/Method: Hand Trowel	
Drillers Name: Sampler B. Burton	
Borehole Diam./Drill Bit Type: 3"	Total Depth 0.5' / Ref. Elev.
Sampler Type: Hand	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 15:48/02/13/06 Drill Finish Time/Date: 15:48
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
									Downslope from Ash Pile					
SO1	X			X			0.5'		silty sand (SM) 10YR 4/3 med density, dry, weakly cemented low plasticity, trace organic roots. surface ash layer minimal < 0.25 inch, very dark grey (10YR 3/1) surface ash not sampled boring NOT deepened to bedrock surface grassy/low vegetation sloping 10-20° E.	—	—	5	55	40
							1							
							2							
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: NC BS17 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: SSFL - NCY

Logged By: J Dolmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: hand trowel

Drillers Name: B Burston

Borehole Diam./Drill Bit Type: 2" Total Depth 0.5' Ref. Elev.

Sampler Type: hand trowel

Drill Start Time/Date: 8.44 2/14/06 Drill Finish Time/Date: same

Well Completion Time/Date: —

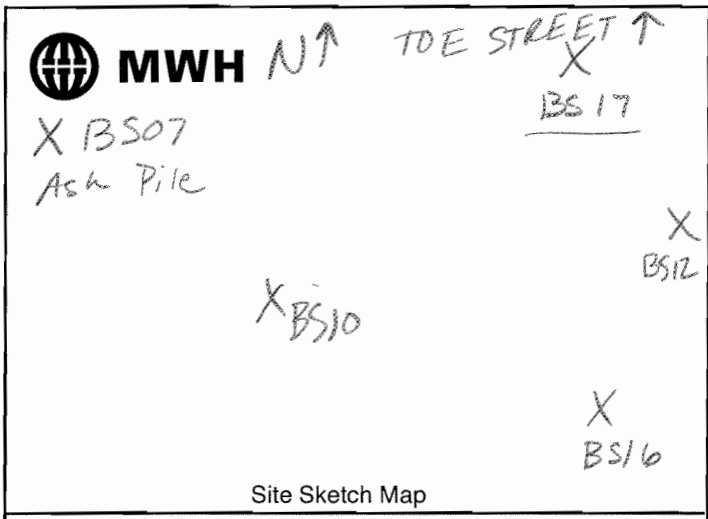
Soil Boring Backfill Time/Date: —

Depth to 1st Water (▽): Time/Date:

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

Depth to other Water Bearing Zones:

Site Sketch Map

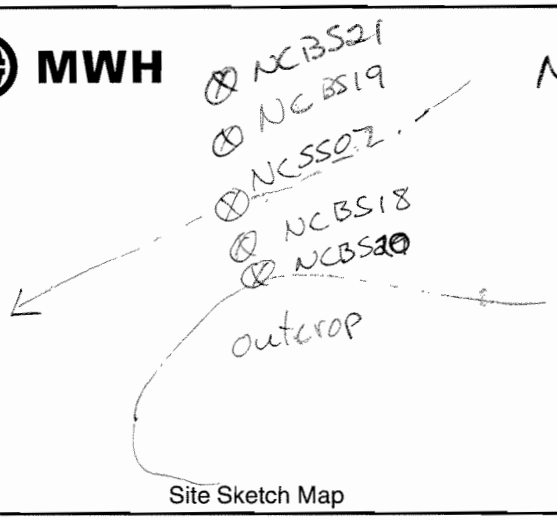


PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
	X			X			0.5'	ML	Downslope From Ashpile Sandy silt, dark yellowish brown (10YR 4/4) soft, moist surface — 0.75 inch ash (7.5YR 3/1) very dark grey surface ash layer not sampled Boring NOT deepened to bedrock surface grassy/low vegetation sloping 10-20° E	—	—	—	30	70

Sol

QA/QC

MWH



Site Sketch Map

Boring #: NCBS18 MW#: Sheet 1 of 1

Project:

Job #: Site: NCY-SSFL

Logged By: JDalmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: Hand Auger

Drillers Name:

Borehole Diam./Drill Bit Type: 4" Total Depth 2'

Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): Time/Date:

Drill Start Time/Date: 4/10/06 Drill Finish Time/Date:

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

Well Completion Time/Date: ——

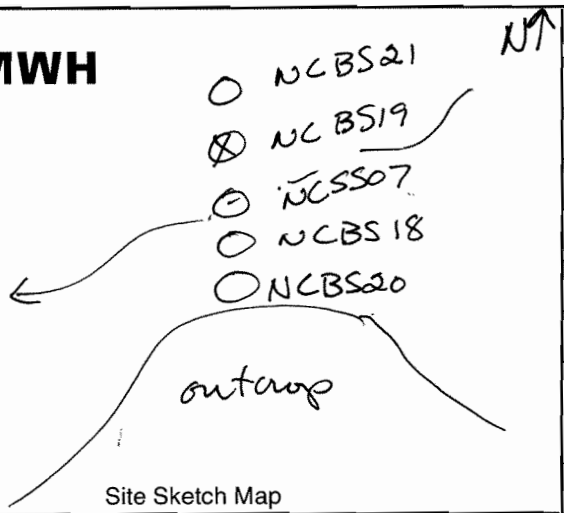
Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date: ——

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
	X			X			0.5'		surface 1' grassy vegitation 0.125" ash layer 10YR 3/2 very dark grey, NOT sampled	–	–	10	30	60
							1					1		
							2	ML	0.5' sandy silt 10 YR 3/3 moist, soft with roots refusal @ 2'					
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



Site Sketch Map

Boring #: NCBS19 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: NCY-SSFL

Logged By: JDolmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: Hand Auger

Drillers Name:

Borehole Diam./Drill Bit Type: 4" Total Depth 2.5

Ref. Elev. —

Sampler Type: —

Depth to 1st Water (▽): Time/Date:

Drill Start Time/Date: 4/10/06 Drill Finish Time/Date:

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

Well Completion Time/Date: —

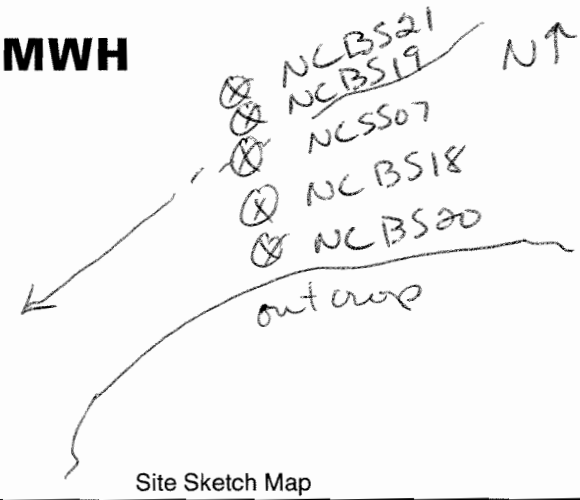
Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date: —

	PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
S01		X			X			0.5		Surface 1' tall grassy vegitation sloping 15°-20° SW	—	—	10	30	60
								1		0.125" ash layer (10YR 3/2) not sampled					
S02		X			X			2.5		0.5' sandy SILT (10YR 3/3) dark brown, moist, very soft roots	20	-	20	20	40
								3		2.5' silty SAND with gravel 10YR 3/3 dark Brown, wet soft					
								4							
								5							
								6							
								7							
								8							
								9							
								10							
								11							
								12							

QA/QC

MWH



Site Sketch Map

Boring #: NCBS20 MW#: Sheet 1 of 1

Project:

Job #: Site: NCY-SSFL

Logged By: J Dolmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: Hand Auger

Drillers Name:

Borehole Diam./Drill Bit Type: 4" Total Depth 1'

Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): Time/Date:

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

Depth to other Water Bearing Zones:

Drill Start Time/Date: 4/10/06 Drill Finish Time/Date:

Well Completion Time/Date: —

Soil Boring Backfill Time/Date: —

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
Soil	X			X			0.5'		Surface 1' grassy vegetation 0.125 ash layer, not sampled (10yR 3/2)					
							1			—	—	20	20	60
							2	ML	Sandy SILT (10yR/3/3) dark Brown moist, soft with roots					
							3		refusal @ 1'					
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: NCBS21 MW#: Sheet 1 of 1

Project:

Job #: Site: NC4-SSFL

Logged By: J Dolmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: Hand Auger

Drillers Name:

Borehole Diam./Drill Bit Type: 4" Total Depth 0.5' Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): Time/Date:

Drill Start Time/Date: Drill Finish Time/Date:

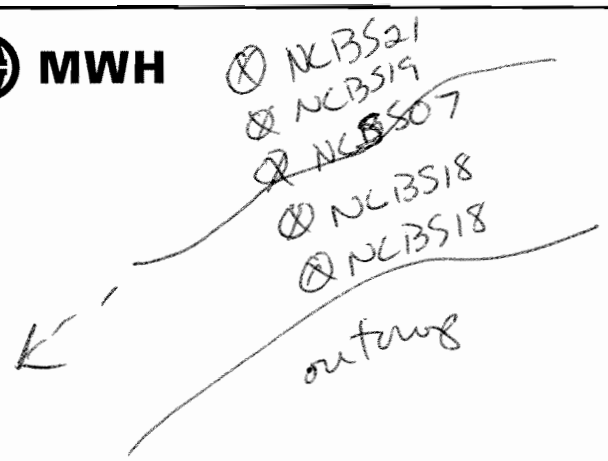
Depth to Water After Drilling (▼): Time/Date:

Well Completion Time/Date:

Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date:

Site Sketch Map



PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
S01	X			X			0.5'		surface 1' grassy vegitation					
							1		0.25' ash layer (10YR 3/2) not sampled					
							2	ML	Sandy SILT, moist very soft with roots	—	—	20	30	50
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: NCBS22 MW#: Sheet 1 of 1

Project:

Job #: Site: NCY-55FL

Logged By: J Dolmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: Hand Auger

Drillers Name:

Borehole Diam./Drill Bit Type: 4" Total Depth 2.5' Ref. Elev.

Sampler Type:

Drill Start Time/Date: 4/10/06 Drill Finish Time/Date:

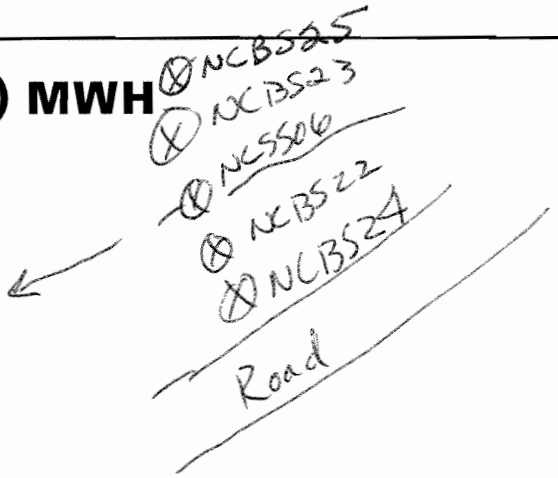
Well Completion Time/Date: —

Soil Boring Backfill Time/Date: —

Depth to 1st Water (▽): Time/Date:

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

Depth to other Water Bearing Zones:



Site Sketch Map

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
301	X			X				0.5'	Surface vegitation 1' grassy, 0.25" ash layer (10YR3/2)					
							1		silty SAND 10YR 3/3	—	—	15	40	45
302	X			X					dark brown					
							2		SAND with silt 10YR4/6					
								2.5	dark yellow brown	—	—	50	30	20
							3		moist med dense					
									sub angular, weathered					
							4		bedrock, refusal @					
									2.5'					
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: NCBS23 MW#: Sheet 1 of 1

Project:

Job #: Site: NCY-SSFL

Logged By: JDalmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: Hand Auger

Drillers Name:

Borehole Diam./Drill Bit Type: 4" Total Depth 0.5' Ref. Elev.

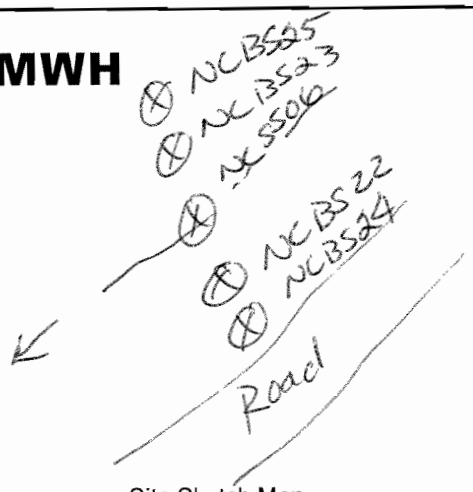
Sampler Type:

Drill Start Time/Date: 4/10/06 Drill Finish Time/Date:

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
SO1	X			X			0.5'		Surface 1" grassy Vegitation 0.125" ash layer (10YR3/2) not sampled					
							1		SILTY SAND 10YR 4/4 dark yellowish Brown Subangular Moist dense refusal @ 0.5'		10	30	20	40
							2							
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: NCBS24 MW#: Sheet 1 of 1

Project:

Job #: Site: NCY-SSFL

Logged By: JDolmat Reviewed By:

Drilling Contractor:

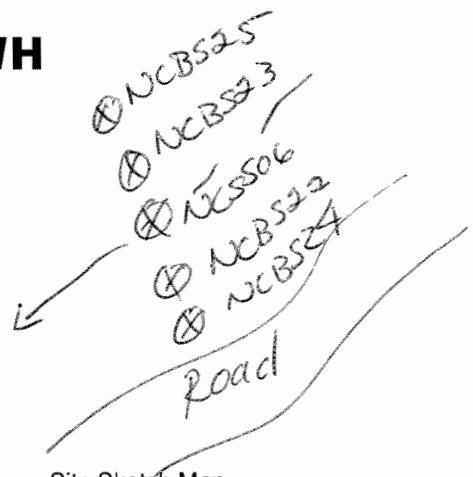
Drill Rig Type/Method: Hand Auger

Drillers Name:

Borehole Diam./Drill Bit Type: 4" Total Depth 0.5'

Ref. Elev.

Site Sketch Map



Sampler Type:

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

Drill Start Time/Date: 4/10/06 Drill Finish Time/Date:

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

Well Completion Time/Date: ——

Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date: ——

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
Soil	X			X			0.5'		surface 1' vegitation 0.5" ash layer, not sampled (10YR 3/2)					
							1		Silty SAND 10YR 4/4					
							2		dark yellowish Brown moist, soft with roots			20	35	45
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: NC BS 26 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: NCY - SSFL

Logged By: JDolmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: Hand Auger

Drillers Name:

Borehole Diam./Drill Bit Type: 4" Total Depth 0.5'

Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): — Time/Date:

Drill Start Time/Date: 4/11/06 Drill Finish Time/Date:

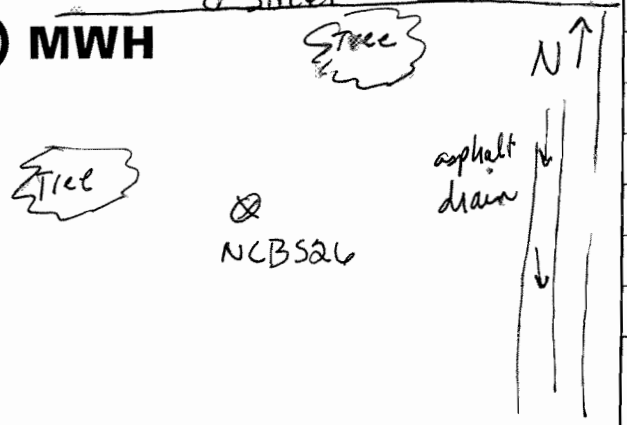
Depth to Water After Drilling (▼): — Time/Date:

Well Completion Time/Date: —

Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date: —

Site Sketch Map



PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
SO1	X			X			0.5		Surface up to 2' tall grassy vegitation sloping 10-15° E	—	—	—	60	30
							1		0.125 ash layer not sampled					
							2		SILTY sand 10YR 3/3 dark brown, moist, soft					
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: NCB527 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: NCY-55FA

Logged By: JDolmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: Hand Auger

Drillers Name: B Stewart

Borehole Diam./Drill Bit Type: 4" Total Depth 0.5'

Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): — Time/Date:

Drill Start Time/Date: 4/11/04 Drill Finish Time/Date:

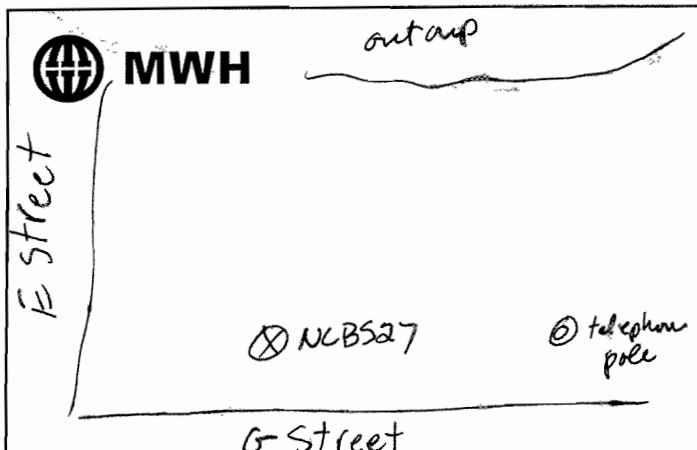
Depth to Water After Drilling (▼): — Time/Date:

Well Completion Time/Date: —

Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date: —

Site Sketch Map



PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
SO1	X			X			0.5		Surface grassy vegetation up to 2' tall sloping 15°-20° E					
							1							
							2		SILTY SAND 10YR 3/3 dark Brown wet Moist, Soft	—	—	—	55	45
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: NCB528 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: NCY-SSFL

Logged By: JDolmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: Hand Auger

Drillers Name: B Stewart

Borehole Diam./Drill Bit Type: 4" Total Depth 0.5'

Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): — Time/Date:

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

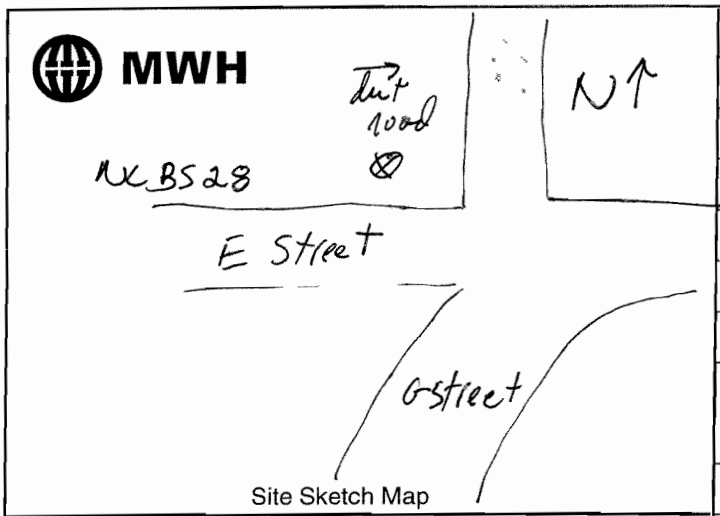
Depth to other Water Bearing Zones:

Drill Start Time/Date: 4/11/06 Drill Finish Time/Date:

Well Completion Time/Date: —

Soil Boring Backfill Time/Date: —

Site Sketch Map

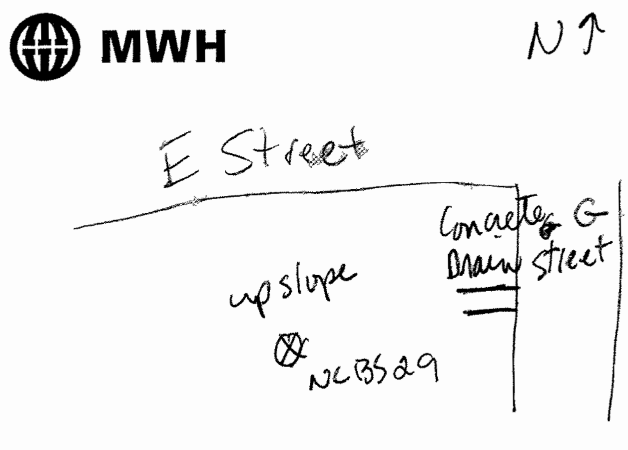


PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
SO1	X			X			0.5'		Surface 1' tall grassy vegitation sloping 10°-20° E NO ash layer Silty SAND 10YR/3/3 dark Brown moist, soft	—	—	—	60	30
							1							
							2						60	
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH

Boring #: NCBS29 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: NCY -SSFL
Logged By: JDolmat	Reviewed By:
Drilling Contractor:	
Drill Rig Type/Method: Hand Auger	
Drillers Name: B Stewart	
Borehole Diam./Drill Bit Type: 4"	Total Depth 0.5'
	Ref. Elev.
Sampler Type:	
Drill Start Time/Date: 4/11/06	Drill Finish Time/Date:
Well Completion Time/Date: —	
Soil Boring Backfill Time/Date: —	



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 (upslope from drain)	Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
S01		X			0X			0.5		Surface sloping 20°-30° E grassy vegitation, no visible ash layer SILTY SAND 10YR 4/4 dk yellow brown moist soft roots	—	—	15	40	45
								1							
								2							
								3							
								4							
								5							
								6							
								7							
								8							
								9							
								10							
								11							
								12							

QA/QC

MWH

Boring #: NCB530 MW#: Sheet 1 of (

Project: Group 6 Data Gap

Job #: Site: NCY -SSFL

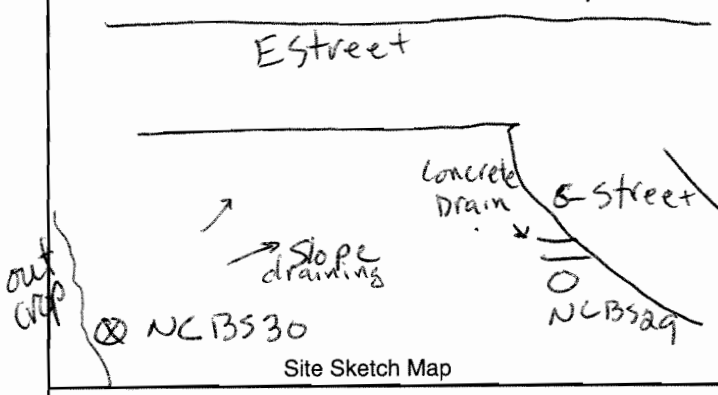
Logged By: JDD/Mat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: hand trowel

Drillers Name: R Roman

Borehole Diam./Drill Bit Type: 3" Total Depth 0.5' Ref. Elev.



Site Sketch Map

Sampler Type:

Depth to 1st Water (▽): Time/Date:

Drill Start Time/Date: 4/13/06 Drill Finish Time/Date:

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

Well Completion Time/Date:

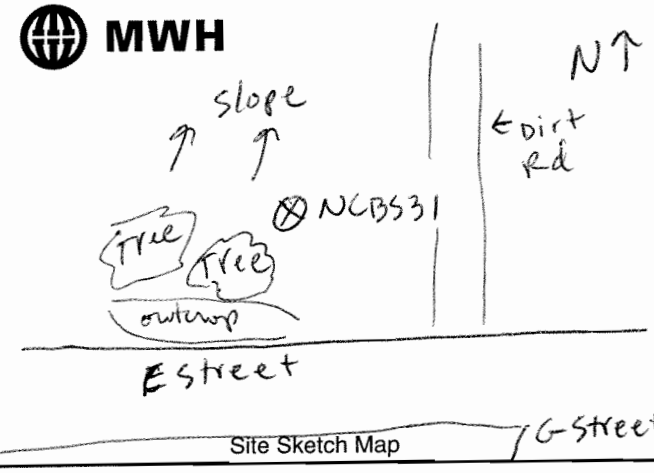
Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
SO1	X			X			0.5'	SP	Surface 1' tall grassy Vegitation Sloping N/NE 10° SILTY SAND 10YR 3/3 dark Brown moist med dense roots, NO VISIBLE ASH layer	–	–	10	60	30
							1							
							2							
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



Site Sketch Map

Boring #: NCBS31 MW#:	Sheet 1 of 1
Project: Group 6 Data Gap	
Job #:	Site: NCY-55FL
Logged By: JDolmat Reviewed By:	
Drilling Contractor:	
Drill Rig Type/Method: hand trowel	
Drillers Name: R Roman	
Borehole Diam./Drill Bit Type:	Total Depth 0.5' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 4/13/06 Drill Finish Time/Date:
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date:
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
S01	X			X			0.5'	SP	surface 2"-3" tall grassy vegitation, sloping N/NE 10°-20° SILTY SAND 10YR 3/3 dk Brown moist med dense, roots .250" ash layer not sampled	—	—	10	60	30
							1							
							2							
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

OGDEN

Surface and Shallow Soil Sample Log

Project Number	Project Name	Date	Time
313150002	Rocketdyne	9/22/99	

Sample Identification Number and Time	Checked by
NCSSØ15Ø1 (+SØ2) @ 1400 RS888	

Sampled by	Recorded by
TB	T. Burton

Method of Collection

Surface Description: Ash piles, dry grass

Notes: Collected at surface ✓

Soil Sample Data

Location: VLS #5

Coordinates	Elevation

Lithology	Depth (in.)	Soil Description	Est. % of G	S	F	Comments
Ash	3	Loose Ash → 1' bgs metallic gray				
	6					
	9					
	12					
		@ 1'-1.5' Grades to Silt w/sand (ML),	-	20	80	
	18	dark brown (7.5YR), dry, v. loose,				
		non-plastic, vf sand				
	24					
		@ 2.5' Becomes dense/stiff, weathered				
	30	siltstone bedrock (possible boulder?)	-	25	75	
		T.D. 2.5' Refusal on				
		bedrock fragment				

OGDEN

Surface and Shallow Soil Sample Log

Project Number	Project Name	Date	Time
313150002	Rocketdyne	10/28/97	0840

Sample Identification Number and Time	Checked by
NCSS0250101 D0' @ 0840	

Sampled by	Recorded by
T. Burton	T. B.

Method of Collection: trowel

Surface Description: small piles of ash, dry grasses

Notes: ULS 4

Soil Sample Data

Location: New Conservation Yard, N end of parking lot asphalt

Coordinates	Elevation

Lithology	Depth (in.)	Soil Description	Est. % of G	Est. % of S	Est. % of F	Comments
	1	Silty sand w/ gravel (SM), gray (2.5Y 6/1),	5	80	15	
	2	dry, v. loose, contains pebbles, ash (from				
	3	incinerator?), non-plastic silt				

OGDEN

Surface and Shallow Soil Sample Log

Project Number	Project Name	Date	Time
313150002	Rocketdyne	6/29/00	1515

Sample Identification Number and Time	Checked by
NCSS03 S01 DP @ 1520	

Sampled by	Recorded by
T. Burton	T. Burton

Method of Collection: scoop

Surface Description: dry, low slope, grassy

Notes: ULS 15

Soil Sample Data

Location: New Con

Coordinates	Elevation

Lithology	Depth (in.)	Soil Description	Est. % of G	Est. % of S	Est. % of F	Comments
—	0	Sandy silt (ML), vf-fine sand, dry,	—	30	70	
—	1	v. loose				
—						
—	2	T.D. 2" bgs				

OGDEN

Surface and Shallow Soil Sample Log

Project Number	Project Name	Date	Time
313150002	Rocketdyne	6/29/00	1530

Sample Identification Number and Time	Checked by
NCSS04 S01 DO @ 1535	

Sampled by	Recorded by
T. Burton	T. Burton

Method of Collection: Scoop

Surface Description: bend in drainage; 1.5' below grade, loose seds below pipe crossing drainage

Notes: ULS 16

Soil Sample Data

Location: New Con Yard; SWMU 7.8

Coordinates	Elevation

Lithology	Depth (in.)	Soil Description	Est. % of G	Est. % of S	Est. % of F	Comments
	1	Silty Sand (SM), fine-med. grained, dry, grayish brown (10YR 4/2), v. loose	—	70	30	
	2	T.D. 1" bgs				

OGDEN

Surface and Shallow Soil Sample Log

Project Number	Project Name	Date	Time
313150002	Rocketdyne	6/29/00	1600

Sample Identification Number and Time	Checked by
NCSS05 S01 D0' @ ~~1605~~ 1600	

Sampled by	Recorded by
T. Bus	T. Burton

Method of Collection: scoop

Surface Description: bare soil in grove of trees, ~~flat~~ low slope

Notes: ULS 14

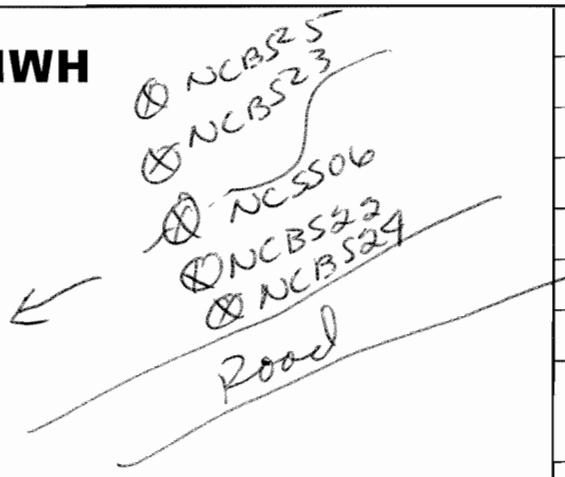
Soil Sample Data

Location: New Con Yard, SWMU 7.8

Coordinates	Elevation

Lithology	Depth (in.)	Soil Description	Est. % of G	Est. % of S	Est. % of F	Comments
	1	Sandy Silt (ML), dry, v. loose, grayish brown (10YR 5/2), non-plastic, vf-fine gr.		35	65	RJ 0
		T.D. 1" bgs				

MWH



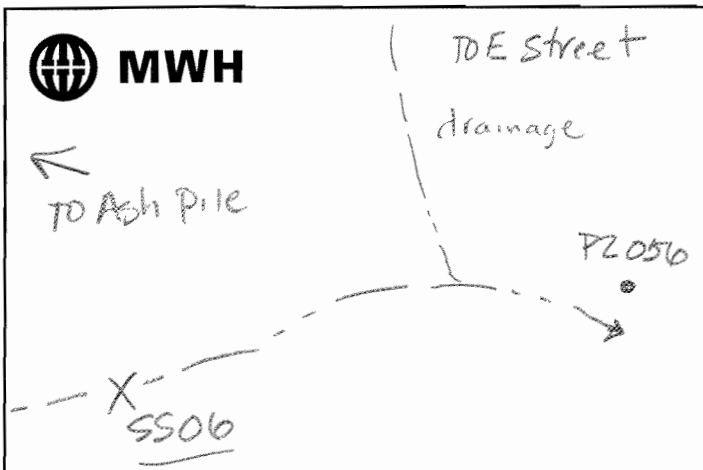
Site Sketch Map

Boring #: NCSS06 MW#:	Sheet 1 of 1
Project:	
Job #:	Site: NCY-SSFL
Logged By: JDolmat	Reviewed By:
Drilling Contractor:	
Drill Rig Type/Method: Hand Auger	
Drillers Name:	
Borehole Diam./Drill Bit Type: 4"	Total Depth 0.5' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 4/10/06 Drill Finish Time/Date:
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date: —
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date: —

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
SO1	X			X			0.5		Surface 0.5' water in Stream					
							1		~~0.5~~ 0.5" ash layer,	—	20	30	30	10
							2	SW	SAND 10yR 3/3 dark Brown Subangular Subround Moist very soft					
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



Site Sketch Map

Boring #: NC SS06 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: SSFL - NCY

Logged By: J Dolmat Reviewed By:

Drilling Contractor: —

Drill Rig Type/Method: hand trowel

Drillers Name: B Stewart

Borehole Diam./Drill Bit Type: 3" Total Depth 0.5'

Ref. Elev.

Sampler Type:

Depth to 1st Water (▽): Time/Date:

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

Depth to other Water Bearing Zones:

Drill Start Time/Date: 0938 2/14/06 Drill Finish Time/Date: Same

Well Completion Time/Date: —

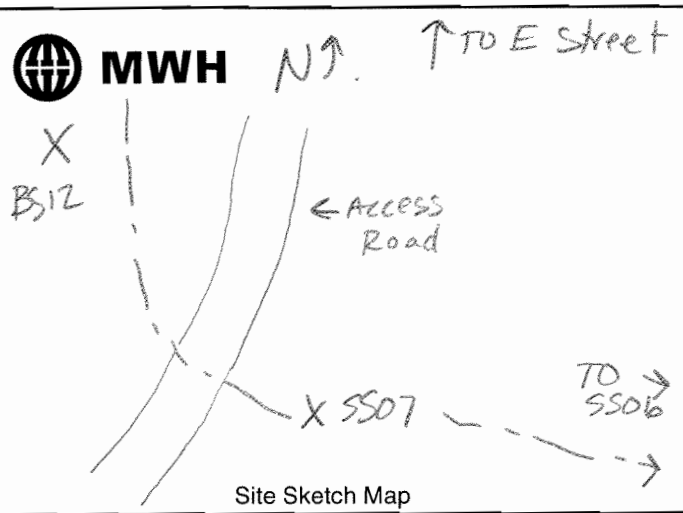
Soil Boring Backfill Time/Date: —

Sediment Sample Ash Pile drainage to NCY boundry

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
SO1	X			X			0.5'	SW	Well graded SAND with gravel, dark grayish Brown (2.5Y 4/2) subround to subangular, loose, slightly moist, gravel 0.25 inch	10	25	20	40	5
							1		surface to 4 inch, burned leaves, silt and ash, very dark gray (10YR 3/1) upper 4 inches not sampled					
							2		boring not deepened to bedrock,					
							3		surface in East bound drainage sloping 10-20° E					
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



Site Sketch Map

Boring #: NCSS07 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: SSFL - NCY

Logged By: J Dolmat Reviewed By:

Drilling Contractor: —

Drill Rig Type/Method: hand trowel

Drillers Name: R Burton

Borehole Diam./Drill Bit Type: 2" Total Depth 0.5' Ref. Elev.

Sampler Type: hand trowel

Depth to 1st Water (▽): Time/Date:

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

Depth to other Water Bearing Zones:

Drill Start Time/Date: 9:32 02/14/06 Drill Finish Time/Date: same

Well Completion Time/Date: —

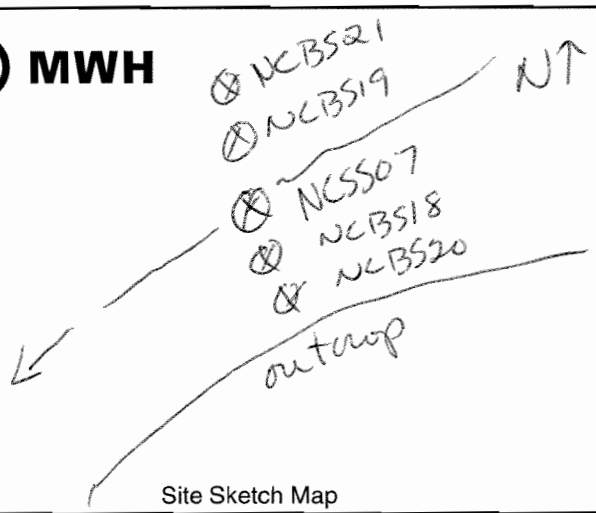
Soil Boring Backfill Time/Date: —

Sediment sample Ash Pile drainage to NCY boundary

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
Soil	X			(			0.5'	SM	silty sand (OM) dark Brown (10YR 3/3) loose, slightly moist. surface ash 0.5 0 inch	—	—	20	40	40
							1							
							2		Very dark grey (10YR 3/1) surface ash layer not					
							3		sampled, boring not					
									deepened to bedrock					
							4		surface in drainage					
							5		sloping 10-20° SE, low, grassy					
									vegitation.					
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



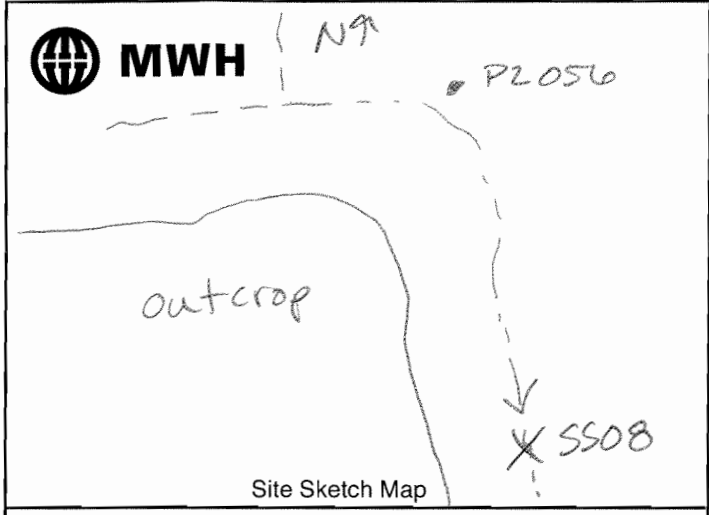
Site Sketch Map

Boring #: NCSS07 MW#:	Sheet 1 of 1
Project:	
Job #:	Site: NCY - SSFL
Logged By: JDolmat	Reviewed By:
Drilling Contractor:	
Drill Rig Type/Method: Hand Auger	
Drillers Name:	
Borehole Diam./Drill Bit Type: 4"	Total Depth 0.5' / Ref. Elev.
Sampler Type:	
Depth to 1st Water (▽): Time/Date:	Drill Start Time/Date: 4/10/06 Drill Finish Time/Date:
Depth to Water After Drilling (▼): Time/Date:	Well Completion Time/Date:
Depth to other Water Bearing Zones:	Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
S01	X			X			0.5		Surface in stream 6 inches approx of stream water Banks of stream 1' vegitation 0.5' ash layer (10YR 3/2)					
							1							
							2							
							3	ML	Sandy Silt, 10YR 3/3 dark Brown, saturated soft	—	—	15	30	55
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

MWH



Site Sketch Map

Boring #: NCSS08 MW#: Sheet 1 of 1

Project: Group 6 Data Gap

Job #: Site: SSFL - NCY

Logged By: JDolmat Reviewed By:

Drilling Contractor:

Drill Rig Type/Method: hand trowel

Drillers Name: B Burton

Borehole Diam./Drill Bit Type: 2" Total Depth 0.5'

Ref. Elev.

Sampler Type: hand trowel

Depth to 1st Water (▽): Time/Date:

Drill Start Time/Date: 1003 2/14/06 Drill Finish Time/Date: Same

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

Well Completion Time/Date:

Depth to other Water Bearing Zones:

Soil Boring Backfill Time/Date:

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of: Gravel	Sand: Coarse	Sand: Medium	Sand: Fine	Silt/clay
									sediment sample Ash Pile drainage to NCY boundary					
SO1	X			X			0.5'	SM	silty sand, dark Brown (10YR 3/3) loose, moist trace organic material	–	–	–	60	40
							1							
							2		surface ash 0.25 inch very dark grey (10YR 3/1)					
							3		surface ash not sampled boring NOT deepened to Bedrock					
							4							
							5		surface in drainage sloping 10-20° S/SW low grassy vegitation					
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

4/13/2006

MONTGOMERY WATSON

Boring #: NCSS01 MW#: — Sheet 1 of 1

Project: SSFL - Group 6 Data Gap

Job #: 10311241.0126 Site: New Con Yard

Logged By: SV Reviewed By: TB/05

Drilling Contractor: MWH

Drill Rig Type/Method: Trowel

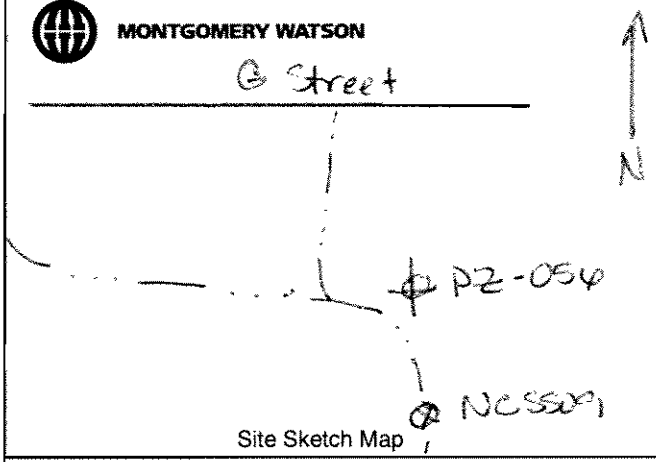
Drillers Name: Ramon Roman

Borehole Diam./Drill Bit Type: 3" Total Depth 0.5

Ref. Elev. —

Sampler Type: Trowel

Site Sketch Map



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

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

Depth to other Water Bearing Zones: —

Drill Start Time/Date: 1405 Drill Finish Time/Date: 1415

Well Completion Time/Date: —

Soil Boring Backfill Time/Date: 1405 4/13/06

PID/OVA	Sample Interval	Recovered (in.)	Blow Counts / 6 in.	Retained for Analysis	Casing Type & Size	Annulus Filler	Depth (Feet)	USCS Soil Type	Soil Description	Estimated % Of Gravel	Sand Coarse	Sand Medium	Sand Fine	Silt/clay
	X	X	NCSS01			@1405			Well graded SAND (SW) dark yellowish brown 10YR4/4, 70% fine sand, 30% medium sand, wet loose, some vegetation, trace gravel, subrounded.		tr	30	70/100	tr
							1		0.5' weathered bedrock					
							2		Poorly-graded SAND (SP), yellowish brown 10YR5/4, fine sand, trace silt, medium dense to hard, wet.					
							3		Total Depth = 0.5' bgs					
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							

QA/QC

APPENDIX A1-3

LABORATORY ANALYTICAL DATA, DATA VALIDATION REPORTS, DATA QUALITY REPORT

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NEW CONCERVATION YARD (SWMU 7.8)
RCRA FACILITY INVESTIGATION REPORT
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

VOLUME III – RFI SITE REPORTS

APPENDIX A1, ATTACHMENT 3

LABORATORY DATA QUALITY

Prepared For:

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LIST OF ACRONYMS AND ABBREVIATIONS

Alta	Alta Analytical
CAS	Columbia Analytical Services
Ceimic	Ceimic Corporation
CEL	Calscience Environmental Laboratory
CI	Chemical Ionization
Del Mar	Del Mar Analytical, Inc.
DTSC	Department of Toxic Substances Control
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
GC/MS	Gas Chromatography/Mass Spectroscopy
MDL	Method Detection Limit
MEC^X	MEC^X, LLC
mg/kg	Milligrams Per Kilogram
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MWH	MWH, Inc.
NCY	New Conservation Yard
ND	Not Detected
NELAP	National Environmental Laboratory Accreditation Program
OCDD	Octachlorodibenzo-p-dioxin
Pace	Pace Analytical
PAH	Polynuclear Aromatic Hydrocarbon
PARCC	Precision, Accuracy, Representativeness, Completeness and Comparability
PCB	Polychlorinated Biphenyl
PPB	Parts Per Billion
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RL	Reporting Limit
SIM	Selective Ion Monitoring
SOP	Standard Operating Procedure
SSFL	Santa Susana Field Laboratory
SVOC	Semivolatile Organic Compound
SWMU	Solid Waste Management Unit
TCDF	Tetrachlorodibenzofuran
TPH	Total Petroluem Hydrocarbons
Triangle	Triangle Laboratory
µg/kg	Micrograms Per Kilogram
µg/L	Micrograms Per Liter
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

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 1A New Conservation Yard (NCY) (SWMU 7.8) prepared by MWH, Inc. (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: dioxins, metals, n-nitrosodimethylamine, polychlorinated biphenyls (PCBs), and polynuclear aromatic hydrocarbon compounds (PAHs). 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 USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (February 1994) and 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 a field blank, equipment rinsates, and field duplicates. 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 included dioxins, metals, n-nitrosodimethylamine, PCBs, and PAHs. The associated data validation reports, annotated laboratory result forms, and data tables are included in this attachment.

According to the established data validation protocols, analytical results were annotated following validation with the following qualifications: "U" (nondetected), "J" (estimated), "UJ" (estimated nondetect), "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 (MS/MSD) 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 spectroscopy (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 NCY 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 NCY 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 AND PRIMARY DATA

The quality of historic and primary data collected from the NCY was reviewed as part of the overall data quality assessment in the RFI Program Report (MWH 2004) and details regarding specific samples and analyses are found therein. The RFI Program Report was not site specific, but a programmatic data review. As such, the quality concerns listed below may or may not affect the NCY site samples. In general, however, the quality of the historical and primary data was acceptable, except as summarized in the sections below.

2.1 HISTORIC DATA

Historical data validated for the RFI consist of samples collected by ICF Kaiser, McLaren/Hart, and Groundwater Resource Consultants, Inc. from 1988 to 1995. These soil samples were analyzed for dioxins, general minerals, metals, PAH, semivolatile organic compounds (SVOC), total petroleum hydrocarbons (TPH), and volatile organic compounds (VOC). As the samples comprising the historical data were collected by other consulting firms, not all QC data were available; however, validation was performed to the extent possible. In no instance did the lack of QC data invalidate the use of the historical data for the RFI.

2.2 PRIMARY DATA

Primary samples were collected for the RFI from 1995 to December 2003. These soil samples were analyzed for dioxins, energetic constituents, general minerals, metals, PAHs, PCBs, SVOCs, TPH, and VOCs. The quality of the primary data was acceptable with the exceptions noted in the sections below.

2.2.1 Ceimic Corporation Certification

Ceimic Corporation (Ceimic) (Narragansett, RI) analyzed almost 2,000 samples in May 1996 and from June 2000 to January 2004. Analyses performed at Ceimic included energetic constituents, general minerals, metals, perchlorate, PCBs, PAHs, SVOCs, VOCs, and TPH. In June 2003, it was determined that Ceimic's California National Environmental Laboratory Accreditation Program (NELAP) certification lapsed due to an administrative oversight. The certification was reestablished upon submission of the application and payment of the accreditation fee. All data from Ceimic was considered to be technically sound, but the results of all analyses performed at Ceimic from July 1, 2002 to July 31, 2003 were qualified as estimated as a conservative measure.

2.2.2 Interference in Soil Metal Analyses

While not all laboratories exhibited soil matrix interference in their metals analyses, most soil analyses were affected by high concentrations of the interfering analytes, specifically iron, aluminum, and vanadium. Antimony was the most consistently affected analyte, however, some other elements were affected.

To account for these interferences, the corrective actions taken resulted in the reporting limits (RLs) of the affected analytes being raised to a concentration equivalent to or greater than the interference in the sample. Detects reported below these levels were qualified as nondetected or as estimated nondetects. Detects reported above these levels were reviewed and their validity were determined on a case-by-case basis. Some detects reported above the raised reporting limits were found to have been affected by interference and were qualified as estimated nondetects.

2.2.2 Columbia Analytical Services Volatile Organic Compound Analyses

Almost 600 samples were analyzed for VOCs by Columbia Analytical Services (CAS) (Canoga Park, CA) from September 1997 to September 1999. Four samples were analyzed at CAS by EPA SW-846 Method 8260. These analyses were validated at QC Level IV and all Method 8260 results were qualified as rejected due to inappropriate manual integration of the calibration data.

The remaining VOCs analyses performed by CAS were analyzed by SW-846 Method 8021. Due to deficiencies in manual integration, the following Department of Toxic Substances Control (DTSC)-approved actions were taken:

- All reported detects were raised by 2× to account for the possible under-reporting.
- The reporting limits for bromoform and chloroform were elevated to 10 micrograms per kilogram (µg/kg), or 10 parts per billion (ppb), and qualified. As the reporting limits for soil sample target compounds were already at levels above the calibration levels affected, most reporting limits were unaffected.
- As the reporting limits for water samples were much lower, the water reporting limits were elevated to the levels equivalent to the soils, 10 micrograms per liter (µg/L), or 10 ppb.
- All target compounds in all samples analyzed by CAS by 8021 were qualified as estimated detects and nondetects.

2.2.3 Dioxin Analyses by EPA Method SW-846 8290

Dioxin data quality was affected by practices at three different laboratories; Alta Analytical (Alta) (El Dorado Hills, CA), Pace Analytical (Pace) (Minneapolis, MN) and Triangle Laboratory (Triangle) (Durham, NC). Alta data with octachlorodibenzo-p-dioxin (OCDD) concentrations that exceeded the linear range of the calibration were qualified as estimated. Alta and Pace detects for 2,3,7,8-TCDF detected below the calibration range were qualified as estimated. Triangle estimated detection limits (EDLs) were not compound-specific for each sample and are not comparable to EDLs generated according to the method and reported by other laboratories.

3.0 QUALITY ASSURANCE FINDINGS FOR THE NEW CONSERVATION YARD GROUP 6 SAMPLES

Soil samples collected as part of the Group 6 sampling effort in the NCY include 14 samples collected for dioxins and metals, and five samples collected for n-nitrosodimethylamine, PAHs, and PCBs. Equipment rinsate samples were collected in association with the dioxins, metals, n-nitrosodimethylamine, and PAHs for Group 6. (As equipment rinsate samples apply to more than one Group 6 site, the equipment rinsate sample may be presented in another Appendix.) A field blank was collected for metals, PCBs and PAHs. (The field blank for Group 6 is presented in Appendix A2, Attachment A2-3.) No field duplicate or field split samples were collected specific to the NCY.

3.1 DIOXINS

Alta analyzed 14 soil samples and one equipment rinsate sample by EPA SW-846 Method 1613 for 19 dioxin and furan compounds. All data are usable as no results were rejected.

Some target compounds were detected in most samples. Other than one OCDD result reported from a dilution, there were no elevated reporting limits. There was no method blank or equipment rinsate qualifications although there were a few compounds reported in the method blanks below the laboratory's lower calibration standard or as estimated maximum possible concentrations (EMPCs). A few target compound results were qualified as estimated detects and nondetects due to ether interferences or because the results were identified as EMPCs. A few 2,3,7,8-TCDF results were qualified as estimated detects as estimated detects as no confirmation

analysis was performed. Unconfirmed detects for 2,3,7,8-TCDF are considered to be over-estimated since the primary analysis is non-specific to this furan isomer.

3.2 METALS

Del Mar Analytical, Inc. (Del Mar) (Irvine, CA) analyzed seven soil samples, a field blank and equipment rinsate samples by EPA SW-846 Methods 6010B, 6020, 7470, and 7471 for 19 metal analytes, three samples were analyzed by 6020 for lead only, and four samples were analyzed by 6020 for silver only. All data are useable except for seven antimony results rejected due to low MS/MSD recoveries.

Most metal analytes were detected in most of the samples and no results were reported with elevated method detection limits (MDLs) or RLs. Most barium, nickel, molybdenum, chromium, copper, vanadium, and zinc results were qualified as estimated detects and nondetects due to low MS/MSD recoveries. Some metals were detected in the associated method blanks. Most boron and molybdenum detects and a few mercury and silver detects were qualified as estimated nondetects due to method blank contamination. Additionally, most copper, nickel, and zinc detects and a few cadmium and lead detects were qualified as estimated detects due to equipment rinsate contamination. During the review of the raw data, the validator noted that the laboratory incorrectly reported one lead result at 10 milligrams per kilogram (mg/kg). The reviewer corrected the result on the sample result form to match the result in the raw data, 11 mg/kg.

3.3 N-NITROSODIMETHYLAMINE

Del Mar analyzed five soil samples and one equipment rinsate sample by EPA 1625C-Chemical Ionization (CI) for n-nitrosodimethylamine. All data are usable as no results were rejected.

N-Nitrosodimethylamine was reported as nondetected in all of the samples. The laboratory diluted four samples prior to analysis due to the dark color of the sample extracts. The data validator reviewed the raw data for the samples and noted no sign of interference, but did determine that the dilution factors were incorrectly reported. The dilution factors, RLs, and MDLs were subsequently corrected on the sample result form. The largest dilution applied was 2.3×. N-Nitrosodimethylamine was qualified as an estimated nondetect in the equipment rinsate

sample due to a detect in the associated method blank. Consequently, there were no equipment rinsate qualifications.

3.4 POLYCHLORINATED BIPHENYLS

Del Mar analyzed five soil samples, field blank and equipment rinsates by EPA SW-846 Method 8082 for seven Aroclors. All results are useable except for six nondetected results in one sample which were rejected due to an exceeded extraction holding time.

Only one detect, for Aroclor 1254, was reported in the samples and this detect was qualified as estimated due to an exceeded extraction holding time. Four samples were reported from 4× dilutions due to the presence of non-target compounds in the sample matrix. There were no method blank, field blank or equipment rinsate qualifications as there were no detects in the associated method blank, field blank or equipment rinsates.

3.5 POLYNUCLEAR AROMATIC COMPOUNDS

Del Mar subcontracted the PAH analyses to Calscience Environmental Laboratories (CEL) (Garden Grove, CA). CEL analyzed five soil samples, field blank and equipment rinsates by EPA SW-846 Method 8270C Select Ion Monitoring (SIM) for 18 PAH compounds. All data are useable as no data were rejected.

Some target compounds were detected in the samples. No results were reported at raised RLs. There were no method blank, field blank or equipment rinsate qualifications as there were no detects in the associated method blank, field blank or equipment rinsates.

4.0 REFERENCES

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